D4.3 SPECIALISED IMPACT ASSESSMENT & RECOMMENDATIONS

Revision: V1.0

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Abstract	The "SPECIALISED Impact Assessment & Recommendations" report evaluates the impact of 8 educational projects funded under the DIGITAL-2021-SKILLS-01-SPECIALISED initiative of the Digital Europe Programme. These projects aim to enhance Advanced Digital Skills across Europe by offering specialised training in fields such as AI, cybersecurity, and digital health. The report outlines the Impact Assessment Framework developed by LEADS, identifies key challenges, including accreditation and financial sustainability, and provides recommendations for future initiatives and policymakers to enhance the impact of similar funded actions.
Keywords	Advanced Digital Skills, SPECIALISED projects, impact assessment, training digital specialists, industry competitiveness

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NATURE OF THE DELIVERABLE:	Report (R)	
DISSEMINATION LEVEL		
PU	Public, fully open, e.g. web	x
SEN	Sensitive, limited under the conditions of the Grant Agreement	
Classified R-UE/ EU-R	EU RESTRICTED under the Commission Decision No2015/ 444	
Classified C-UE/ EU-C	EU CONFIDENTIAL under the Commission Decision No2015/ 444	
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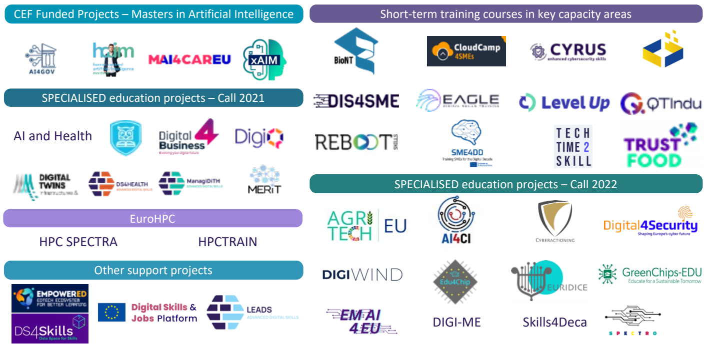
EXECUTIVE SUMMARY

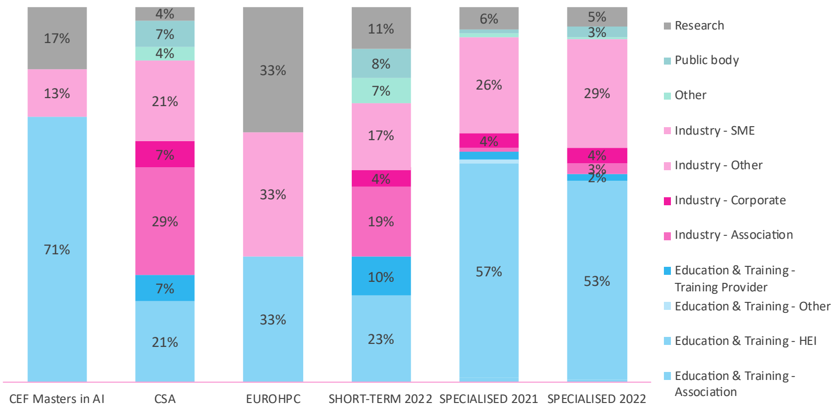
The "SPECIALISED Impact Assessment & Recommendations" report focuses on the evaluation of 8 educational projects (SPECIALISED 2021) funded under the DIGITAL-2021-SKILLS-01-SPECIALISED call of the Digital Europe Programme (DIGITAL). After setting the context within which the projects have been developed, deployed and analysed, particularly the Strategic Objective 4 (SO4) of the DIGITAL programme, the report covers the following sections:



Mapping and analysis of the SO4 ADS Cluster

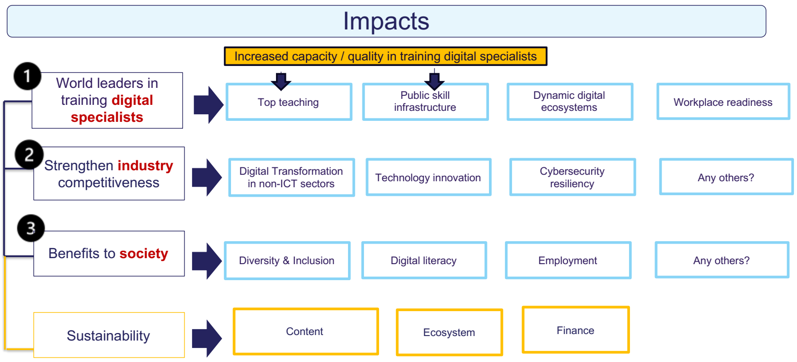
The report presents an overview of the SO4 ADS Cluster to which the SPECIALISED 2021 belong and offers a detailed breakdown of:

- Cluster actions by:
  - The specific open call under which they were funded.
  - Common themes (e.g. Digital health, manufacturing, public administration etc.)
  - Key technology areas they address (e.g. AI, cybersecurity, data and analytics etc.)
  - The formats of programmes that emerged through these actions (e.g. Academic master's degrees, executive master's degrees, short-term training courses etc.)
- Cluster participant organisations by:
  - Their area of operation (e.g. Education and training, research, industry etc.)
  - Type (e.g. Higher Education Institution (HEI), training provider, SME, association etc.)
  - Geographical distribution



Impact Assessment Framework for the SPECIALISED 2021

The report details the stages of impact definition and monitoring across the SPECIALISED 2021. The projects have made significant strides in enhancing Advanced Digital Skills (ADS) across different themes, domains and technology areas. The application of the Impact Assessment has revealed varied levels of impact readiness among the projects, highlighting a robust engagement in some areas while identifying gaps in others.



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Barriers and challenges to overcome

The assessment concludes that while the projects demonstrate a potential for high impact, their effectiveness is often tempered by systemic and operational challenges. These include:

- Achieving accreditation across different national frameworks.
- Coping with the inherent misalignment of different departments and teams within organisations, particularly HEIs.
- Ensuring the relevance of content and meeting the market demand for ADS.
- Establishing sustained financial models to ensure longevity and scalability.
- Securing the participation of SMEs in developing the study programmes.

In short, the analysis of the SO4 ADS Cluster and the SPECIALISED 2021 reveals a large variety among the funded actions. The scope of the Cluster was found to be rather horizontal in terms of the themes and application domains it covers. The ADS promoted through the actions are also rather dispersed across different technology areas. Moving forward, the funded actions should align with market needs and the areas where the market provides supply.

When it comes to measuring the impact generated in the SO4 ADS Cluster, limited results have been provided to date, due to the maturity level of the funded actions. Planning beyond the duration of the project lifetime has not been common practice among the SPECIALISED 2021, as the first cohort in this type of action. That said, it is critical for future projects and programmes to focus on sustainability since their early stages of development, drawing from existing reports, consultations and publication provided across the cluster.

Recommendations

The SO4 ADS Cluster actions have been tasked with the challenge to support Europe's Digital Decade objectives, in particular the creation of 20 million ICT specialists by 2030. Their contribution in this directions lies mainly within promoting the dissemination and exchange of knowledge, encouraging cross-organisational and cross border collaboration of ADS experts and stakeholders and facilitating the involvement of SMEs in cultivating ADS.

To this end, the "SPECIALISED Impact Assessment & Recommendations" report provides several high-level recommendations for the European Commission and HaDEA to maximise the impact of similar existing and upcoming actions. These are centred around three main pillars:

- **Promoting the value of the DIGITAL programme**
    - The DIGITAL SO4 ADS Cluster should be a seal of excellence and prestige.
    - Quality is core to the success and only excellence accepted.
    - Actions should define at proposal stage their target profiles and learning pathways or at minimum the target learners.
    - Consortia and actions need to be afforded flexibility and adaptability.
    - Ensure accreditation readiness from the outset.
    - The validation of skills is a major requirement of industry, but the qualification is important to the individual.
    - Industrial collaboration is extremely important especially with leading tech providers, but companies also need to be supported as a beneficiary not a buyer.
    - SMEs in consortia must have a strategic role.
- **Leveraging wholescale investments and infrastructures**

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  - The DIGITAL funding should be strategic in frontier digital economy development.
  - Embrace a strategic shift towards building upon existing initiatives.
  - Form smaller consortia to reduce administrative burdens.
  - Foster the sharing of data and knowledge through central hubs and trusted sharing platforms.

- **Embedding sustainability into actions**
  - Adopt a more comprehensive and coordinated approach towards impact assessments.
  - Provide a list of minimum impact indicators (or metrics) common to all projects.
  - Actions should have a designated impact officer from the start.
  - More periodic assessments (at least once a semester) are needed.
  - Actions should be encouraged to also benchmark best practices being developed by other initiatives across the world.

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ABBREVIATIONS

ADS	Advanced Digital Skills
AI	Artificial Intelligence
AI and Health	Advanced Digital Skills Programme Artificial Intelligence and Health
CEF	Connecting Europe Facility programme
CEF Masters in AI	CEF-TELECOM Masters in AI
CoVE	Centres of Vocational Excellence
CSA	Coordination and Support Action
CyberSecPro	Collaborative, Multi-modal and Agile Professional Cybersecurity Training Programme for A Skilled Workforce in the European Digital Single Market and Industries
DIGITAL	Digital Europe Programme
DIGITAL4BUSINESS	Master's Programme focused on the practical application of Advanced Digital Skills within European Companies
DIGITWIN4CIUE	Digital Twins for Complex Infrastructures and Urban Ecosystems
DigiQ	DigiQ: Digitally Enhanced European Quantum Technology Master
DSJP	Digital Skills and Jobs Platform
DS4HEALTH	Digital skills for Healthcare Transformation
DS4Skills	Digital Space for Skills
EC	European Commission
EuroHPC JU	European High Performance Computing Joint Undertaking
HaDEA	Health and Digital Executive Agency
HEI	Higher Education Institution
HPC	High Performance Computing
ICT	Information Computer Technology
KPI	Key Performance Indicator
LEADS	Leading Europe's Advanced Digital Skills
ManagiDiTH	Master of Managing Digital Transformation in the Health Sector
MERIT	Master of Science in Smart, Secure and Interconnected Systems
ML	Machine Learning
SHORT-TERM 2022	DIGITAL-2022-TRAINING-02-SHORT-COURSES
SO4	Strategic Objective 4 of the DIGITAL Programme
SPECIALISED 2021	DIGITAL-2021-SKILLS-01-SPECIALISED
SPECIALISED 2022	DIGITAL-2022-SKILLS-03-SPECIALISED-EDU
STEM	Science, Technology, Engineering and Mathematics
WP	Work Package

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1 INTRODUCTION

1.1 Context

The DIGITAL programme was conceived with the aim of empowering citizens with ADS and preparing them to tackle current societal challenges. In particular, it calls out the following objectives:

- Boost excellence and capacity of training for digital specialists in the region.
- Develop dynamic digital ecosystems that attract and retain top global talent, and drive innovation and digital breakthrough.

The DIGITAL programme is set to invest, through specialised education programmes and other actions, €121M for actions on Advanced Digital Skills (ADS) in key capacity areas within the 2021- 2027 period. The aim is to enhance the competency of Advanced Digital Skills (ADS), one of its priority areas, by developing master's programmes, short-term training courses and a training academy. LEADS is set to provide a roadmap to effectively direct that investment. Having previously defined the current and predicted demand of key ADS, LEADS is assessing how to best deliver such skills.

Under the Specific Objective 4 - Advanced Digital Skills (SO4) of the DIGITAL programme an extensive portfolio of actions has been established. Part of it is a collection of twenty SPECIALISED projects funded through two separate calls. This report will present an impact assessment conducted on the eight DIGITAL-2021-SKILLS-01-SPECIALISED projects (hereby SPECIALISED 2021) that were awarded through the first open call.[1]

1.2 Purpose of this document

This report provides an Impact Assessment Framework for the SPECIALISED 2021, aiming to evaluate their effectiveness in enhancing ADS across Europe through specialised training in critical domains and technology areas. Integral to this evaluation is the analysis of the wider SO4 ADS Cluster, and a detailed examination of how these projects align with the broader objectives of the DIGITAL programme. The document further outlines the challenges faced by these projects, including accreditation and financial sustainability, and offers actionable recommendations for enhancing the effectiveness and longevity of future digital skill initiatives. This report serves as a critical resource for stakeholders involved in digital education, providing insights that will guide the improvement of project design, execution, and policy formulation to maximise the impact of the European Commission's investments in digital education.

1.3 Target audience

- **SPECIALISED projects:** Representatives from the projects can reflect on their progress in terms of impact generation, monitoring and assessment, taking into account the insights extracted about their counterparts. They can also consider tailored recommendations and best practice that are expected to maximise their projects' impacts moving forward. In particular, the newly awarded projects under DIGITAL-2022-SKILLS-03-SPECIALISED-

[1] https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/digital-2021-skills-01-specialised;callCode=null;freeTextSearchKeyword=digital-2021-skills;matchWholeText=true;typeCodes=0,1,2,8;statusCodes=31094501,3109450

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ED can gain valuable insight into how to incorporate impact management in their activities from an early stage.
- **Education and Training providers:** The proposed Impact Assessment Framework can be adapted to the needs of educational programmes, beyond the SPECIALISED, acting as a valuable tool for measuring success through their lifecycle.
- **European Commission and Health and Digital Executive Agency (HaDEA):** The report provides clear and actionable recommendations to the EC and HaDEA regarding both the design of open calls for similar study programmes, but also the funding and management of actions related to ADS objectives under the DIGITAL programme.

1.4 Relation to other project deliverables

While the SPECIALISED projects are generally advanced educational courses such as master's programmes and other HEI-driven initiatives focused on bridging knowledge gaps between ICT and other sectors (such as healthcare and manufacturing), they corroborate some of the key general recommendations from LEADS, and, therefore, may be relevant initiatives for the mitigation of ADS in Europe. Other relevant content and/or recommendations generated in the context of LEADS can be found in the following:

Deliverables:

- D1.3 Final ADS demand and forecast report
- D2.1 Programme and course analysis and mapping
- D2.2 Gap analysis
- D4.1 Topic Group report

Publications[2]:

- Best Practices for Aligning Higher Education Curricula to ADS Dynamic Demand
- Empowering Tomorrow's Workforce Bridging the Digital Skills Gap through Higher Education
- Advanced Digital Skills: Meeting the Education and Training Challenges
- Digital Europe Programme Advanced Digital Skills. Supporting the success of the DIGITAL Programme

1.5 About LEADS

Leading Europe's Advanced Digital Skills (LEADS) is the Coordination and Support Action funded under call DIGITAL-2021-SKILLS-01-ANALYSIS. LEADS, in the context of the Digital Europe Programme, aims to deliver insights into the changing Advanced Digital Skills (ADS) demands within a dynamic technological development context and current digital transformation to equip the education and training communities by providing roadmaps and guidelines.

Since the commencement of its contract, LEADS has interacted with the SPECIALISED 2021 on a regular basis, setting up thematic Topic Groups (TGs), including one on impact assessment. Through the TG meetings, LEADS has followed the development of the projects from an early stage, observing challenges faced and best practices applied across different areas. These insights are brought together in this report to allow for examining the efforts of the projects around impact assessment in context.

[2] https://advancedskills.eu/publications/

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2 MAPPING AND ANALYSIS OF THE SO4 ADS CLUSTER

2.1 DIGITAL programme

The Digital Europe Programme (DIGITAL) (2021-2027) is an EU funding programme focused on bringing digital technology to businesses, citizens and public administrations. It provides strategic funding to answer these challenges, supporting projects in key capacity areas such as: supercomputing, artificial intelligence, cybersecurity, Advanced Digital Skills, and ensuring a wide use of digital technologies across the economy and society. With an overall budget of over €7.9B, DIGITAL aims to shape the digital transformation of Europe's society & economy.

The general objective of the DIGITAL programme is stated as: "*improving the competitiveness of Europe in the global digital economy while contributing to bridging the digital divide across the EU and reinforcing the EU's strategic autonomy, through holistic, cross-sectoral and cross-border support and a stronger EU contribution.*"[3]

In particular, the actions funded under the programme should: "*address market failures or sub-optimal investment situations, in a proportionate manner, without duplicating or crowding out private financing, and should provide clear European added value.*"[4]

The Programme also has five interrelated specific objectives:

- Specific Objective 1 – High Performance Computing
- Specific Objective 2 – Artificial Intelligence
- Specific Objective 3 – Cybersecurity and Trust
- Specific Objective 4 – Advanced Digital Skills
- Specific Objective 5 – Deployment & Best Use of Digital Capacity & Interoperability

These align particularly with the EU's digital ambitions for 2030, as outlined in the Digital Compass developed under the Digital Decade Policy Programme (Digital Decade). LEADS and the SPECIALISED projects contribute primarily towards Strategic Objective 4 (SO4) of the Digital Decade, in relation to skills:

"Advanced Digital Skills shall support the development of Advanced Digital Skills in areas covered by the Programme in order to contribute to increasing Europe's talent pool, bridge the digital divide and foster greater professionalism, especially with regard to high performance and cloud computing, big data analytics, cybersecurity, distributed ledger technologies, quantum technologies, robotics, artificial intelligence, while taking gender balance into account."[5]

2.2 Funded projects

The mechanisms that were foreseen at the establishment of the DIGITAL included:

- Supporting the design and delivery of high-quality, long-term training and courses, including blended learning, for students and for the workforce.
- Supporting the design and delivery of high-quality, short-term training and courses for the workforce, in particular in SMEs and in the public sector.

[3] REGULATION (EU) 2021/694
[4] https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52020PC0403&from=EN
[5] https://eur-lex.europa.eu/eli/dec/2022/2481/oj

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- Supporting high-quality on-the-job training and work placements for students, including traineeships, and the workforce, in particular in SMEs and in the public sector.

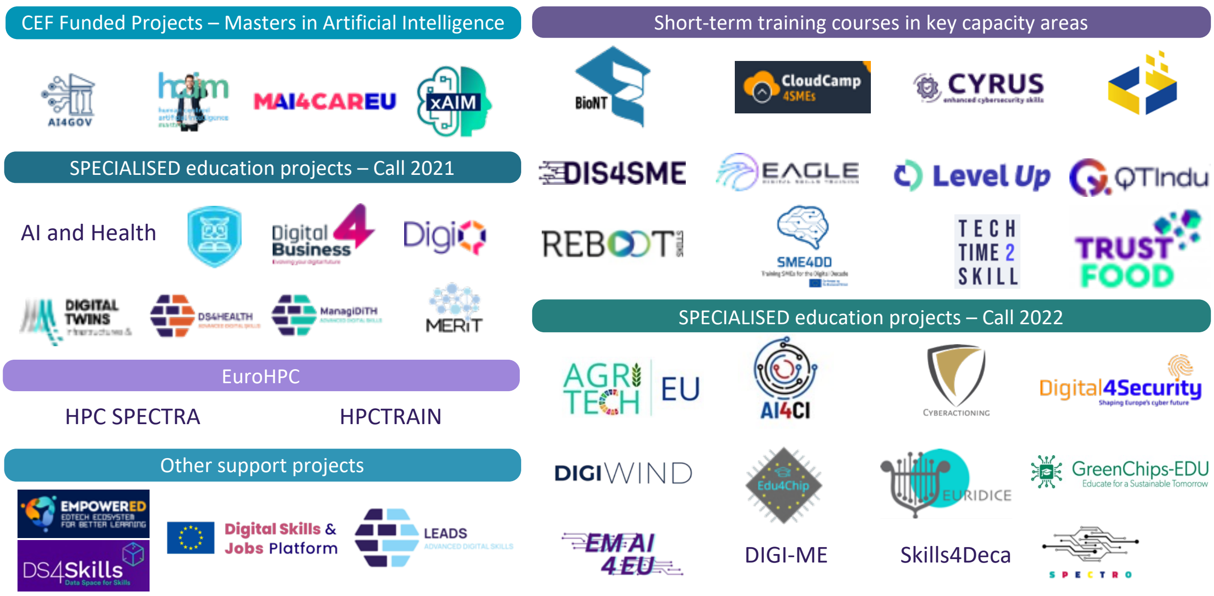
Over the past two Work Programmes this has translated into:

- 24 Tertiary degree education programme design and delivery projects
- 12 Short-term training course design and delivery projects
- 2 Training platform development projects
- 4 Coordination and Support Actions

Specifically, within the defined ADS Cluster, a total of 42 actions are identified across the following calls:

- **DIGITAL-2021-SKILLS-01-SPECIALISED (SPECIALISED 2021):** 2022-2026 – 8 Projects – EU funding €56.5M [Total €103M][6]
- **DIGITAL-2022-SKILLS-03-SPECIALISED-EDU (SPECIALISED 2022):** 2023-2027 – 12 Projects - EU funding €78.2M [Total €125.5M]
- **DIGITAL-2022-TRAINING-02-SHORT-COURSES (SHORT-TERM 2022):** 2022-2025 – 12 Projects – EU funding €24.3M [Total €40.5M]
- **CEF-TELECOM Masters in AI (CEF Masters in AI):** 2020-2024 – 4 Projects – EU funding €6.5M [Total €8.7M][7]

Figure 1. Overview of SO4 ADS Cluster.



The SO4 cluster actions are at varied stages, where some projects have well-established educational programmes and courses in ADS, while others are at the designing or launching stages. Specifically, having commenced before the other projects, the CEF Masters in AI have already delivered two rounds of courses and are complete or nearing completion. Likewise, the SPECIALISED 2021 have completed their content design and development, with some

[6] These numbers account for the total EU-funding requested and the total investment including co-funding from other sources and private investment. The DIGITAL-2021-SKILLS-01-SPECIALISED and DIGITAL-2022-SKILLS-03-SPECIALISED-EDU had a funding rate of 50%. The DIGITAL-2022-TRAINING-02-SHORT-COURSES had a funding rate of 50% and 75% for SMEs. The CEF-TELECOM-Masters in AI had a funding rate of 75%.

[7] The CEF-TELECOM-Masters in AI are at the end of their delivery but are still an active part of the SO4 ADS cluster as of the release of this report.

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already entering their second academic year in autumn 2024 and the SHORT-TERM Training are in delivery phase.

The cluster is expected to be enhanced with at least 19 new projects awarded through the 2023 and 2024 calls:

- Second set of calls with a common deadline in 2023:
    - **DIGITAL-2023-SKILLS-05-CYBERACADEMY:** A European umbrella action integrating various activities in the area of cybersecurity with the objective of increasing their visibility, accessibility and impact. **(3)**
    - **DIGITAL-2023-SKILLS-05-SPECIALEDU:** This action will support the design and delivery of higher education programme(s) and self-standing modules. **(3)**
    - **DIGITAL-2023-SKILLS-05-SPECIAL-PROGEDU (CSA):** This action will deliver insights into the changing ADS demands in the EU and the existing education and training offer. **(1)**
- Third set of calls with a common deadline in 2024:
    - **DIGITAL-2024-ADVANCED-SKILLS-06-WOMEN (CSA):** This action will enhance girls and women's involvement in ICT, hence advancing on the DDPP target of employing 20 million ICT specialists in EU by 2030 and the 'Women in Digital Declaration' goal of equality in tech. **(1)**
- Further set of calls with a common deadline in 2024:
    - **Specialised Education Programmes in Key Capacity Areas:** A minimum of **11** projects, including at least one high-scoring proposal for each of the following (i) areas: virtual worlds, edge computing, quantum computing, photonics, robotics, automatisation and (ii) sectors: agriculture, transport, renewable energy, waste management, and ADS for government and public sector.

2.3 Related DIGITAL actions within SO4

Other relevant initiatives supported and funded by the DIGITAL programme are listed below. More information on each can be found in the DIGITAL work programmes[8] and Annex 3.

- Digital Skills and Jobs Platform (DSJP)[9]
    - The Digital Skills and Jobs Platform contributes to the Digital Europe Policy Programme and aims to support the closing of the Advanced Digital Skills gap and the reaching of the Digital Decade targets. To achieve this, the Platform provides a single point of information related to Advanced Digital Skills in Europe. At EU level, the Platform gathers all relevant information and funding opportunities for stakeholders to benefit from. It also provides access to an EU-funded self-assessment test in which users can evaluate their Advanced Digital Skills and receive training/learning recommendations. The Platform also provisionally hosts the Cyber Security Skills Academy. At national level, as a result of Connecting European Facility (CEF) calls in 2019 and 2020, connections to 22 National Coalition websites are being established. These national websites are connected to the core Digital Skills and Jobs

[8] https://digital-strategy.ec.europa.eu/en/activities/work-programmes-digital
[9] https://digital-skills-jobs.europa.eu/en

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Platform, establishing a mutually enriching exchange with relevant content and data on Advanced Digital Skills and jobs at EU and national level.

- Cybersecurity Skills Academy
  - The activities that could be funded under this Topic are (i) training programmes for SMEs, start-ups and the public sector and (ii) support operations.
  - The Academy will be a European umbrella integrating various ongoing activities that address cybersecurity challenges, with the objective of increasing their visibility, accessibility and impact. These activities will align along common goals, key performance indicators and a joined-up communication strategy to seek greater impact.
- Data Space for Skills (DS4Skills)
  - Data is at the core of skills, education, training and employment, offering enormous potential for innovative applications. The objective of this call is to develop and deploy a secure and trusted European Common Data Space for sharing and accessing skills data for various purposes, from analytical and statistical purposes to policy development or re-use in innovative applications in line with European values.
  - The awarded proposal will integrate, test and deploy the data space for skills, based on existing technical building blocks and on the concept and design elaborated in the framework of the preparatory action on data space for skills.
- EmpowerED[10]
  - Running from 2023 to 2025, the project is financed by the European Commission and coordinated by European Schoolnet (EUN). It aims to establish a pan-European network and platform for exchange between European EdTech initiatives (start-ups, SMEs), EdTech support organisations (incubators, accelerators, testbeds, investors), practitioners (teachers and educationalists in K12 schools, H.E., VET), and policymakers (government ministries/agencies involved in educational innovation) as well as other key actors such as universities, researchers, NGOs and associations.
- European High Performance Computing Joint Undertaking (EuroHPC JU)[11]
  - The EuroHPC JU is a legal and funding entity composed of public and private members, created in 2018 and located in Luxembourg to lead the way in European supercomputing.
  - HPC SPECTRA is a relevant project of the EuroHPC JU, aiming at improving the EuroHPC JU's training strategy by (i) developing an innovative EuroHPC Training Platform and (ii) co-organising the 2024 and 2025 HPC Summer School (IHPCSS).
  - "EUMaster4HPC is a master's programme composed of European universities, research/supercomputing centres and industrial partners aiming to define a joint curriculum in HPC across Europe, defining the body of knowledge to master the HPC field and creating a collaborative European ecosystem in HPC."[12]

[10] https://www.empowerededtech.eu/
[11] https://eurohpc-ju.europa.eu/index_en
[12] https://eurohpc-ju.europa.eu/research-innovation/our-projects/eumaster4hpc_en

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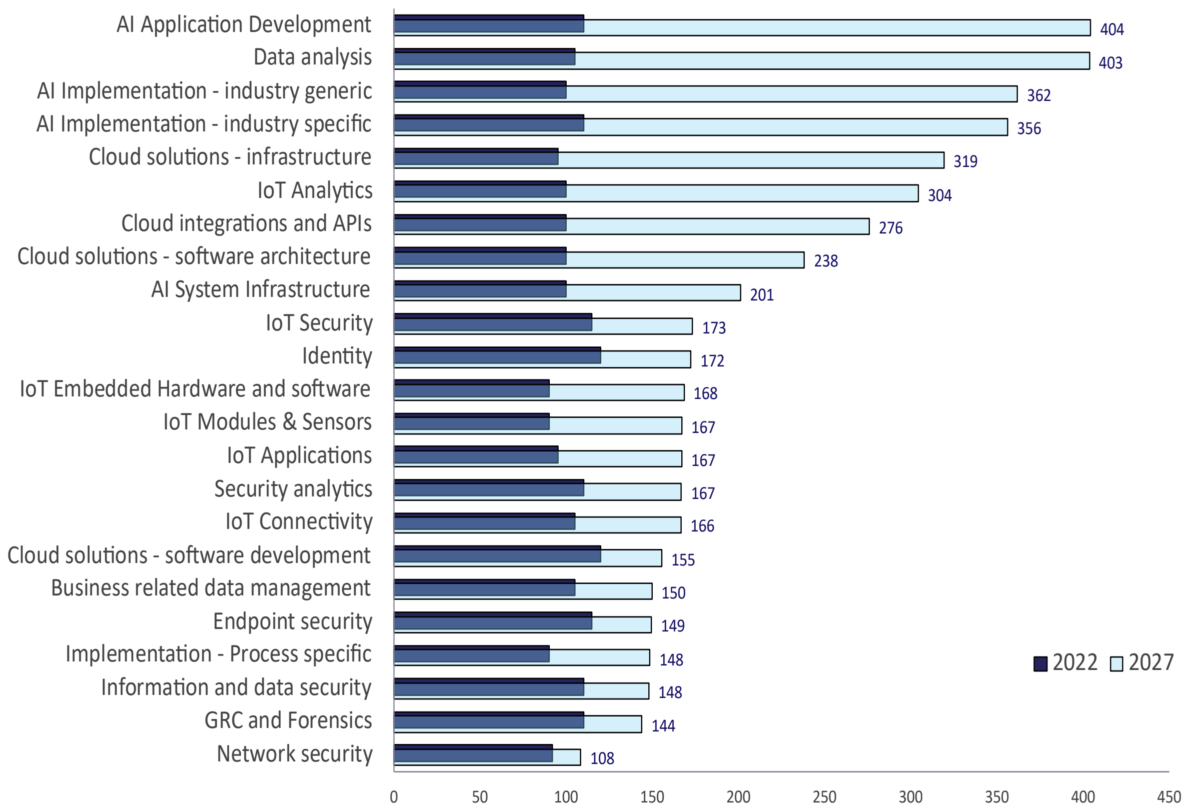
2.4 Identified demand and context for assessment

Given technology advancement and the subsequent accelerated digital transformation of industries, organisations, the embracing of these trends to remain competitive and improve their operational efficiency is a must. This partiularly pertains to the adoption of digital tools and skills, such as the adoption of cloud computing, implementing data analytics and AI solutions, digitising process, and enhancing online customer experiences. Drawing on the LEADS CSA's mandate to provide a roadmap to effectively direct investments, the project assessed the ADS demand in current and future markets. Over 150 use cases on industry resource focus areas for development were identified. Hereby, the development of AI, IoT, Cybersecurity, Business Intelligence/Data Science, Cloud Computing and Quantum markets in software, hardware and services were identified.[13]

Figure 2. Relative demand forecasting for identified skills pockets. (100=demand in 2020)



Through the LEADS Survey it was found that two-thirds of European organizations have already developed in-house Business Intelligence/Data skills, with a quarter planning to continue hiring in this area. This highlights the widespread adoption of data-driven strategies among European businesses. Currently, around 60% of these organisations possess Cloud skills, and about 30% intend to recruit more Cloud experts in the coming years. These statistics are similar for Cyber, which is distinct from the use case tracking made.

From the D2.2 LEADS Gap analysis[14], the chart below shows the current and projected demand (including scenarios) for individuals with skills for the scope technology areas. The LEADS educational supply data below estimates the coverage of advanced skill sets across five technology areas, categorized by training course type: Global VET Courses, Public VET Courses,

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[13] D1.2 FIRST DRAFT OF ADS DEMAND AND FORECAST REPORT (2023). Zenodo. doi: 10.5281/zenodo.8384388.
[14] D2.2 LEADS GAP ANALYSIS. (2024). Zenodo. https://doi.org/10.5281/zenodo.12606216

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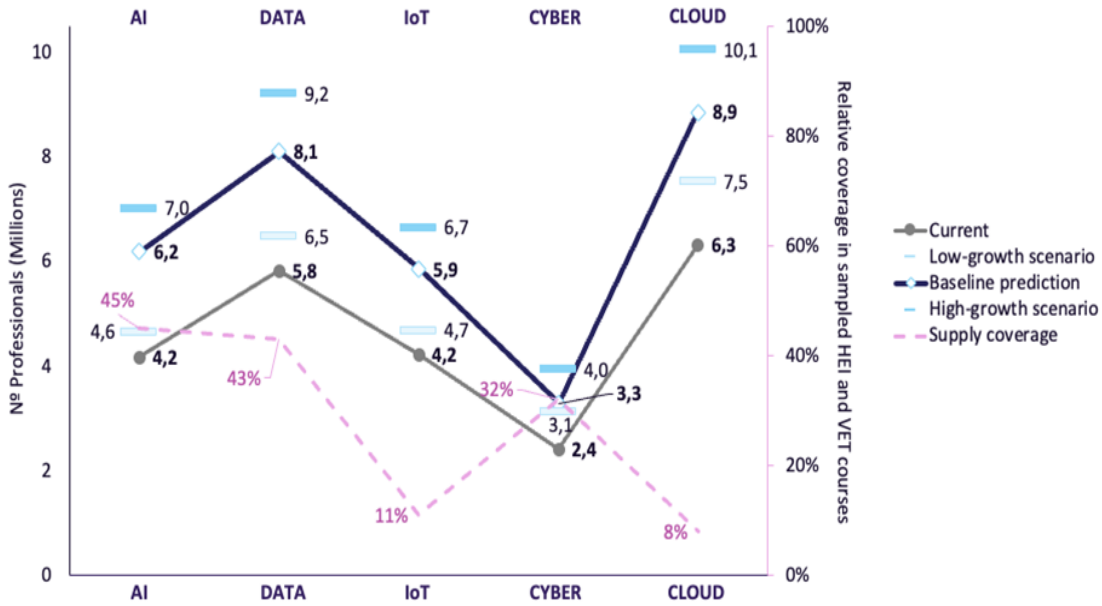
and Higher Education (HEI) programs (PhD and Master programmes). It is apparent that the demand for cyber is more closely matched to supply (principally through VET and training courses),while Data, IoT and Cloud are further separated. It must be noted that for Cloud and IoT, the training often occurs outside the scope of HEI and within digital ecosystems e.g. AWS Certification, which were limited in the collection of supply.

Figure 3: Mapping of demand and supply across 5 key skills areas



2.5 Principal skills, themes and formats within the SO4 ADS Cluster

2.5.1 Skills pockets and themes

As previously described, the actions within the SO4 ADS Cluster of DIGITAL are highly diverse in their scope of activities, formats and approaches. Based on provided details and published descriptions, the following tables present a mapping of key capacity areas and themes for the SO4 ADS Cluster actions and a further breakdown of key capacity areas and themes by call.[15]

The most common skills pockets covered include AI, Cybersecurity, and Data Analytics, coinciding with the high demand areas identified by the LEADS analysis. For all top skills pockets mapped, there is a notable concentration on themes that are horizontal without defined applications. As can be observed in further tables, this is likely due to the horizontal nature of the SHORT-TERM 2022 cluster of projects; these are tasked with supporting SMEs broadly. It is notable, however, that the SPECIALISED (2021 and 2022) still retain this level of horizontal focus, with an even distribution among other application areas of Cybersecurity, Digital Health, Energy, and Manufacturing.

The skills pockets with the most applications appears to be Robotics and Microelectronics, while from a thematic view, Energy/Sustainability and Infrastructure appear to have the broadest number of skills pockets. In general, however, there is limited clustering to be observed, it is notable that among the top industries relevant to the EU, there is limited specification for Agriculture, Automotive and Professional Services, however, it can be seen

[15] Excluded actions from the mapping are CEF-Masters in AI and EuroHPC due to their narrow focus and the Coordination and Support Actions.

that healthcare and cybersecurity are relatively well served[16], especially given the dedicated set of calls for cybersecurity programmes.

Table 1. Mapping of skills pockets and themes across the ADS SO4 Cluster.[17]

	Agrifood	Cybersecurity	Digital Health	Energy/Sustainability	Infrastructure	Manufacturing	Public Administration	Horizontal	Total
AI & ML		1	3	1	1	2	2	10	**20**
Cloud						1		4	**5**
Cybersecurity		6	1	1	1			8	**17**
Data & Analytics		1	3	1	1			7	**13**
DLTs	1			1				5	**7**
IoT			1		1	1		4	**7**
Microelectronics				1		1			**2**
Quantum								2	**2**
Robotics		1	1		1	1		2	**6**
Other	1		1	1				1	**4**
Total	**2**	**9**	**10**	**6**	**5**	**6**	**2**	**43**	

Among the SPECIALISED 2022, although emphasis is still given on cybersecurity, horizontal themes combined with AI and ML and data analytics are more prevalent. Additionally, the projects of this call touch upon blockchain technologies, as well as manufacturing combined with AI and ML skills. These were not previously addressed by the SPECIALISED 2021.

Table 2. Mapping of skills pockets and themes addressed by SPECIALISED 2021 and SPECIALISED 2022

	Cybersecurity	Digital Health	Energy/sustainability	Infrastructure	Manufacturing	Horizontal	Total
AI & ML		2	1	1	2	5	**11**
DLTs			1			2	**3**
Cloud					1	1	**2**
Cybersecurity	4	1	1	1		4	**11**
Data & analytics	1	1	1	1		3	**7**
IoT		1		1	1	2	**5**
Microelectronics			1		1		**2**
Quantum						1	**1**
Robotics	1	1		1	1		**4**

[16] Cybersecurity: explicitly addressed in the SPECIALISED 2022 (3 projects), SHORT-TERM 2022 (2 projects) and SPECIALISED 2021 (1 project). Digital health: addressed in the SPECIALISED 2021 (3 projects), SHORT-TERM 2022 (1 project) and CEF Masters in AI (1 project).

[17] Note that cybersecurity is considered both a theme and a skills where it is applied skills for organisational security, e.g. Digital4Security.

Other		1	1			1	**3**
Total	**6**	**7**	**6**	**5**	**6**	**19**	

Among the SHORT-TERM 2022, the emphasis on AI and ML, cybersecurity and data and analytics across horizontal themes is even more intense. Blockchain and cloud, followed by IoT and robotics skills for horizontal themes are also rather common. In general, it appears that the short-term courses aim to develop ADS regardless of domain, rather than focusing on specific verticals

Table 3. Mapping of skills pockets and themes across the SHORT-TERM 2022 funded actions

	Agrifood	Cybersecurity	Digital Health	Horizontal	Total
AI & ML		1		4	**5**
DLTs	1			3	**4**
Cloud				3	**3**
Cybersecurity		2		4	**6**
Data & analytics			1	4	**5**
IoT				2	**2**
Quantum				1	**1**
Robotics				2	**2**
Other	1				**1**
Total	**2**	**3**	**1**	**23**	

The most recent Work Programme 2023-2024 and upcoming call for the SPECIALISED Masters has directive guidance for skills and applications areas, with three categories of programmes to be funded: *Type 1: Key digital areas: a. Virtual worlds b. Edge computing c. Quantum computing d. Photonics e. Robotics and automatization; Type 2.1 Acquisition of advanced green digital skills related to specific technologies such as AI, data analytics, extended reality, robotics, cloud computing, internet of things and machine learning in the following specific sectors related to the green transition: f. Agriculture g. Transport h. Renewable energy i. Waste management; Type 2.2: Interdisciplinary programme(s), targeting at the acquisition of Advanced Digital Skills for: j. Government and public sector.* It is likely to provide specific applications and directed skills pockets, including those for edge and XR that have not been addressed to date.[18]

2.5.2 MAPPING OF PARTNERS AND LOCATIONS

ORGANISATIONAL TYPES

For all funded actions, the partner organisations were identified and classified as either BENEFICIARY, i.e. direct grant recipient and responsible for delivery of actions or ASSOCIATED BENEFICIARY, i.e. a linked third party or organisation providing support without direct relationship to the delivery of the actions.

From this, both types of beneficiaries were categories by the principal categories of Education & Training, Research, Industry and Public Bodies that are further classified in a sub-category based on the dataset.

[18] For reference to definition of edge skills see: ON THE EDGE: MARKING THE IMPACT OF THE CEI CONTINUUM ON SKILLS DEMANDS. (2023). Zenodo. https://doi.org/10.5281/zenodo.8384412

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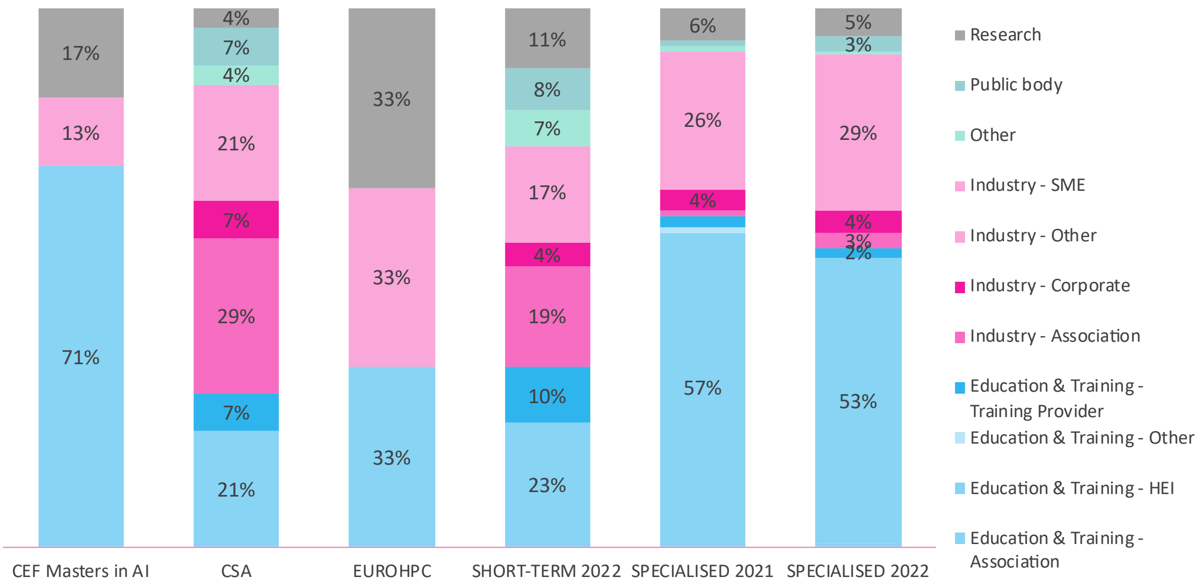
Table 4. Classification of participants in the SO4 ADS Cluster actions by type.

Education & Training	• HEI • Training provider • Association	Public body	• Agency • Cluster • National (Ministry) • Regional (Local Authority)
Industry	• SME • Corporate • Association • Other	Research	• RTO • Other
		Other	• Non-profit • DIH • Association • Other

In comparing the differences between the SPECIALISED calls, there appears to be a greater participation of industry in the SPECIALISED 2022 compared to the first round of calls, however, the participation of industry is more notable in the SHORT-TERM 2022. Research organisations, principally RTOs and centres of excellence, are the minority for most of the ADS SO4 Clusters. SMEs are significant participants from industry across all calls, but there is also a strong participation of industry associations, particularly in the CSAs. It is clear that HEIs remain the dominant beneficiary across the calls with a low uptake from training providers.

Figure 4. Participants of the SO4 ADS Cluster actions by call and organisation type for Beneficiaries only.



Across the whole SO4 ADS Cluster, there are only 4 Digital Innovation Hubs (identified).

Table 5. Participants of the SO4 ADS Cluster actions by call and organisation type (Beneficiaries only).[19]

ORGANISATION CATEGORY	CLUSTER						TOTAL
	SPECIALISED 2021	SPECIALISED 2022	SHORT-TERM 2022	CEF MASTERS IN AI	EUROHPC	CSA	
Education & Training	62	96	39	17	1	8	223
Industry	31	62	48	3	1	16	161
Research	6	9	13	4	1	1	34

[19] Note: distribution includes each beneficiary within each funded action and will include duplicates of the same organisation where they participate in more tan one action.

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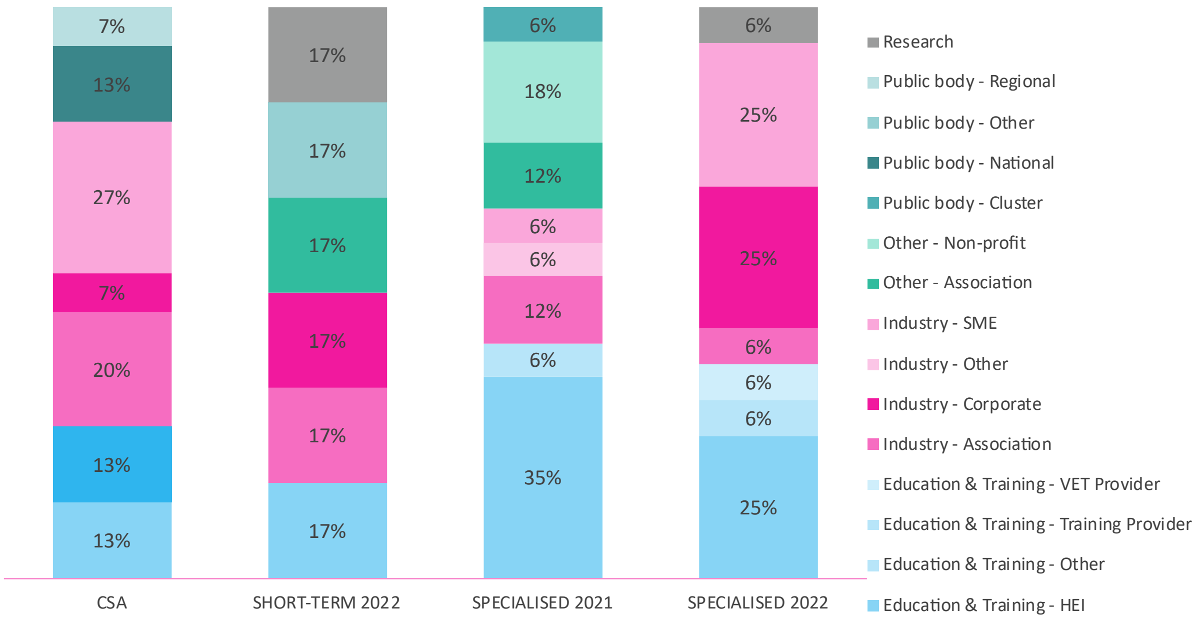
Public body	1	5	9			2	17
Other	1	1	8			1	11
Total	101	173	117	24	3	28	446

In comparison to Beneficiaries, Associated Beneficiaries are more likely to come from industry, public bodies and other categories. It is assumed this is due to their more supportive role, such as that seen for NGOs which represent specific patient groups or regional clusters and support agencies.

Figure 5 Participants of the SO4 ADS Cluster actions by call and organisation type for Associated Beneficiaries only.



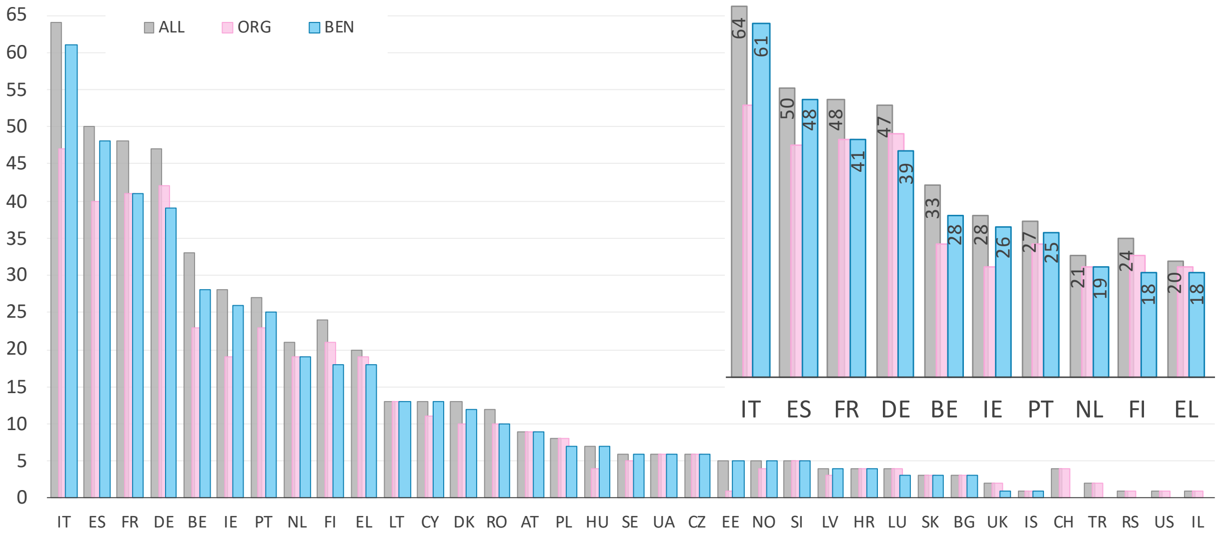
GEOGRAPHICAL DISTRIBUTION

The project partners come from all across the EU-27 Member States, as well as Iceland, Turkey and Ukraine.[20] As seen in the figure below, the countries with the highest representation are Italy, Spain, Germany, France and Ireland, followed by Belgium, Portugal, Netherlands, Greece and Finland in the top 10.

It is worth noting that the participation of EU countries in these calls is not proportionate to their population size reported by Eurostat.[21] For example, Italian (61) and Spanish (48) entities are more represented compared to German (41) and French (39) entities, even though the latter have considerably larger population in the EU. Similarly, Poland and Romania with the fifth and sixth largest population respectively are well behind the top 10 spots. Ireland, Finland and Greece, on the other hand, appear very frequently among the participants, despite their relatively small population.

[20]Iceland participates in the Digital Europe Programme as from 01 January 2021.Turkey participates in the Digital Europe Programme, but only to "Specific Objectives 1, 2, 4 and 5" (agreement signed in August 2023 — applies retroactively from 01 January 2023) Ukraine participates in the Digital Europe Programme, but only to "Specific Objectives 1, 2, 4 and 5" (agreement signed in September 2022 — applies retroactively from 01 January 2021)
[21] https://european-union.europa.eu/principles-countries-history/key-facts-and-figures/life-eu_en

Figure 6. Overview of the location of ADS Cluster partners provided as All Partners (including associated beneficiaries), direct beneficiaries only. Inset provides magnified view of top ten MS.[22]



While the above graph provides the countries in order of listed beneficiaries, when the duplication of individual organisations is removed (pink bars), it can be seen that a greater diversity of participants is present for Germany and France as compared to Spain and Ireland. The table below provides the most successful organisations within the ADS SO4 Cluster to date.

Table 6. List of top organisations as beneficiaries

BENEFICIARY	Actions	MS	Type
TALLINNA TEHNIKAÜLIKOOL	5	EE	HEI
CONSIGLIO NAZIONALE DELLE RICERCHE	5	IT	RTO
UNIVERSIDAD POLITECNICA DE MADRID	4	ES	HEI
ADECCO FORMAZIONE SRL	4	IT	Training Provider
SKILLNET IRELAND COMPANY LIMITED BY GUARANTEE	4	IE	Agency
UNIVERSITA DI PISA	4	IT	HEI
TECHNISCHE UNIVERSITEIT DELFT	3	NL	HEI
SCHUMAN ASSOCIATES SCRL	3	BE	SME
POLITECNICO DI MILANO	3	IT	HEI
EIT DIGITAL	3	BE	Association
BUDAPESTI MUSZAKI ES GAZDASAGTUDOMANYI EGYETEM	3	HU	HEI
UNIVERSITAT AUTONOMA DE BARCELONA	3	ES	HEI
UNIVERSIDADE NOVA DE LISBOA	3	PT	HEI
DANMARKS TEKNISKE UNIVERSITET	3	DK	HEI
UNIVERSITAT POLITECNICA DE CATALUNYA	3	ES	HEI

Countries with lower participation rates do not have the same organisation mix. The smaller a country's participation, the less types of organisations they tend to contribute. As seen in the figure above, countries with 10 or less participating organisations are typically represented only by education and training and a few industry organisations.

[22] Data provided includes all DIGITAL funded actions and CEF-TELECOM-Masters in AI

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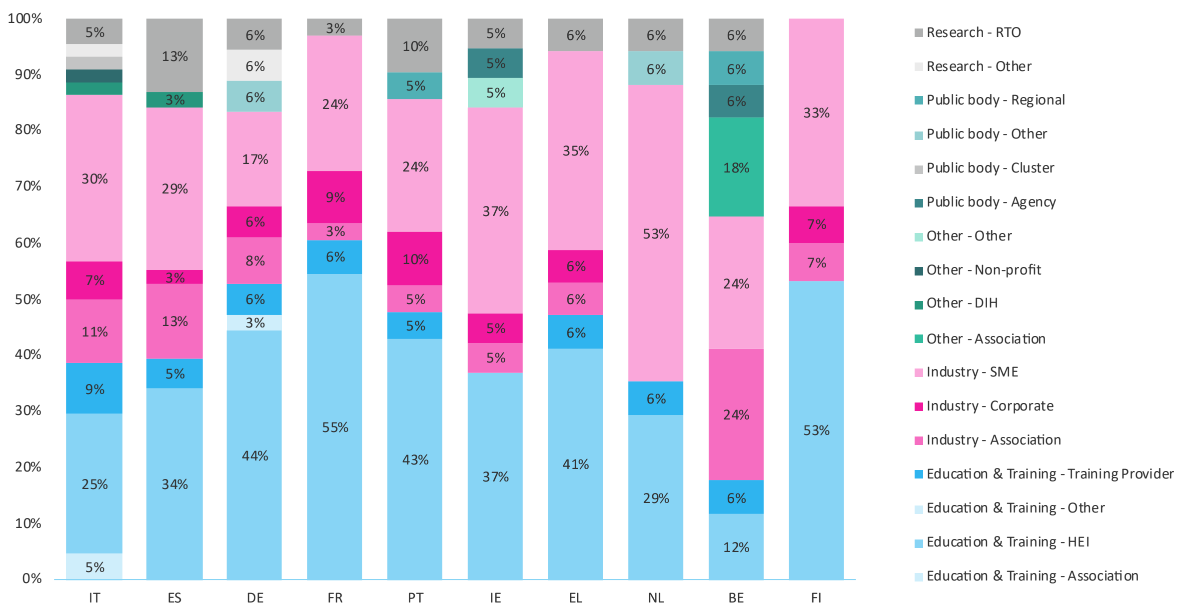
Across the top 10 countries, the majority of participants are from both Education and Training, and Industry (significantly represented by SMEs). Ireland, Belgium, Cyprus and the Netherlands are among few countries where the share of participating organisations from Industry exceeds that of organisations from Education and Training, with the participation of associations significantly higher for Belgium (24%) and relatively high for both Italy and Spain, at 13% and 11% respectively.

Figure 7. Mapping of the participants from the top ten MS by type.



2.5.3 Overview of Formats

Having established an overview of the programmes within the SO4 cluster, it is important to also consider their various formats. The cluster includes:

- Academic master's degrees with ECTS
  - Dual master's degrees: award from each institution
  - Joint master's degrees: single award from collective institutions
- Executive (professional) master's degrees: targeted at labour force, delivered without ECTS based on the certificate issued by a single or multiple institutions.
- Master's modules: to be integrated in existing master's programmes (ECTS available).
- Massive open online courses (MOOCs) (without ECTS).
- Short-term courses (professional certification or micro-credential based)
  - Professional training.
  - Stand-alone modules.
  - Life-long learning modules.

Programme formats per type

- **CEF-TELECOM Masters in AI:** Academic and professional master's degrees.
- **DIGITAL-2022-TRAINING-02-SHORT-COURSES:** Short-term courses
- **EuroHPC:** Dual master's degree.
- **DIGITAL-2022-SKILLS-03-SPECIALISED-EDU:** The currently in development programmes are expected to include bachelor's and master's degrees, executive master's degrees, MOOCs and self-standing modules.

- **DIGITAL-2021-SKILLS-01-SPECIALISED**:

Table 7. SPECIALISED 2021 formats.

PROJECT	FORMAT	EQF	ECTS
AI and Health	Joint master's (double) degree	7	120
CyberSecPro	Short-term courses; MOOC (+certification scheme)	-	-
DigiQ	Individual modules; project certificate	7	Min. 30 ECTS to obtain certificate
DIGITAL4BUSINESS	Master's degree (fully accredited and industry certified)	7	60 / 90 / 120
DIGITWIN4CIUE	Executive master's degree	7	60
DS4HEALTH	Master's degree	7	90 / 120
ManagiDiTH	Joint master's degree	7	90
MERIT	Master's degree; short-term courses	7	90

3 An Impact Assessment Framework for DIGITAL ADS

3.1 Introduction

The scope of impact assessment has been limited to the funded actions SPECIALISED 2021 as the core portfolio of actions coordinated by LEADS. These 8 actions formed the first cohort of actions funded under the SO4 within the DIGITAL Programme. Specifically, this portfolio includes:

- **AI and Health** (Artificial Intelligence and Health)
- **CyberSecPro** (Collaborative, Multi-modal and Agile Professional Cybersecurity Training Programme for A Skilled Workforce in the European Digital Single Market and Industries)
- **DigiQ** (Digitally Enhanced European Quantum Technology Master)
- DIGITAL4BUSINESS (Master's Programme focused on the practical application of Advanced Digital Skills within European Companies)
- **DIGITWIN4CIUE** (Digital Twins for Complex Infrastructures and Urban Ecosystems)
- **DS4HEALTH** (Digital Skills for Healthcare Transformation)
- **ManagDiTH** (Master of Managing Digital Transformation in the Health Sector)
- **MERIT** (Master of Science in Smart, Secure and Interconnected Systems)

For LEADS, acting as a Coordination and Support Action, it should be noted that the scope of the impact assessment refers to the portfolio of actions and does not intend nor should be interpreted as a critical review of the activities, progress or performance of any specific action. The funded actions have a specific responsibility towards set KPIs as part of their Grant Agreements, which are outlined in the respective call document (fiche)[23] and include:

Students (gender/age/educational background, country of origin)

- Nº HEIs offering the new programme(s)
- Nº applications to the programme(s)
- Nº students enrolled to the programme(s)
- Nº students who have successfully completed the education programme(s) in the time foreseen by the action:
  - Nº people who received degree after successful completion of full programme
  - Nº people who received certification after successful completion of full online course
- # students benefitting from the support (financial/other) from the education institutions

Partnership and universities

- Hours of hands-on training, using equipment purchased/leased within the action
- Nº collaborations with industry:
  - Nº seminars/lectures held by industry experts (member/ non-member of the consortia)
  - Nº cooperation agreements signed with industry partners, involving sharing of technical equipment and/or facilities
- Nº job-placements/internships carried out by the students
  - in the organisation member of the consortium

[23] https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/digital/wp-call/2021/call-fiche_digital-2021-skills-01_en.pdf

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   - in an external organisation
- Increase in (2021-2024) of:[24]
   - international to domestic staff ratio
   - the proportion of research that involves international collaboration.

These KPIs form part of their formal reporting and progress management with the agency responsible for project monitoring, HaDEA. While some of these KPIs, related to the project execution phase, may overlap with the contained impact assessment. The purpose of the LEADS progress is to measure the contribution of the portfolio towards the stated objectives of the DIGITAL programme and provide guidance for the funding of future actions.

In the definition of an impact assessment framework, a collective group of representatives for impact within the SPECIALISED 2021 was formed – Topic Group 4: Impact Assessment (TG4). The TG4 was convened on the following occasions with the associated focus:

Table 8. Topic Group 4 meetings (2023-2024).

DATE	TOPICS
05/09/2023	• Presentation of the purpose of the TG Impact Management • Round table of the SPECIALISED projects • Existing sustainability or exploitation plans from the SPECIALISED projects • Concept framework for impact assessment
11/11/2023	• Presentation of Impact Management in the MERIT project • Round table of the SPECIALISED projects
09/01/2024	• Presentation of the purpose and structure of the Impact Assessment Framework • Feedback collection for SPECIALISED projects • Identification of future actions
12/03/2024	• Presentation of preliminary analysis results for Impact Assessment Framework

Through these engagements, it became evident early on, that the phase of development of the portfolio of actions was not sufficiently mature for the collection of data with the purpose of providing estimated projections. As described in the previous section, most of the actions were, at the point of review, in design phases and undergoing administrative processes for accreditation and launch of the intended programme. Added to this is the diversity of approaches and format, including the design readiness of the portfolio, to be further discussed.[25]

During this engagement, the topic of definition of impact was addressed collaboratively, providing a common vision and distinguishing from performance KPIs. A proposed impact assessment framework was provided by LEADS and further refined based on feedback received with projects sharing their approaches and best practices in the application of data-led measurements and feasibility of collection methods.

After concluding the co-design and collaborative assessment phase, individual interviews were conducted with the individual SPECALISED 2021 to assess their current status in measuring impact and an understanding of their existing mapping and metrics. Annex 1 provides a summary per project.

[24] Can be considered an impact metric rather than a KPI
[25] For reference, the DigiQ approach was to include quantum modules onto existing Masters' programmes while Digital4Business sought a greenfield approach, starting with demand definition.

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3.2 Definition of impact

WHAT IS IMPACT?

The call for proposals for DIGITAL-2021-SKILLS-01-SPECIALISED specifically refers to the following impacts:

- Extent to which the project will increase and improve the offer of education programmes and the number of students specialised in key capacity areas.
- Extent to which the project will strengthen competitiveness and bring important benefits for society.

Additionally, the SPECIALISED 20201 were expected to contribute to the following long-term objectives:

- Support excellence in HEIs, making them world leaders in training for digital specialists and increase capacity of the training offer for advanced technologies.
- Development of dynamic digital ecosystems where academic excellence, research and innovative industries work together to attract and retain the best talents worldwide.
- Contribute to the overall objectives of the DIGITAL programme.

WHAT IS IMPACT ASSESSMENT?

The respective Work Programmes, by their nature, do not provide a common definition or framework for the projects to conduct their own impact assessment. This is the responsibility of each consortium, taking into account the particular nature of the action.

From published literature, Simister (2017)[26] indicated "an impact assessment involves the assessment of long-term and/or significant changes brought about through a development intervention or series of interventions”. Veenstra and Timan (2022)[27] noted that impact assessments have been used in the field of digital transformation to analyse policy implications and are “expected to include economic impacts as well as social and environmental impacts, focusing on public value and addressing societal challenges”.

An impact assessment is instrumental to measure the effectiveness and longevity (sustainability) of the SPECIALISED projects. Broadly at MS and EU level, training and education require continuous and significant investment from both the private and public sector. The identification of the input and output of an instrument or action is readily defined, i.e. number of learners, completion rate, etc., the measurement of impact of learning is less commonly achieved.

This can be based on the short-term view of actions; a design to meet the scope and stipulations of a programme without due attention to connect their outputs (e.g. number of graduates, internships) with long-term impact (e.g. innovation, productivity, career mobility).

As such, the impact assessment for the SPECIALISED projects evaluates their long-term trajectory and outcomes during and beyond their grant agreement. With an emphasis on the latter, post-grant phase. As such, an impact assessment enables projects to monitor and manage their long-term sustainability (beyond the grant agreement), scalability and

[26] Simister, N. (2017) “Impact Assessment”, INTRAC. https://www.intrac.org/wpcms/wp-content/uploads/2017/01/Impact-Assessment.pdf
[27] Veenstra, A.F. & Timan, T. 2022. "A Public Value Impact Assessment Framework for Digital Governance".

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ultimately their success. It essentially addresses their *raison d'être* and answers the question "are the projects meeting EU policy objectives?".

For example, is the inclusion of students of different gender, income and background making Advanced Digital Skills more socially equitable and inclusive? Is this contributing to help meet the Digital Decade target of 20 million employed ICT specialists by 2030.

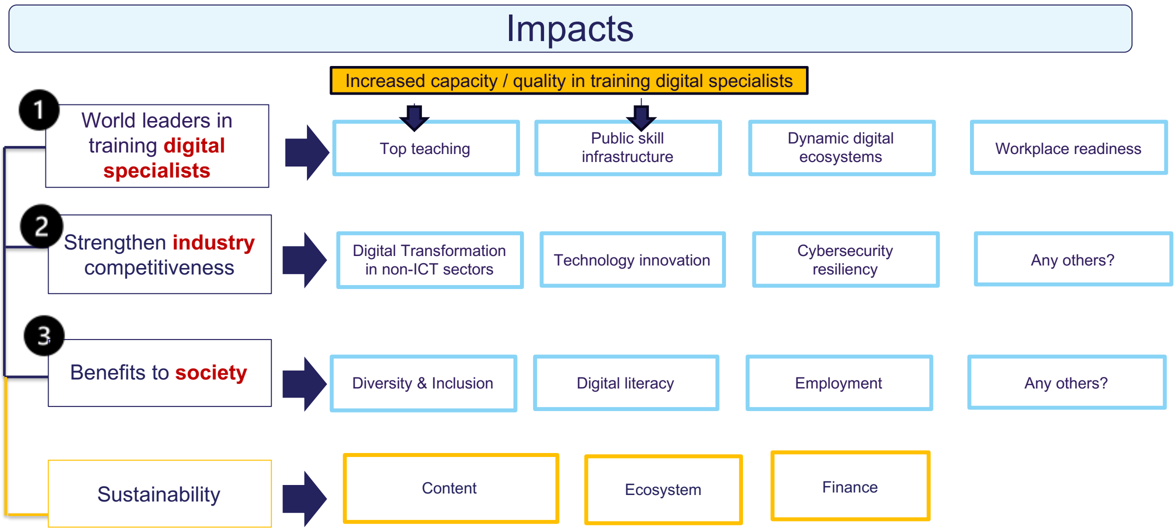
Furthermore, if actions monitor and assess their impacts during design and execution, they can identify and course-correct problems in time to reach a sustainable scaling of the developed. Added to this, is the need to correctly identify both tangible and intangible assets that can form the basis of continued impact and growth, reacting to unforeseen benefits and disbenefits and maximising the spillover effects.

3.3 Recommended impact framework for common assessment of SPECIALISED

The proposed framework takes the intended impacts of the overall DIGITAL programme as the basis for defining the broad areas. This was further elaborated on the published work programmes for 2021-2021 and finally looking towards the principal goals of the Digital Decade Strategy. [28],[29]

As a result, the framework was developed which included stakeholders, impacts, and metrics. It should address the specifics of the actions and be adaptable to the variety of formats and topics covered by the SPECIALISED 2021.

Figure 8. Recommended impact indicators mapped across the SPECIALISED projects' objectives.



MAPPING IMPACT STAKEHOLDERS

An impact assessment requires a multi-stakeholder approach that takes into account the goals, agenda, interests ("what's in it for me?") and involvement of relevant stakeholders in the project. An impact assessment replies to the question: "Is my project delivering expected outcomes and impacts to my stakeholders?".

[28] https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_en
[29] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32021R0694

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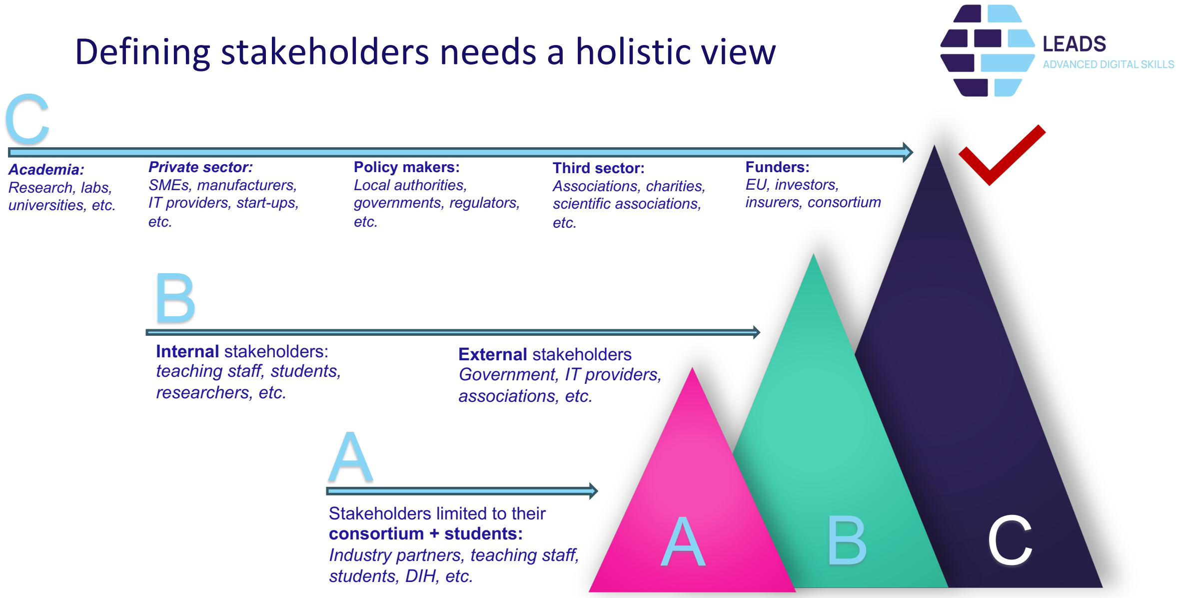
Figure 9. Three levels of key stakeholders in the Impact Assessment Framework.



As such, projects should engage stakeholders during the life of their grant agreement and beyond and adopt a stakeholder-centred methodology in data collection, analysis, and evaluation of their impacts. Furthermore, the scope of impact assessment should be considered on a concentric series:

- Impact within the partner organisation (Direct)
- Impact within the consortium (Direct)
- Impact on the beneficiaries (Direct)
- Impact among the action collaborators and external partners (Direct)
- Impact on the local and international ecosystems and networks (Indirect)
- Impact on society (Indirect)

Stakeholder categories within both internal and external groups aid the specification of relevant metrics and define the data collection approaches. For example, the project ManagiDiTH identified the following stakeholder categories:

- Academia & Research; educational institutions and research centres.
- Private sector, including companies and SMEs in manufacturing, industry associations, IT providers and start-ups.
- Policy makers, including local authorities, governments, and regulators.
- Third sector, including charities, and scientific associations.
- Funders, including the EC, investors, insurers, and the project's consortium.

Impacts

Starting with the (broad) objectives quoted in the call for proposals DIGITAL-2021-SKILLS-01-SPECIALISED, the Impact Assessment Framework recommends a number of specific impacts in the table below:

Table 9. Recommended impact categories for the SPECIALISED 2021.

BROAD	SPECIFIC IMPACTS
World leaders in training	**High-quality teaching**: Consortiums attract and retain qualified staff for the successful running of programmes.

digital specialists	**Public skill infrastructure**: Certificates, degrees and other qualifications are recognised across geographies and industries.
	Dynamic digital ecosystems: Partnerships across academia, industry and research, bringing about innovation and digital breakthroughs.
	Workplace readiness: Students acquire the necessary skill sets and behaviours required for the workplace.
Strengthening industry competitiveness	**Digital transformation in non-ICT sectors**: non-ICT sectors (e.g. healthcare) are digitised and modernised with relevant skills and technologies.
	Technology innovation: New digital technologies are developed, or existing technologies are used in innovative ways.
	Cybersecurity resiliency: Organisations are able to prevent, detect, respond to and recover from cyber-attacks.
	Others (particular to singular projects: For example, the availability of a skilled workforce can result in greater business productivity and resiliency and address the Advanced Digital Skills gap in many industries.
Benefits to Society	**Diversity & Inclusion**: ADS become available to a diverse student population and a greater talent pool, impacting their welfare and career development.
	Digital literacy: ICT professionals are upskilled in ADS when the projects disseminate materials (e.g. through open resources) to the broader society.
	Employment: Students and professionals improve their employability with the acquisition of ADS whose demand is increasing.
	Others (particular to singular projects): For example, the projects can help further develop a data-driven society, through data sharing models and robust architectures in their consortia.

To highlight an example of the application across the portfolio, the impacts under Strengthening Industry Competitiveness are distributed differently across the actions as can be observed below.

Table 10. Relevant metrics for 'strengthening industry competitiveness' per project.[30]

PROJECT	METRICS SET TO BE MEASURED		
	Digital transformation in non-ICT sectors	Technology innovation	Cybersecurity resiliency
AI and Health	Yes	Yes	No
CyberSecPro	Yes	No	Yes
DigiQ	Yes	Yes	No
DIGITWIN4CIUE	Yes	Yes	No
DS4HEALTH	Yes	Yes	No
ManagiDiTH	Yes	Yes	Yes
MERIT	Yes	Yes	Yes

INDICATORS

Indicators provide a set of specific, measurable, assignable, realistic, time-related (SMART[31]) metrics that enable the projects to determine a baseline (or starting point) and targets, and to monitor their progress against expected impacts. Across the SPECIALISED 2021, the existing metrics and approaches were mapped to find the common metrics that are applicable to the whole portfolio. These provided indicators provide a means to measure during the project

[30] DIGITAL4Business is not included in the table, as the project was in the process of defining these impact metrics during the development of this report.
[31] https://community.mis.temple.edu/mis0855002fall2015/files/2015/10/S.M.A.R.T-Way-Management-Review.pdf

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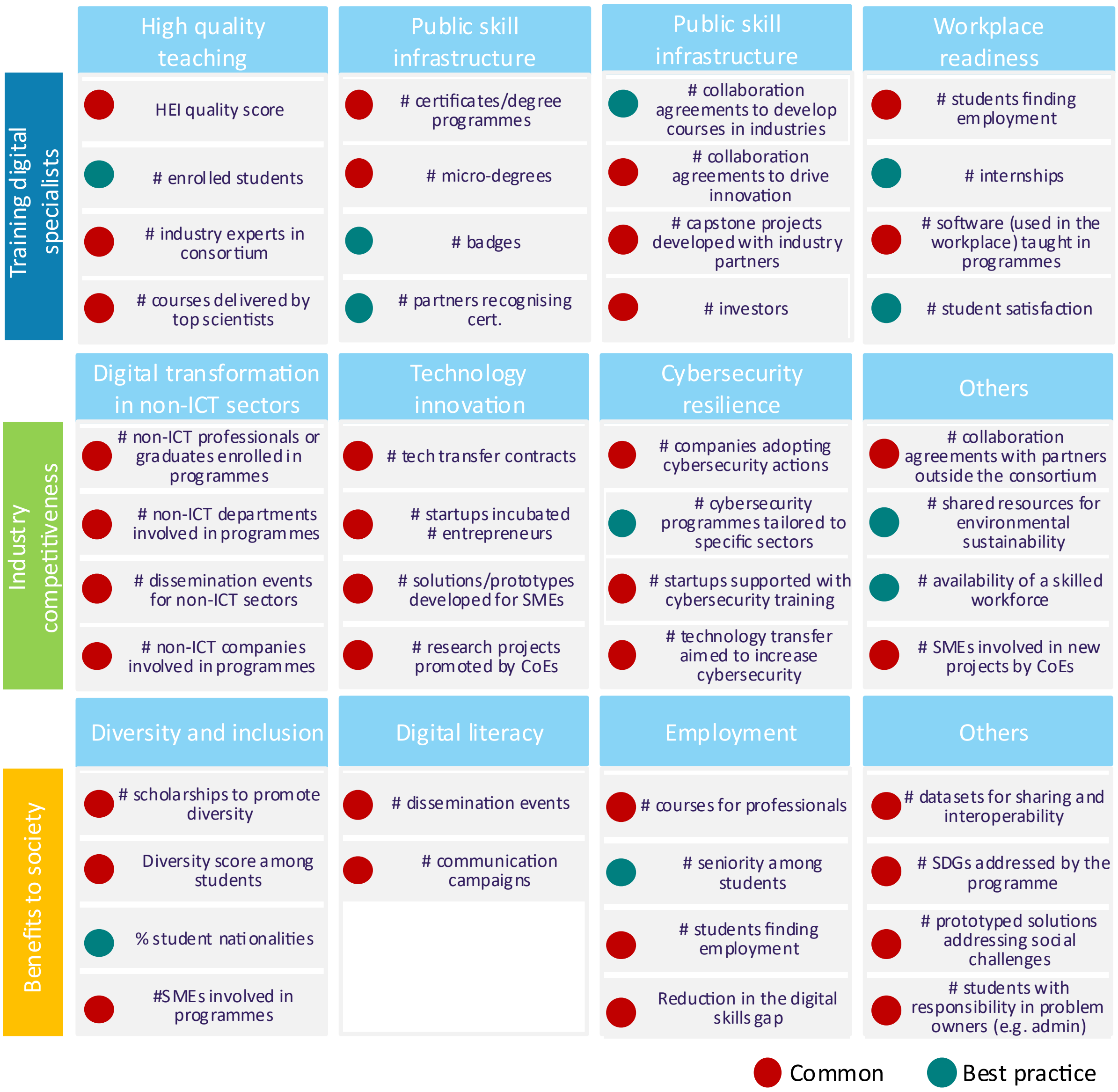
lifetime, an indication towards future impact realisation. Figure 2 shows a list of indicators for reference, which it is not exhaustive, but rather illustrative of the work (still in progress) by the projects. Some indicators are common across several projects whilst others, although not always common, are examples of best practice and recommended for use.

Figure 10. Developed indicators for Impact Assessment.



SPECIALISED 2021 IMPACT READINESS

In the proposed Impact Assessment Framework, the projects have been classified according to their progress status in terms of identifying and measuring impact metrics. Specifically, they are assigned to one of the stages indicated in Figure 5.

Figure 11. Impact assessment progress status per project

Project	Impacts not yet identified.	Impacts identified.	Impacts identified Metrics defined.	Impacts identified. Metrics defined & tracked.
AI and Health			✓	
CyberSecPro		✓		

DigiQ			✓	
DIGITAL4BUSINESS	✓			
DIGITWIN4CIUE			✓	
DS4HEALTH		✓		
ManagiDiTH			✓	
MERIT				✓

As seen in the table above, three projects are still in the process of identifying relevant indicators for their impacts, as efforts are often slowed down by the need to address methodology considerations (explained in the following section), establish long-term vision, and allocate dedicated staff to conduct impact assessments. In some instances, work on identifying impact indicators intensifies as the projects get going; the participants become better aware of the requirements of this particular task and form a shared understanding that their responsibilities go beyond tracking the KPIs outlined in their grant agreements.

However, there are a few projects that have made significant progress in this respect, in particular:

- **MERIT**, delivering a Master of Science (MSc) in Smart, Secure and Interconnected Systems, is using a HEI quality score for their training and education programmes, as well as a diversity score in their student population, amongst other indicators.
- **DIGITWIN4CIEU**, whose training is mainly for civil engineers and is focused on digital twins for complex infrastructures and urban ecosystems, has a strong innovation agenda and has developed indicators measuring: (1) research projects promoted by their Centre of Excellence (CoE); (2) technology transfer contracts; (3) incubated startups.

3.4 Data collection and methodology

All projects, with the exception of two, have not yet started gathering data to monitor their impacts. Their baselines have not been set either, although some have defined targets in relation to their impacts.

The methodology for data collection is a concern for most, given their state of maturity and experience with the task. Some of the challenges include the following:

- Who is responsible for data collection (ensuring quality, integrity, and transparency)? Who should be involved in the process?
- How often should data be collected? Is this feasible?
- Can data collection be automated or easily retrievable? How to streamline the process?
- Can data be easily visualised through existing systems?
- Can data be analysed and forecasted?

Yet, most projects are contemplating a manual laborious and time-consuming work. As they have not produced this dataset in the past and lack guidance, the projects are left to their own device.

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MERIT DATA COLLECTION METHODOLOGY

MERIT has provided their tailored methodology for evaluating participating HEIs and the development of their improvement plans. This includes:

- Analysis of existing sources to find methodologies & tools to estimate HEIs quality based on academic literature review from Web of Science, Scopus, EBSCO databases etc.
    - Analysis of MERIT partners' (country-specific) quality evaluation reports to identify evaluation areas, quality aspects and evaluators recommendations.
    - A tree hierarchy of eight categories of criteria (Research, Education, Staff, Infrastructure, Academic ethics and environment, Entrepreneurship, Internationalization, Impact and visibility) detailed in up to 4 levels according to criteria similarities, with additional data and references.
- Quantitative evaluation to obtain a list of criteria for MERIT HEIs.
    - Extending the list of criteria from step 1-2 with focus groups and the data measured at MERIT HEIs and FBK (17 additional ones).
    - Requesting MERIT Universities and FBK to indicate the criteria importance (selection upon 50% threshold).
    - Data collection for the selected criteria (5 years – 2018 to 2022) via public databases and MERIT partner representatives.
    - Defining an importance weight for each criteria and category via the Analytical Hierarchical Process (AHP) approach and a multi-step decision-making.
    - Using the criteria to evaluate MERIT Universities and FBK and select the criteria with significant differences (>15%) among them.
- Qualitative evaluation by pooling quality best practices and challenges from MERIT Universities and FBK.
- Discussion of identified criteria in dedicated meetings and brainstorming on reasons and future direction. Defining recommendations for each improvement area based on experience, possible issues and best practices to obtain a well analysed and better-tailored list.

Besides the early stage for the actions in developing a methodology for data collection, there are also intrinsic data limitations that are caused by the broad and long-term nature of their impacts, in particular:

- Lack of information or empirical evidence to support impacts.
- Secondary information is not systemically or rigorously collected by third parties.
- The time lag between the programmes and their respective impacts.
- Impacts can be broad, and the result of many interdependent inputs and changes, and not exclusively the outcome of the projects.

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4 BARRIERS AND CHALLENGES TO OVERCOME

In the coordination of the SPECIALISED 2021 actions, there are a set of challenges that have been identified in the design and launch phases of the funded programmes. These have been identified through the discussions within the Topic Group structure which, based on demand from the coordinators of the actions, addressed Programme Design and Accreditation, SME Engagement, cross-DIGITAL Engagement, Communications and Recruitment. Further information is provided in D4.1 Topic Group Report and a selection of best practices is available on the Advanced Skills repository.[32]

The following sections aims to provide an overview of the key challenges identified across the cluster and additionally provide a summary of the ADS SO4 Cluster workshop organised in October 2023 with the European Commission and HaDEA to address them.

4.1 Principal challenges identified

Firstly, it must be addressed that the engagement with the cluster was greatest with the SPECIALISED 2021 group of actions which was the first collection of actions funded under the ADS SO4. As the first portfolio of actions, within a novel programme, their experiences have been invaluable in proving learnings and feedback for unblocking the supply of talent and enhancing the impact of the DIGITAL programme overall.

The following challenges were particularly notable for their recurrence among the portfolio and their common presence among related actions (e.g. EuroHPC) and relevant stakeholders engaged in WP3. These identified challenges enabled the selection of topics and key questions that are provided in the LEADS Final Guidelines (D3.2).

The key challenges surround:

- **Accreditation** - SPECIALISED projects face significant challenges in securing accreditation, which varies by EU Member State and complicates international programme development.
- **Compatibility of internal structures** – harmonising the processes and limitations across institutions in distinct Member States and affording the flexibility of resources for novel programme deployment.
- **Ensuring content relevance and alignment to demand** – ensuring the future-proofing of developed content, relevance to practical and real-world scenarios and the access to the necessary trainers and industry partners.
- **Sustainability of programmes and financial modelling** – ensuring that the design and delivery of the programmes will scale post-grant period.
- **Participation of SMEs** – both as beneficiaries and within the developed programmes.

4.1.1 SOLVING THE ACCREDITATION PUZZLE

The number one issue among all stakeholders revolves around accreditation. This is likely to be the top challenge given the design and development phase that the actions were in during the lifetime of LEADS. It has, however, been a key point of discussion, peer-learning and sharing of best practice.

[32] https://advancedskills.eu/best-practice-repository/

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The type and scale of the challenge surrounding accreditation is dependent on the type of course to be developed (joint, dual), location of the participating institutions, and the level of integration of the respective courses and programmes.

It is important to note that there is a distinction between the provision of credits (ECTS) that are recognised in other institutions for continuing education, i.e. academic masters, and those that are issued by individual institutions which provide validation and seal of approval from the institution but have not processed through regional or national compliance mechanisms, i.e. professional masters.

The variation between the different systems in Member States creates a significant burden for the administrative process, with the same process in some cases being repeated for each Member State. This has hindered the development of the programmes and their launch while causing consortia to dedicate resources and energy, disproportional to the impact and generating time pressures for realising the expected outcomes within the grant period of 48 months.

The common accreditation pathways observed include:

- **Institutional** accreditation: granted to entire institutions or departments.
- **Programmatic accreditation:** granted to specific study programmes.
    - **Joint accreditation:** granted through a single, unified application process on the basis of standards established by all accrediting bodies involved.
    - **Individual accreditation:** granted through a separate application and evaluation process for each training provider on the basis of standards set by the respective accrediting body.

INSTITUTIONAL ACCREDITATION

Institutional accreditation represents the process in which an accrediting body evaluates an educational institution to ensure it meets certain standards of quality and effectiveness regarding its vision, governance, resources and student services. This is necessary for the programmes as this guarantees widespread recognition of and in-turn, enrolment in the programme. Hereby the following important points stood out:

- Complexity of frameworks requiring extensive processing period.
- Inflexibility of institutional accreditation process.
- Non-institutionally accredited programmes are not equally regarded by employers and students, undermining impact metrics like high-quality teaching and employability.
- Institutionally accredited academic degrees more common in Europe, prioritising industry-accredited certificates & courses.

Initiatives that deliver programmes producing industry-recognised certificates or programme-specific diplomas for students tend to attract less talent. As such, many of the SPECIALISED projects aim for joint institutional accreditation, but due to the challenging nature of this process they compromise on the implementation of best practices and other impact-generating opportunities.

JOINT ACCREDITATION

Joint Accreditation involves the recognition granted to programmes delivered in different locations in meeting the standards and criteria set forth by the respective accreditation bodies across various regions or countries simultaneously. As the SPECIALISED programmes are

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developed and delivered by consortia of European universities, this type of accreditation is typically preferred to ensure the different standards of all participating countries are met. One of the most common challenges in Programme Design & Joint Accreditation pertains to the accreditation process, where national accreditation institutes do not align with international or cross-country programmes. The following points stood out:

- Lack of processing capacity to cover national institutions in accreditation process.
- Issuing of diplomas across multiple countries.
- Lack of comprehensive cross-country curricula or overlap of curricula across locations.
- Information on the approach and process to Joint Programme Accreditation.
- Joint efforts developed and operated by international consortia struggle to have their programmes accredited across countries.
- Establishing cooperation agreements between partner institutions.
- Mobility considerations for 100% remote / online programmes.
- Quality control in the face of universities solely accredited by national authorities.

To address this challenge, Digital4Business aimed to establish joint academic Quality Assurance (QA) processes and procedures for joint programmes, on the basis of the European Approach. The European Approach enables institutions to select the QA agency to perform the evaluation among a list of European Quality Assurance Register for Higher Education (EQAR)-registered options. This evaluation is based on a single set of standards without applying additional national criteria. However, the QA agency's decision needs to be recognised in all countries where the programme will be offered. Since the European approach is not accepted across all of Europe, this may not always be the case, and further legislative changes may be needed.

Similarly, DIGITWIN4CIUE tested the Joint European Degree Label in Engineering (JEDI), which aims to turn this pilot initiative into an attractive, value-adding label for full joint European degrees. JEDI is currently on-boarding joint study programmes, evaluating and optimising the set of criteria for the JEDI label and planning for its long-term application, based on feedback received through projects like DIGITWIN4CIUE.

A further point noted was the replication of course material across countries. MERIT indicated that some partnerships could be linked but not in an official joint programme due to overly specific or overly flexible programmes, which hindered the creation of long-term partnerships beyond the project duration.

In discussions about industry participation in the design and delivery of the SPECIALISED programmes, the capacity to deliver the courses was a key concern, marked by the following points:

- ECTS allocation for programme
- Determination of viable programme delivery schedules for both part-time and full-time students.
- Challenge to consistently engage teaching personnel to effectively teach programme.
- Recruit a sufficient capacity in teachers for the delivering of programmes.

4.1.2 Overcoming the Misalignment of Institutional Processes

While the accreditation challenge is a particular case of this, it merits reflection on the challenges for consortia in the development of joint or common actions.

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Individuals within the partner institutes, particularly within HEIs are encountering challenges within their own organisations that creates frictions between organisational processes, public contracting limitations and flexibility in resources and the existing models within HEIs.

Fundamentally universities, particularly public entities, are constrained environments which are specific to each region and institution. The contracting of staffing, the management of hours, the approval of courses or the coordination of mobility are some examples of the items that are out of the control of consortia.

While this is nothing new to academics or those working with HEIs, the complexity of working across institutions and ensuring the collaboration and access to global technologies and expertise has its limits. There are differences in financial models, autonomy of departments, cultural approaches among others that consortia have to navigate both internally and externally.

4.1.3 ENSURING THE RELEVANCE OF CONTENT AND DEMAND

The nature of Advanced Digital Skills, and the forefront positioning of the SPECIALISED programmes creates a need for novel content, methods, and expertise. The SPECIALISED are positioned to drive that frontier talent development and as such the content is cutting edge but can also be at risk of not reaching relevance or retaining the relevance in the face of shifting demands from industry.

The balance between meeting the needs of industry, affording learners with robust skills and knowledge to build long-lasting careers, and planning for relevance on a 3-5 horizon or inserting sufficient adaptability for continued development, is a continuous endeavour.

The close engagement with industry is believed to be core to this, supported by data and cross-portfolio investments into the mapping of current and future demand.

A challenge experienced by AI & Health as well as CyberSecPro was ensuring the application of their course material to in-person-practices that are also in demand for industry. Here it was noted how research-heavy and theoretical course material prevented the acquisition of market-ready skill. Hereby, CyberSecPro further emphasised the disconnect between the academic goals of higher education institutions and the practical, immediate needs of SMEs.

Similar to the challenge of AI & Health and CyberSecPro in creating course material that accurately reflected industry needs, DIGITWIN4CIUE referenced this as well. However, this was put into context of the rapid pace of technological innovation, making it more difficult to design courses that develop skills in demand on a short-medium- and long-term basis.

4.1.4 SUSTAINABILITY OF PROGRAMMES AND FINANCIAL MODELS FOR SCALE

Again, the SPECIALISED 2021 are in the initial phase but as has been addressed in previous sections, the need for designing for scale and sustainability is needed from proposal development phase.

It is understood that the DIGITAL Programme is not intended to supplement or bridge investment gaps in other areas of policy but provide that kick-start to high-impact and excellence driven actions that will have a significant return on investment for both the EU and the participating organisations. This market-focus is evident by the 50% funding rates that forces consortia to acquire co-funding or provide such level in-kind. This means that consortia should view the grant period as an opportunity to find a product-market fit and adopt such a mindset.

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This, however, has proven challenging in the first cohort of actions, given the strategic gaps between funding initiatives like HORIZON and ERASMUS+ where their institutions are more familiar. Further to this has been the limited investment from MS in the programmes funded, despite the national interest and the access to various mechanisms, among them the RRF. This has been provided for within the EDIH framework, but consortia have not achieved to the same level the backing of their Ministries in financial terms.

For funded actions to be seen as high-impact investments and adopt a *'start-up'* mindset is difficult for traditional entities, which provide the reputation and stability, but have a lower risk appetite for experimentation and educational model exploration. This requires an activation of stakeholders surrounding the SO4 ADS Cluster – promoting their excellence and uniqueness among other policy instruments.

Furthermore, the startup/product development approach can be seen at odds with the public interest in developing the talent that is to underpin the future global competitive of the Union, the Single Market and the value chains. If we need to address this urgently, do we need to forego traditional assessment frameworks for policy interventions and focus on scale and breadth now over future sustainability.

4.1.5 PARTICIPATION OF SMEs – NECESSARY BUT DIFFICULT

Generating enough interest in SMEs to participate in the development of training programmes was a major challenge experienced. SMEs staffed with less personnel, could find it more difficult to enrol in a programme if it involved a senior employee (e.g. solely responsible for operations & product development) whose work had to be covered by other employees. For the training programmes, this meant that less involvement and engagement from SMEs came about in the delivery of the programmes.

It was noted the challenge of SMEs to attract candidates among their personnel for enrolment when the programmes in which they were involved are ready for delivery. This can be caused by the training concept being perceived as not immediately applicable to urgent task completion in the SME and not fully matching with the work outlook to be worthy of serious consideration. In linkage with the challenge of attracting and persuading SMEs to participate in the development and delivery of study programmes, CyberSecPro highlighted that even after reaching an agreement with SMEs, ensuring their consistent engagement is complicated. This might be due to external factors such as short-term market demands or fluctuating business priorities, which can negatively influence the frequency of engagement of SMEs.

A similar challenge that was experienced by DIGITWIN4CIEU was not just generating interest in the programmes per se but convincing them of the important skills their employees could acquire through these. Here it was noted how some SMEs tend to have a lack of awareness on the long-term benefit of enrolling in programmes despite the necessary front-end financial investment. DS4Health made note of the challenge in having SMEs engaged with the programme as a means to build their staff without the guarantee of these staying at the company. As some candidates could partake in a programme and not be obliged to staying at the company afterward, it can prevent SMEs feeling assured in making that investment, particularly due to the high tuition fees.

Finally, SMEs within the consortium are acutely affected by the 50% financing, where the development of a programme is not a viable commercial product for them or not within existing core business. Care needs to be taken where SMEs have a role in the project that is supporting without the generation of their own assets.

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5 CONCLUSIONS

5.1 Diversity of the SO4 ADS Cluster

The scope of the SO4 ADS Cluster is currently horizontal in terms of themes and applications. This is evident from the number of actions, both in the SHORT-TERM and SPECIALISED formats which have universal application of specific skillsets defined. It can be anticipated that as the cluster progresses through later stages of the DIGITAL Programme greater specification will arise. This will result either through the evolution of proposals to fill existing gaps and through guidance from the EC.

It is a challenging task to specify currently the skills and competences that will be in demand for the future 4-6 years, and it is likely that not all SPECIALISED or SHORT-TERM will retain their current structures or focuses, as long as they are responsive to demand. Further sharing and coordination of demand and engagement with both industry and technology developers could ensure that actions are in-line, with agile feedback loops to apply continuous improvements.

The skills pockets covered by the SO4 ADS are reasonably distributed, with a particular emphasis on AI, Data, and Cyber given their likely market potential and highlighted demand. This balance between commercial success and policy objective is one to be traversed, by their nature Advanced Digital Skills should be frontier and have a limited addressable market of both learners with the relevant prior experience and industries with the career opportunities for them. The risk of crowding out is one that requires attention. The route to ensuring sustainability and commercial viability of funded actions must be taken in context where the market is already providing supply.

A note on quality, given the scale of demand for specific skills and talent, there will be a proliferation of training courses and educational offerings that will include the skills pocket. This does not mean that all offerings will produce the same calibre of talent or provide the same level of excellence. The benefit of inclusion of so many HEIs currently is their capacity to provide such levels and there should be an association of prestige and excellence for funded actions and those students, learners and collaborators who participate.

As has been discussed in other fora, the applied nature of ADS is key and not limited to HEIs solely, it is welcomed that there is a broadening of the actors from Education and Training communities as a whole to address the multiple routes and profiles to be considered. The value of the HEIs should not be underestimated but promotion of collaboration with VET providers and networks can enable the exploration of novel approaches or progression of dual viewpoints to the value of both systems.

The connection with research centres and centres of excellence is important as the future view on demand and technology development, but adequate roles and resource should be ensured for effective collaboration. The participation of RTOs is currently limited, but the recognition that expertise in advanced technologies is currently more likely to be found in industry, an ecosystem of industrial collaborators and access to the tools and systems is necessary for the success and applicability of the developed programmes.

Another point of diversity is in the formats of the programmes and actions, including the multiplicity present within a single action. It is agreed that there is not a correct format at this stage, especially in terms of credits or duration, while a minimum standard must exist, it would

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be of value for the cluster as a whole to share experiences and review results to understand in which context does each format have particular strengths.

5.2 Measuring impact of the SO4 ADS Cluster

It is evident that the current phase of the cluster limits the ability towards defining a future impact of the initiative as a whole. This initial start-up phase has been necessary to explore approaches and ensure the fit of solutions. It is anticipated that at the end of the academic year 2024/2025 there will be significant experience, data and insights to understand how the direction of the actions will be shaped. Currently there is a restricted view of the applicability and relevance in the developed programmes, the actions are providing convincing data and justification to their approaches and design of programmes captured as best practice, but the actual results will have to come from the first deployment of actions.

From the outset, within the SPECIALISED 2021, there has been a notable absence of planning for the post-grant lifetime of the developed programmes, networks and assets. It is understandable as the first cohort, which is exploratory by nature, but with the experiences of the CEF-DIGITAL now available and with the substantial reports, consultations and publications provided across the cluster, future actions must address this at the proposal phase.

The focus on sustainability of the programmes and courses was not fully considered in the teams responsible for design of the same, the role of impact and sustainability was in many cases a delegated action and individual who, while requiring specialist expertise and role, needs to be running throughout all actions of the project and part of the central coordination of actions. The view of impact assessment and mapping should be a structured means for verifying that the action is on a correct path and provide that capacity to course correct during the grant period to refine offering and activities to achieve successful exit velocity post-grant.

There is now a common impact assessment approach available for cluster actions that can serve as a backbone for their own planning and core consortium reviews. It must be flexible to address the diversity of scope and approaches but fundamentally provide the route to mapping impact and give early validation of the strategies and models employed. The focus of impact on the levels of stakeholders is important, a layered view from partner organisations towards consortium, beneficiaries, ecosystems and society should seek to uncover the true results and long-term impact. In all Advanced Digital Skills actions, as in research policy, spill-over effects have to be considered as desirable and a valid outcome.

5.3 Limitations and barriers to 20 million ICT Specialists

It cannot be put in doubt that the consortia of the SO4 ADS Cluster face a difficult task. The DIGITAL programme is not like any other and the ambition for funded actions is signification, as evidenced by the funding available. There are frictions, in many cases underestimated, that are generated between the existing operational models and systems and the exploratory and dynamic context of Advanced Digital Skills.

Across HEIs, that there is a lack of available talent for teaching and training who have the knowledge and skills to deliver Advanced Digital Skills in an environment where the technologies are advancing annually. Existing staff are limited by teaching load, ability to contract or access external resources or gain experience first-hand in novel technologies for lack of data, resources or industrial experience and applications. The benefit of the SO4 ADS

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Cluster is that this expertise across institutions can be leveraged and are given the platform to ensure that across regions of the EU, the scale of excellent teaching can be achieved.

This benefit of cross-organisational and cross-border collaboration generates the greatest challenges in achieving common standards, approvals and certifications. The order of complexity increases the greater the number of regions or HEIs (especially public entities) involved.

As with all actions, the SME is central to the success, but they are difficult customers and collaborators. The SME existence is marked by their limited access to resources, scope for engagement and the short-term planning horizons. The investment from an SME is always a significant decision for the organisation and must have direct outcomes to the success of the business in short-term. What SMEs contribute, in contrast to the above is high levels of flexibility and lower administrative thresholds to reach results. Additionally, SMEs can provide a more comprehensive view of the technology or value chain landscape as employees are both specialist and cross-functional. It must be taken with care the term of SME, there is massive chasm between essentially sole traders or traditional industrial entities compared to high-technology engineering firms or specialist tier one manufacturers.

Lastly, access to project hubs for information exchange and global benchmarking of best practices promotes wider collaboration and knowledge sharing, ultimately contributing to the success and sustainability of specialised projects beyond Europe's borders

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6 Recommendations

6.1 Promoting the value of the DIGITAL programme

- **The DIGITAL SO4 ADS Cluster should be a seal of excellence and prestige**. The focus on the ADS demands excellence at all levels and this should be evident through the funded actions. This elevation at European level will aid consortia to developing impactful programmes and courses and attract top talent and industrial collaborators. The explicit link to the Digital Decade mission needs to be reinforced by European institutions and by the actions themselves.
- **Quality is core to the success and only excellence accepted.** Actions need to be the leading way in ADS skills development and the DIGITAL should promote only those who provide global ambition and connection to the mission of ensuring the competitiveness of European industry and society. Consortia should ensure that the excellence is developed across the whole of Europe but this cannot be seen as just another funding programme, it has to be for bold and driven organisations.
- **Actions should define at proposal stage their target profiles and learning pathways or at minimum the target learners**, depth of knowledge and scale of progression. It is recommended that actions assign their scope to one of the following categories: Group A – Inventors and Creators of Next-Generation and Novel Advanced Digital Technologies; Group B – ICT Specialists – Deep System Knowledge Experts; Group C – ICT Experts - Systems Users and Application Developers; Group D – Advanced Digital Tools Users. This allows for directed action by the EC in response to whole programme needs and policy objectives.
- **Consortia and actions need to be afforded flexibility and adaptability** in their approaches to respond to changes, data and early outcomes. The actions should be considered each a venture and with reasonable justification be able to pivot to ensure the financial viability of the developed programmes and courses, ensuring a product-market fit. This requires a close alignment with HaDEA and the definition of strategies and models being explored to have clear validation of outcomes rather than completion of the minimum requirements in the grant agreements.
- **Ensure accreditation readiness from the outset**. Proactively address accreditation requirements from project inception to avoid potential delays and complexities. Ensuring unified accreditation standards across diverse regulatory landscapes early on enhances credibility, aligns partners, and facilitates smooth implementation and scalability across multiple European universities.
- **The validation of skills is a major requirement of industry, but the qualification is important to the individual**. The use of micro credentials and the institutional certification provides a flexible and trusted means for employers to validate the skills of graduates and learners. The value of the certification and transferability is a major source of motivation for the learner and, although at times more complicated, is necessary for their career development and future talent pool developments.
- **Industrial collaboration is extremely important especially with leading tech providers, but companies also need to be supported as a beneficiary not a buyer**. Companies, like all others, are struggling themselves in the definition of skills demands, level of skills and types of profiles. It is a risk to shape programmes subservient to the specifications of industry partners, this risks the overspecialisation of individuals or the development of programmes that are not a correct fit. The HR and Directors of companies need to be

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supported in understanding their own needs and the long-term view to avoid reactionary and misaligned investments.
- **SMEs in consortia must have a strategic role** – At 50% funding, the participation of an SME in an action has to have a commercial outcome for the organisation. SMEs who are partners have to have a commercial interest in the developed assets and programmes and this should be reflected in their role. Where specialist SMEs are providing horizontal roles, like in communications, consortia should consider that this is a sub-contracted role if not held by other organisations.

6.2 Leveraging wholescale investments and infrastructures

- **The DIGITAL funding should be strategic in frontier digital economy development**, but the much larger Horizon Europe programme should be adapted to include skilling and training as a mandatory action in all technology development projects.
- **Embrace a strategic shift towards building upon existing initiatives**. Focus on enhancing and adapting successful partnerships, courses and training programmes on ADS already proven effective within collaborative networks of European universities and SMEs. This approach minimises the risks of developing entirely new curricula and accelerates implementation by building upon established partnerships and models
- **Form smaller consortia to reduce administrative burdens** Optimise decision-making and streamline communication by forming smaller, agile consortia. Through this approach administrative overhead will be reduced, stronger collaboration will be fostered among members, and projects will be enabled to navigate operating challenges more efficiently.
- **Foster the sharing of data and knowledge through central hubs and trusted sharing platforms.** The scale of research and consultations across the whole cluster is large, each action has performed analysis and data collection and the opportunity for integrating this is enormous, not just for current actions but for shaping future actions. Mechanisms for sharing data and integration in data spaces can facilitate this, and common sharing events where methodologies have diverged promoted.

6.3 Embedding sustainability into actions

- A more **comprehensive and coordinated approach towards impact assessments** should be adopted with a greater integration it into the work programme and open call stage. By doing so, selected projects are aware and committed from the start, and impact assessment does not become an afterthought. A common impact assessment framework could form part of the award criteria and that candidate projects will have to abide by, if selected. A well thought sustainability plan should be included as part of proposal evaluations that is aligned with their impact assessment framework. Selected projects should provide evidence about their long-term viability in, at least, their self-financing, training content and ecosystem.
- A list of **minimum impact indicators (or metrics) common to all projects**, should be provided during the tendering process, while there are expected outcomes well defined as part of the DIGITAL work programmes and call fiches – greater emphasis on the post-grant phases will aid consortia in development of their own metrics. Guidance, detailed materials about impact assessments (including recorded webinars, step-by-step guides, project planning tools, best practice booklets, etc.) would support stronger consortia and actions.

- Actions **should have a designated impact officer from** the start, with responsibility to monitor and manage impact indicators, engage with stakeholders, and oversee their overall impact assessment. **Actions should provide feedback to HaDEA with lessons learned** from implementing an impact framework and relevant recommendations. This way, the framework will evolve in an iterative manner and consider the inputs from the projects and their stakeholders.
- More periodic assessments (at least once a semester) are needed to evaluate the importance of topics and challenges to be tackled by each SPECIALISED project, including the liaison among new programmes and existing research streams across the DIGITAL Programme. The actions continue to benefit from project hubs (i.e. Topic Groups) to exchange and share information with other similar initiatives to identify common pain points to be tackled.
- Beyond Europe, **actions should be encouraged to also benchmark best practices being developed by other initiatives across the world** to foment wider collaboration and knowledge sharing, this can be promoted through the **Digital Skills and Jobs Platform and/or through the Digital Partnerships**.

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the European Union

7 ANNEX 1

Project: AI and Health

- Start date: 01/12/2022
- End date: 30/11/2026
- Programme format: 2-Year Academic Master's Degree (120 ECTS)
- Skills areas and themes: AI, Bioinformatics, Digital Health

Impact assessment progress status

Impacts not yet identified. → Impacts identified. → **Impacts identified. Metrics defined.** → Impacts identified. Metrics defined & tracked. → Impacts identified. Metrics defined & tracked. Data shared.

Impact assessment in brief

Stakeholders	Metrics to be tracked	Identified contributions to DIGITAL Impact		
		Becoming world leaders in training digital specialists	Strengthening industry competitiveness	Benefits to the wider society
Not provided.	# employees benefiting from reskilling and upskilling opportunities provided under the project # cooperation agreements signed with industry partners, involving sharing of technical equipment and/or facilities	<u>High quality teaching:</u> Exchange of knowledge and best practices among experienced professors in the consortium. <u>Public skill infrastructure:</u> All students participating in the double-degree will have dedicated access to equipment. <u>Dynamic digital ecosystems:</u> Collaboration with selected EDIH involved in AI and Health. <u>Workplace readiness:</u> Internships in research labs and companies mastering skills in AI and Health.	<u>Technology innovation:</u> Training on cutting-edge technologies to French and EU working professionals. <u>SME focus:</u> Targeting innovative SMEs.	<u>Diversity & Inclusion:</u> Targeting SMEs with dedicated communication. <u>Employment:</u> Lifelong learning courses for professionals, who are upskilled in AI technologies.

Funded by the European Union

Project: CyberSecPro

- Start date: 01/12/2022
- End date: 30/11/2025
- Programme format: Portfolio of training opportunities under each of the modules
- Skills areas and themes: Cybersecurity in Healthcare, Energy, Maritime

Impact assessment progress status

Impacts not yet identified. → **Impacts identified.** → Impacts identified. Metrics defined. → Impacts identified. Metrics defined & tracked. → Impacts identified. Metrics defined & tracked. Data shared.

Impact assessment in brief

Stakeholders	Metrics to be tracked	Identified contributions to DIGITAL impact		
		Becoming world leaders in training digital specialists	Strengthening industry competitiveness	Benefits to the wider society
Cybersecurity and ICT professionals Trainers, Higher Education Institutions Companies (Maritime, Health, Energy)	Targets are set in many categories, but metrics need to be explicitly defined.	<u>High quality teaching:</u> At least 10 cybersecurity experts. Curriculum based on actual market needs and gaps identified. <u>Public skill infrastructure:</u> A certification scheme to be established. <u>Dynamic digital ecosystems:</u> Alliances in academia, industry, and research to drive alignment, innovation, and digital breakthroughs. <u>Workplace readiness :</u> 530 trainees will be trained and mentored. Workplace and industry level material on cybersecurity courses.	<u>Digital transformation of non-ICT sector:</u> At least 80 trainees will be non-ICT graduates. At least 50 trainees will be cybersecurity self-trained. <u>Cybersecurity resilience:</u> 8 startups and/or scale-ups will be supported.	<u>Diversity & Inclusion:</u> A human-centred, non-bias inclusive programme. At least 70 trainees will be older than 45 years. At least 150 trainees will women and/or no-binary. <u>Employment:</u> Decrease the cybersecurity skills gap and sustain student knowledge. 60 Cybersecurity trainees joined the cybersecurity workforce.

Funded by the European Union

Project: DIGITWIN4CIEU

- Start date: 01/11/2022
- End date: 31/10/2026
- Programme format: 1-year blended institutional degree (titulo propio) or official Master's depending on country (60 ECTS)
- Skills areas and themes: AI, cybersecurity, IoT, data analytics & robotics for construction, civil engineering, architecture

Impact assessment progress status

Impacts not yet identified.	Impacts identified.	Impacts identified. Metrics defined.	Impacts identified. Metrics defined & tracked.	Impacts identified. Metrics defined & tracked. Data shared.

Impact assessment in brief

Stakeholders	Metrics to be tracked	Identified contributions to DIGITAL impact		
		Becoming world leaders in training digital specialists	Strengthening industry competitiveness	Benefits to the wider society
Internal: Students Researchers Staff Services providers External: Other EELISA partners Professional bodies and associations Governments Citizens Civil engineering consultancy firms IT providers	Identified for each expected impact category.	<u>High quality teaching (metrics):</u> # Educational programmes offered by CoE. # Entrepreneurship programmes. # HEIs participating in teaching. <u>Public skill infrastructure (metrics):</u> # Joint certificates/diploma. # partners recognising the certification. <u>Dynamic digital ecosystems (metrics):</u> # Capstone projects developed with industrial partners. # Startups incubated. <u>Workplace readiness (metrics):</u> # Proprietary or open access software taught during the training.	<u>Digital Transformation in non-ICT sectors (metrics):</u> # and % of non-ICT companies involved in the educational programmes. # Dissemination events for non-ICT sectors. <u>Technology innovation (metrics):</u> # Digital twins for infrastructures and cities promoted, studied, or improved because of the project. # and € of technology transfer contracts. # and € of research technology development projects. # Startups incubated. <u>SME inclusion (metrics):</u> # SMEs involved in new projects launched from the CoE.	<u>Diversity & Inclusion (metrics):</u> # and % of diversity grants and scholarships given to students. <u>Higher degree of a data-driven society (metrics):</u> # Data-driven models included in digital twins for infrastructures and cities promoted, studied, or improved because of the Project. <u>UN SDGs (metrics):</u> # SDGs addressed by the courses (e.g. decarbonisation of energy, efficient mobility).

Funded by the European Union

Project: DigiQ

- Start date: 01/10/2022
- End date: 30/09/2026
- Programme format: Courses in existing Master's programmes and/or DigiQ Certificate (30+ ECTS of DigiQ courses completed)
- Skills areas and themes: Quantum technology

Impact assessment progress status

Impacts not yet identified. → Impacts identified. → **Impacts identified. Metrics defined.** → Impacts identified. Metrics defined & tracked. → Impacts identified. Metrics defined & tracked. Data shared.

Impact assessment in brief

Stakeholders	Metrics to be tracked	Identified contributions to DIGITAL Impact		
		Becoming world leaders in training digital specialists	Strengthening industry competitiveness	Benefits to the wider society
Academic partners Students Teachers Industry partners	# Students participating (and completing) the programme. Performance of participating students compared to local average performance. Satisfaction scores obtained through student feedback.	<u>High quality teaching:</u> Reputable HEIs participating in teaching. <u>Public skill infrastructure:</u> Certificates / degree programmes that are valid beyond DigiQ. <u>Dynamic digital ecosystems:</u> Collaboration between academic and industry partners that will outlive DigiQ. <u>Workplace readiness:</u> Students get quantum-related jobs.	<u>Digital Transformation in non-ICT sectors:</u> Master programmes targeting students without a bachelor's in physics. <u>Technology innovation:</u> Innovation is a core impact of DigiQ.	<u>Diversity & Inclusion:</u> The programme has an important outreach goal, aiming to educate general public on quantum technologies.

Funded by the European Union

Project: DS4HEALTH - TBC

- Start date: 01/01/2023
- End date: 30/12/2026
- Programme format: Part-Time (90 ECTS) or Full-Time (120 ECTS) Academic Master's Degree
- Skills areas and themes: E-health, AI, cybersecurity, IoT, data analytics, robotics

Impact assessment progress status

- Impacts not yet identified.
- Impacts identified.
- Impacts identified. Metrics defined.
- Impacts identified. Metrics defined & tracked.
- Impacts identified. Metrics defined & tracked. Data shared.

Impact assessment in brief

Stakeholders	Metrics to be tracked	Identified contributions to DIGITAL impact		
		Becoming world leaders in training digital specialists	Strengthening industry competitiveness	Benefits to the wider society
University Clinics Pharma industry Healthcare professionals Internship providers IT industry	Not provided	<u>Public skill infrastructure:</u> Master's degree & maybe badges and/or micro-degrees in the future. <u>Dynamic digital ecosystems:</u> Consortium ecosystem: step by step building up and promoting. <u>Workplace readiness:</u> Project work in clinic. Different Universities have different tracks with new technology.	<u>Digital Transformation in non-ICT sectors:</u> Digitalisation of healthcare. <u>Technology innovation:</u> eHealth (skills) and robotics.	<u>Higher degree of a data-driven society:</u> Data sharing and Interoperability. <u>UN SDGs:</u> Public health improvement.

Funded by the European Union

Project: ManagiDiTH

- Start date: 01/01/2023
- End date: 31/12/2026
- Programme format: 2-Semester Online Master's Degree (90 ECTS)
- Skills areas and themes: Digital Health

Impact assessment progress status

Impacts not yet identified. → Impacts identified. → **Impacts identified. Metrics defined.** → Impacts identified. Metrics defined & tracked. → Impacts identified. Metrics defined & tracked. Data shared.

Impact assessment in brief

Stakeholders	Metrics to be tracked	Identified contributions to DIGITAL Impact		
		Becoming world leaders in training digital specialists	Strengthening industry competitiveness	Benefits to the wider society
Education & research: Researchers, universities, labs & medical schools. Policymakers: Governments, regulators & local authorities. Companies: Start-ups, SMEs & larger corporations in the healthcare sector. Healthcare / social care providers & professionals: Pharmacies, physicians, nurses, healthcare institutions & elderly care centres. Third sector: Patient associations, charities, voluntary communities & scientific societies. Funders: Investors in eHealth and MedTech & insurers.	# Job-placements/ internships carried out by students # Cooperation agreements with industry # Seminars/ lectures held by industry experts # Hours of hands-on training	<u>High quality teaching:</u> Consortium partners. <u>Public skill infrastructure:</u> Master's Programme. <u>Digital ecosystems:</u> Master's Trialogical Learning Model, with co-design and capacity building strategies connected to RIS3. Workplace readiness: Master's programme curriculum, networking with SMEs & associated partners.	<u>Digital Transformation in non-ICT:</u> Dissemination of knowledge and tech integration in the health ecosystem. <u>Technology innovation:</u> Co-production and co-creation of an innovation repository with associated partners. <u>Cybersecurity resiliency:</u> Preventive and personalised approach to information systems and digital networks. <u>Availability of a skilled workforce:</u> Graduates, construction of contexts of cooperation outside the project scope.	<u>Diversity & Inclusion:</u> Qualification and skill development for all stakeholders. <u>Employment: Lifelong learning:</u> Recognition of skills and competencies for graduates and healthcare professionals & third sector. <u>Data-driven society:</u> Promotion of an inclusive and trustworthy digital data space. UN SDGs Patient-focused and human-centric approach to digital healthcare.

Funded by the European Union

Project: MERIT

- Start date: 01/10/2022
- End date: 30/09/2026
- Programme format: Academic Master's Degree (project aims also include creating an educational ecosystem to train digital specialists)
- Skills areas and themes: AI, cybersecurity, IoT

Impact assessment progress status

Impacts not yet identified. → Impacts identified. → Impacts identified. Metrics defined. → Impacts identified. Metrics defined & tracked. → **Impacts identified. Metrics defined & tracked. Data shared.**

Impact assessment in brief

Stakeholders	Metrics to be tracked	Identified contributions to DIGITAL Impact		
		Becoming world leaders in training digital specialists	Strengthening industry competitiveness	Benefits to the wider society
Undergraduate university students SMEs Public sector SME associations Regional business and innovation ecosystems EDIH networks at EU & national levels ICT employees needing upskilling General public	# HEI quality score # Partners contributing to the programme # Enrolled ICT and non-ICT students Student employment # Solutions / prototypes developed for existing society challenges Diversity score (% of students eligible for diversity scholarships) *Might be updated as MERIT follows agile principles.*	<u>High quality teaching:</u> Consortium with highly qualified training staff, sharing experiences. Organised internal conferences. Consortium upskilling through engagement with course materials & infrastructure <u>Dynamic digital ecosystems:</u> The consortium and partners are involved in the programme and events. <u>Workplace readiness:</u> The quality of the programme measured through student satisfaction, partner inclusion, and the practical experience obtained in placements. Study programmes will be "live" and updated even after the project, integrating automated tools (e.g. for field trend analysis, student experience monitoring, etc) and solutions for long-term collaboration benefits.	<u>Digital Transformation in non-ICT:</u> Edification campaign, focus on SME cases for projects. <u>Technology innovation:</u> The consortium collaborates in research and development. Established spin-offs and start-ups. <u>Cybersecurity resiliency:</u> Edification campaign and courses for SMEs and society.	<u>Diversity & Inclusion:</u> # and % of diversity scholarships given. <u>Employment - Lifelong learning:</u> Short term ICT courses are available for non-ICT bachelors. <u>Others:</u> Social rights promotion activities. Open source and data promotion policy.

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Project: DIGITAL4business

- Start date: 01/12/2022
- End date: 30/11/2026
- Programme format: Part-Time (60, 90 ECTS) or Full-Time (120 ECTS) Academic Master's Degree
- Skills areas and themes: AI, cybersecurity, cloud computing

Impact assessment progress status

Impacts not yet identified.	Impacts identified.	Impacts identified. Metrics defined.	Impacts identified. Metrics defined & tracked.	Impacts identified. Metrics defined & tracked. Data shared.

Impact assessment in brief

Stakeholders	Metrics to be tracked	Identified contributions to DIGITAL Impact		
		Becoming world leaders in training digital specialists	Strengthening industry competitiveness	Benefits to the wider society
Not provided.	Not provided.	Not provided.	Not provided.	Not provided.

Funded by the European Union

8 ANNEX 2

PROJECT ACRONYM	PARTICIPANT	TYPE	COUNTRY
AGRITECH EU	AGRICOLUS S.R.L.	Company/SME	IT
AGRITECH EU	APRA SPA	Company/SME	IT
AGRITECH EU	CESKA ZEMEDELSKA UNIVERZITA V PRAZE	HEI	CZ
AGRITECH EU	CONSIGLIO NAZIONALE DELLE RICERCHE	RTO	IT
AGRITECH EU	CONSORZIO UNIVERSITARIO IN INGEGNERIA PER LA QUALITA E L'INNOVAZIONE	Non-profit/NGO	IT
AGRITECH EU	CSITA ZS	Company/SME	CZ
AGRITECH EU	GEOPONIKO PANEPISTIMION ATHINON	HEI	EL
AGRITECH EU	INSTITUT NATIONAL D'ENSEIGNEMENT SUPERIEUR POUR L'AGRICULTURE, L'ALIMENTATION ET	HEI	FR
AGRITECH EU	UNIVERSIDAD DE ALMERIA	HEI	ES
AGRITECH EU	UNIVERSITA DEGLI STUDI DI MACERATA	HEI	IT
AGRITECH EU	UNIVERSITA DI PISA	HEI	IT
AGRITECH EU	UNIVERSITEIT GENT	HEI	BE
AGRITECH EU	XPERIENCIA VIRTUAL SL	Company/SME	ES
AI and Health	GENOMEUP SRL	Company/SME	IT
AI and Health	INGENIARS SRL	Company/SME	IT
AI and Health	INSTITUT NATIONAL DE RECHERCHE EN INFORMATIQUE ET AUTOMATIQUE	HEI	FR
AI and Health	KODE SRL	Company/SME	IT
AI and Health	ROKA FURADADA SL	Company/SME	ES
AI and Health	STOCKHOLMS UNIVERSITET	HEI	SE
AI and Health	UNIVERSITA DI PISA	HEI	IT
AI and Health	UNIVERSITAT AUTONOMA DE BARCELONA	HEI	ES
AI and Health	UNIVERSITATEA DE MEDICINA SI FARMACIE CAROL DAVILA DIN BUCURESTI	HEI	RO
AI and Health	UNIVERSITATEA DIN BUCURESTI	HEI	RO
AI and Health	UNIVERSITE COTE D'AZUR	HEI	FR
AI and Health	UNIVERSITE D'AIX MARSEILLE	HEI	FR
AI4CI	ASSOCIATION DE GESTION DU CONSERVATOIRE NATIONAL DES ARTS ET METIERS DE LA REGION	VET provider	FR
AI4CI	AVIGNON UNIVERSITE	HEI	FR
AI4CI	CONSERVATOIRE NATIONAL DES ARTS ET METIERS	HEI	FR
AI4CI	DIETHNES PANEPISTIMIO ELLADOS	HEI	EL
AI4CI	ECLEXYS SAGL	Company/SME	CH
AI4CI	FUNDACIO PRIVADA I2CAT, INTERNET I INNOVACIO DIGITAL A CATALUNYA	Non-profit/NGO	ES
AI4CI	FUNDACION INSTITUTO TECNOLOGICO DE CASTILLA Y LEON	Company/SME	ES
AI4CI	GREEN COMMUNICATIONS SAS	Company/SME	FR
AI4CI	KM-BOOKS PUBLISHING GROUP LLC	Company/SME	UA
AI4CI	NATIONAL TECHNICAL UNIVERSITY OF UKRAINE IGOR SIKORSKY KYIV POLYTECHNIC INSTITUTE	HEI	UA
AI4CI	SMILE	Other	FR

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AI4CI	TANHOST LLC	Company/SME	UA
AI4CI	U-HOPPER SRL	Private training	IT
AI4CI	UNIVERSIDAD CARLOS III DE MADRID	HEI	ES
AI4CI	UNIVERSITA DI PISA	HEI	IT
AI4CI	UNIVERSITAT POLITECNICA DE CATALUNYA	HEI	ES
AI4CI	UNIVERSITATEA BABES BOLYAI	HEI	RO
BIONT	ALBERT-LUDWIGS-UNIVERSITAET FREIBURG	HEI	DE
BIONT	BIOBYTE SOLUTIONS GMBH	Company/SME	DE
BIONT	DEUTSCHE ZENTRALBIBLIOTHEK FUR MEDIZIN (ZB MED)-LEIBNIZ-INFORMATIONSZENTRUM	Non-profit/NGO	DE
BIONT	ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE	HEI	CH
BIONT	EUROPEAN MOLECULAR BIOLOGY LABORATORY	Non-profit/NGO	DE
BIONT	HPC NOW CONSULTING SL	Company/SME	ES
BIONT	SIMULA LEARNING AS	Non-profit/NGO	NO
BIONT	UNIVERSITAT DE BARCELONA	HEI	ES
BIONT	UNIVERSITETET I OSLO	HEI	NO
CloudCamp4SMEs	ADECCO FORMAZIONE SRL	Private training	IT
CloudCamp4SMEs	AKKODIS ITALY SRL	Company/SME	IT
CloudCamp4SMEs	AMAZON WEB SERVICES EMEA SARL	Company/SME	LU
CloudCamp4SMEs	ASOCIACION ESPAÑOLA DE FABRICANTES DE MAQUINAS-HERRAMIENTA, SUS ACCESORIOS,	Association	ES
CloudCamp4SMEs	BI-REX- BIG DATA INNOVATION RESEARCH EXCELLENCE	Non-profit/NGO	IT
CloudCamp4SMEs	BWCON GMBH	Company/SME	DE
CloudCamp4SMEs	CABI	Non-profit/NGO	DK
CloudCamp4SMEs	CONFINDUSTRIA EMILIA ROMAGNA RICERCA SCARL	Non-profit/NGO	IT
CloudCamp4SMEs	EUROPEAN BUSINESS AND INNOVATION CENTRE NETWORK AISBL	Non-profit/NGO	BE
CloudCamp4SMEs	FAST LANE BENELUX BV	Private training	NL
CloudCamp4SMEs	FAST LANE INSTITUTE FOR KNOWLEDGE TRANSFER GMBH	Private training	DE
CloudCamp4SMEs	FUNDACION DE INVESTIGACION DE LA MAQUINA HERRAMIENTA	Company/SME	ES
CloudCamp4SMEs	FUNDINGBOX COMMUNITIES SL	Company/SME	ES
CloudCamp4SMEs	SCHUMAN ASSOCIATES SCRL	Company/SME	BE
CloudCamp4SMEs	UNIONE DEGLIINDUSTRIALI E DELLE IMPRESE ROMA, FROSINONE, LATINA, RIETI, VITERBO	Association	IT
CloudCamp4SMEs	ZWIAZEK PRZEDSIEBIORCOW I PRACODAWCOW	Association	PL
CYBERACTIONING	AMPED SRL	Company/SME	IT
CYBERACTIONING	DIGITALSIGN - CERTIFICADORA DIGITAL SA	Company/SME	PT
CYBERACTIONING	EUROTUX INFORMATICA S.A.	Company/SME	PT
CYBERACTIONING	FUNDACION IMDEA NETWORKS	Association	ES
CYBERACTIONING	QASCOM SRL	Company/SME	IT
CYBERACTIONING	SECURIQ SISTEMAS SL	Company/SME	ES
CYBERACTIONING	UNIVERSIDAD DE GRANADA	HEI	ES
CYBERACTIONING	UNIVERSIDADE DO MINHO	HEI	PT

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CYBERACTIONING	UNIVERSITA DEGLI STUDI DI PADOVA	HEI	IT
CYBERACTIONING	VILNIAUS UNIVERSITETAS	HEI	LT
CyberSecPro	ACEEU GMBH	Association	DE
CyberSecPro	AIT AUSTRIAN INSTITUTE OF TECHNOLOGY GMBH	HEI	AT
CyberSecPro	APIROPLUS SOLUTIONS LTD	Company/SME	CY
CyberSecPro	C2B CONSULTING	Company/SME	FR
CyberSecPro	COFAC COOPERATIVA DE FORMACAO E ANIMACAO CULTURAL CRL	HEI	PT
CyberSecPro	CONSIGLIO NAZIONALE DELLE RICERCHE	RTO	IT
CyberSecPro	FOCAL POINT	Company/SME	BE
CyberSecPro	INFORMATION TECHNOLOGY FOR MARKET LEADERSHIP	Company/SME	EL
CyberSecPro	INSTITUT MINES-TELECOM	HEI	FR
CyberSecPro	JOHANN WOLFGANG GOETHE-UNIVERSITAET FRANKFURT AM MAIN	HEI	DE
CyberSecPro	LAUREA-AMMATTIKORKEAKOULU OY	HEI	FI
CyberSecPro	MAGGIOLI SPA	Company/SME	IT
CyberSecPro	PDM E FC PROJECTO DESENVOLVIMENTO MANUTENCAO FORMACAO E CONSULTADORIALDA	Private training	PT
CyberSecPro	POLYTECHNEIO KRITIS	HEI	EL
CyberSecPro	SECURITY LABS CONSULTING LIMITED	Company/SME	IE
CyberSecPro	SERIOUS GAMES INTERACTIVE APS	Company/SME	DK
CyberSecPro	SINTEF AS	RTO	NO
CyberSecPro	SOCIAL ENGINEERING ACADEMY (SEA) GMBH	Company/SME	DE
CyberSecPro	TALLINNA TEHNIKAÜLIKOOL	HEI	EE
CyberSecPro	TECHNISCHE UNIVERSITAET BRAUNSCHWEIG	HEI	DE
CyberSecPro	TRUSTILIO BV	Company/SME	NL
CyberSecPro	UNINOVA-INSTITUTO DE DESENVOLVIMENTO DE NOVAS TECNOLOGIAS-ASSOCIACAO	Non-profit/NGO	PT
CyberSecPro	UNIVERSIDAD DE MALAGA	HEI	ES
CyberSecPro	UNIVERSIDADE NOVA DE LISBOA	HEI	PT
CyberSecPro	UNIVERSITY OF CYPRUS	HEI	CY
CyberSecPro	University of Novi Sad Faculty of Sciences	HEI	RS
CyberSecPro	UNIVERSITY OF PIRAEUS RESEARCH CENTER	HEI	EL
CyberSecPro	ZELUS IKE	Company/SME	EL
CYRUS	CEFRIEL SOCIETA CONSORTILE A RESPONSABILITA LIMITATA	Association	IT
CYRUS	DEEP BLUE SRL	Company/SME	IT
CYRUS	EIT MANUFACTURING CENTRAL GGMBH	VET provider	DE
CYRUS	EUROPEAN FEDERATION FOR WELDING JOINING AND CUTTING	VET provider	BE
CYRUS	G & N SILENSEC LTD	Company/SME	CY
CYRUS	ITALIENISCHE HANDELSKAMMER FUR DEUTSCHLAND	Association	DE
CYRUS	STICHTING VU	HEI	NL
CYRUS	STOWARZYSZENIE POLSKA PLATFORMA BEZPIECZENSTWA WEWNETRZNEGO	Non-profit/NGO	PL
CYRUS	UNION INTERNATIONALE DES CHEMINS DE FER	Association	FR

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CYRUS	UNIVERSITATEA SPIRU HARET	HEI	RO
CYRUS	VIESOJI ISTAIGA LIETUVOS INOVACIJU CENTRAS	Association	LT
DigiAdvance	DROGHEDA ENTERPRISE CENTRE COMPANY LIMITED BY GUARANTEE	Non-profit/NGO	IE
DigiAdvance	DUBLIN CITY UNIVERSITY	HEI	IE
DigiAdvance	FUNDACIO BARCELONA MOBILE WORLD CAPITAL FOUNDATION	Private training	ES
DigiAdvance	INOVA-RIA ASSOCIACAO DE EMPRESAS PARA UMA REDE DE INOVACAO EM AVEIRO	Non-profit/NGO	PT
DigiAdvance	UNIVERSIDADE DE AVEIRO	HEI	PT
DigiAdvance	UNIVERSITAT AUTONOMA DE BARCELONA	HEI	ES
DigiQ	AARHUS UNIVERSITET	HEI	DK
DigiQ	AHMED SHAEEMA ZAMAN	Other	DK
DigiQ	CENTRALESUPELEC	HEI	FR
DigiQ	CESKE VYSOKE UCENI TECHNICKE V PRAZE	HEI	CZ
DigiQ	DANMARKS TEKNISKE UNIVERSITET	HEI	DK
DigiQ	DELOITTE TECHNOLOGY, S.A.	Company/SME	PT
DigiQ	ECOLE NORMALE SUPERIEURE	HEI	FR
DigiQ	FUNDACIO INSTITUT CATALA DE NANOCIENCIA I NANOTECNOLOGIA	HEI	ES
DigiQ	FUNDACIO INSTITUT DE CIENCIES FOTONIQUES	HEI	ES
DigiQ	HELSINGIN YLIOPISTO	HEI	FI
DigiQ	INSTITUTO SUPERIOR TECNICO	HEI	PT
DigiQ	KOBENHAVNS UNIVERSITET	HEI	DK
DigiQ	LUDWIG-MAXIMILIANS-UNIVERSITAET MUENCHEN	HEI	DE
DigiQ	PQI-ASSOCIACAO PORTUGUESE QUANTUM INSTITUTE	HEI	PT
DigiQ	QUARKS INTERACTIVE S.R.L.	Company/SME	RO
DigiQ	RHEINISCH-WESTFAELISCHE TECHNISCHE HOCHSCHULE AACHEN	HEI	DE
DigiQ	RUPRECHT-KARLS-UNIVERSITAET HEIDELBERG	HEI	DE
DigiQ	SORBONNE UNIVERSITE	HEI	FR
DigiQ	TECHNISCHE UNIVERSITAET MUENCHEN	HEI	DE
DigiQ	UNIVERSITA DI PISA	HEI	IT
DigiQ	UNIVERSITAT AUTONOMA DE BARCELONA	HEI	ES
DigiQ	UNIVERSITAT DE BARCELONA	HEI	ES
DigiQ	UNIVERSITE DE STRASBOURG	HEI	FR
DigiQ	UNIVERSITE DE TECHNOLOGIE DE TROYES	HEI	FR
DigiQ	UNIVERSITE PARIS-SACLAY	HEI	FR
DIGITAL4Business	ACADEMIA DE STUDII ECONOMICE DIN BUCURESTI	HEI	RO
DIGITAL4Business	ADECCO FORMAZIONE SRL	Private training	IT
DIGITAL4Business	AKKODIS ITALY SRL	Company/SME	IT
DIGITAL4Business	ALMA MATER STUDIORUM - UNIVERSITA DI BOLOGNA	HEI	IT
DIGITAL4Business	Certiport, A business of NCS Pearson Inc	Private training	US
DIGITAL4Business	CONSORZIO INTERUNIVERSITARIO NAZIONALE PER L'INFORMATICA	Association	IT

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DIGITAL4Business	DIGITAL TECHNOLOGY SKILLS LIMITED	Company/SME	IE
DIGITAL4Business	DIGITALEUROPE AISBL*	Association	BE
DIGITAL4Business	LEE HECHT HARRISON DEUTSCHLAND GMBH	Company/SME	DE
DIGITAL4Business	LINKOPINGS UNIVERSITET	HEI	SE
DIGITAL4Business	MATRIX INTERNET APPLICATIONS LIMITED	Company/SME	IE
DIGITAL4Business	NATIONAL COLLEGE OF IRELAND	HEI	IE
DIGITAL4Business	SCHUMAN ASSOCIATES SCRL	Company/SME	BE
DIGITAL4Business	SKILLNET IRELAND COMPANY LIMITED BY GUARANTEE	VET provider	IE
DIGITAL4Business	TALLINNA TEHNIKAÜLIKOOL	HEI	EE
DIGITAL4Business	TERAWE TECHNOLOGIES LIMITED	Company/SME	IE
DIGITAL4Business	UNIVERSIDADE NOVA DE LISBOA	HEI	PT
DIGITAL4Business	UNIVERSITE PARIS 8 VINCENNES SAINT-DENIS	HEI	FR
DIGITAL4Business	UNIVERSITY OF DIGITAL SCIENCE GGMBH	HEI	DE
Digital4Security	ADECCO FORMAZIONE SRL	Private training	IT
Digital4Security	ADECCO ITALIA HOLDING DI PARTECIPAZIONE E SERVIZI SPA	Company/SME	IT
Digital4Security	AGORIA ASBL	Non-profit/NGO	BE
Digital4Security	ATAYA & PARTNERS	Company/SME	BE
Digital4Security	BANCO SANTANDER SA	Company/SME	ES
Digital4Security	CONTRADER SRL	Company/SME	IT
Digital4Security	CY CERGY PARIS UNIVERSITE	HEI	FR
Digital4Security	DIGITAL TECHNOLOGY SKILLS LIMITED	Company/SME	IE
Digital4Security	DIGITALEUROPE AISBL*	Association	BE
Digital4Security	EUROPEAN DIGITAL SME ALLIANCE	Association	BE
Digital4Security	FRAUNHOFER GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG EV	Association	DE
Digital4Security	G & N SILENSEC LTD	Company/SME	CY
Digital4Security	INDEPENDENT PICTURES LIMITED	Company/SME	IE
Digital4Security	IT@CORK ASSOCIATION LIMITED LBG	Association	IE
Digital4Security	MATRIX INTERNET APPLICATIONS LIMITED	Company/SME	IE
Digital4Security	MUNSTER TECHNOLOGICAL UNIVERSITY	HEI	IE
Digital4Security	MYKOLO ROMERIO UNIVERSITETAS	HEI	LT
Digital4Security	NATIONAL COLLEGE OF IRELAND	HEI	IE
Digital4Security	NAUKOWA I AKADEMICKA SIEC KOMPUTEROWA - PANSTWOWY INSTYTUT BADAWCZY	HEI	PL
Digital4Security	NOKIA NETWORKS FRANCE	Company/SME	FR
Digital4Security	Pearson Benelux BV	Company/SME	NL
Digital4Security	POLITECNICO DI MILANO	HEI	IT
Digital4Security	POLSKI KLASTER CYBERBEZPIECZENSTWA CYBERMADEINPOLAND SP. Z O. O.	Association	PL
Digital4Security	PROFIL KLETT D.O.O.	Company/SME	HR
Digital4Security	RED OPEN S.R.L.	Company/SME	IT
Digital4Security	SCHUMAN ASSOCIATES SCRL	Company/SME	BE

Digital4Security	SERVICENOW IRELAND LIMITED	Company/SME	IE
Digital4Security	SKILLNET IRELAND COMPANY LIMITED BY GUARANTEE	VET provider	IE
Digital4Security	SVEUCILISTE U RIJECI	HEI	HR
Digital4Security	TERAWE TECHNOLOGIES LIMITED	Company/SME	IE
Digital4Security	UNIVERSIDAD INTERNACIONAL DE LA RIOJA SA	HEI	ES
Digital4Security	UNIVERSITA DEGLI STUDI DI BRESCIA	HEI	IT
Digital4Security	UNIVERSITAT KOBLENZ	HEI	DE
Digital4Security	UNIVERSITATEA POLITEHNICA DIN BUCURESTI	HEI	RO
Digital4Security	UNIVERSITY OF DIGITAL SCIENCE GGMBH	HEI	DE
Digital4Security	VYSOKE UCENI TECHNICKE V BRNE	HEI	CZ
Digital4Security	VYTAUTO DIDZIOJO UNIVERSITETAS	HEI	LT
DIGITWIN4CIUE	ALTAMETRIS	Company/SME	FR
DIGITWIN4CIUE	BUDAPESTI MUSZAKI ES GAZDASAGTUDOMANYI EGYETEM	HEI	HU
DIGITWIN4CIUE	ECOLE NATIONALE DES PONTS ET CHAUSSEES	HEI	FR
DIGITWIN4CIUE	ISTANBUL TEKNIK UNIVERSITESI	HEI	TR
DIGITWIN4CIUE	MAINRAIL SL	Company/SME	ES
DIGITWIN4CIUE	NOMMON SOLUTIONS AND TECHNOLOGIES SL	Company/SME	ES
DIGITWIN4CIUE	TYRIS AI SL	Company/SME	ES
DIGITWIN4CIUE	UNIVERSIDAD POLITECNICA DE MADRID	HEI	ES
DIGITWIN4CIUE	UNIVERSITATEA POLITEHNICA DIN BUCURESTI	HEI	RO
DigiWind	Cadpeople A/S	Company/SME	DK
DigiWind	DANMARKS TEKNISKE UNIVERSITET	HEI	DK
DigiWind	F6S NETWORK IRELAND LIMITED	Association	IE
DigiWind	NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU	HEI	NO
DigiWind	POLITECHNIKA GDANSKA	HEI	PL
DigiWind	SOFTSERVE POLAND SP ZOO	Company/SME	PL
DigiWind	TECHNISCHE UNIVERSITEIT DELFT	HEI	NL
DigiWind	Technological University of the Shannon: Midlands Midwest	HEI	IE
DigiWind	UNIVERSITETET I OSLO	HEI	NO
DigiWind	WHIFFLE BV	Company/SME	NL
DIS4SME	ASOCIACION DE LA INDUSTRIA NAVARRA	Association	ES
DIS4SME	CONSIGLIO NAZIONALE DELLE RICERCHE	RTO	IT
DIS4SME	EPSILON ITALIA SRL	Private training	IT
DIS4SME	G.I.M. - GEOGRAPHIC INFORMATION MANAGEMENT	Company/SME	BE
DIS4SME	GISIG GEOGRAPHICAL INFORMATION SYSTEMS INTERNATIONAL GROUP ASSOCIAZIONE	Association	IT
DIS4SME	KATHOLIEKE UNIVERSITEIT LEUVEN	HEI	BE
DIS4SME	OPEN GEOSPATIAL CONSORTIUM EUROPE	Association	BE
DIS4SME	SIIT SOCIETA CONSORTILE PER AZIONI SIGLABILE SIIT SCPA	Association	IT
DIS4SME	SVEUCILISTE SJEVER	HEI	HR

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DIS4SME	VRECAR SIMON	Other	SI
DS4Health	BAYER AKTIENGESELLSCHAFT	Company/SME	DE
DS4Health	CLINOMIC MEDICAL GMBH	Company/SME	DE
DS4Health	CONSIGLIO NAZIONALE DELLE RICERCHE	RTO	IT
DS4Health	ECOLE NATIONALE SUPERIEURE DE TECHNIQUES AVANCEES	HEI	FR
DS4Health	ECOLE POLYTECHNIQUE	HEI	FR
DS4Health	INFORMATION TECHNOLOGY FOR TRANSLATIONAL MEDICINE (ITTM) SA	Company/SME	LU
DS4Health	INSTITUT JOZEF STEFAN	HEI	SI
DS4Health	INSTITUT MINES-TELECOM	HEI	FR
DS4Health	INSTITUT POLYTECHNIQUE DE PARIS	HEI	FR
DS4Health	KNOWLEDGEBIZ CONSULTING-SOCIEDADE DE CONSULTORIA EM GESTAO LDA	Company/SME	PT
DS4Health	MEDIZINISCHE UNIVERSITAET WIEN	HEI	AT
DS4Health	PANEPISTIMIO IOANNINON	HEI	EL
DS4Health	SECRETARIA REGIONAL DA SAUDE	Government	PT
DS4Health	TEL AVIV UNIVERSITY	HEI	IL
DS4Health	UNINOVA-INSTITUTO DE DESENVOLVIMENTO DE NOVAS TECNOLOGIAS-ASSOCIACAO	HEI	PT
DS4Health	UNIVERSIDADE NOVA DE LISBOA	HEI	PT
DS4Health	UNIVERSITAETSKLINIKUM AACHEN	HEI	DE
EAGLE	ASOCIACION DIGITAL INNOVATION HUB INDUSTRY 4.0 (DIHBU)	Association	ES
EAGLE	CONFEDERACION DE ASOCIACIONES EMPRESARIALES DE BURGOS	Association	ES
EAGLE	LIETUVOS KIBERNETINIU NUSIKALTIMU KOMPETENCIJU IR TYRIMU CENTRAS	Association	LT
EAGLE	SKILLNET IRELAND COMPANY LIMITED BY GUARANTEE	VET provider	IE
EAGLE	SLOVENSKA OBCHODNA A PRIEMYSELNA KOMORA	Association	SK
EAGLE	TURUN AMMATTIKORKEAKOULU OY	HEI	FI
EAGLE	UNIVERSIDAD DE BURGOS	HEI	ES
EAGLE	UNIVERSITY OF LIMERICK	HEI	IE
EAGLE	UNIVERZITA MATEJA BELA V BANSKEJ BYSTRICI	HEI	SK
EAGLE	VERNIAN RTI	Company/SME	CY
EAGLE	VSB - TECHNICAL UNIVERSITY OF OSTRAVA	HEI	CZ
Edu4Chip	DANMARKS TEKNISKE UNIVERSITET	HEI	DK
Edu4Chip	FRAUNHOFER GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG EV	RTO	DE
Edu4Chip	INFINEON TECHNOLOGIES AG	Company/SME	DE
Edu4Chip	INSTITUT MINES-TELECOM	HEI	FR
Edu4Chip	KUNGLIGA TEKNISKA HOEGSKOLAN	HEI	SE
Edu4Chip	LODZHIKUARKS OOD	Company/SME	BG
Edu4Chip	MINRES TECHNOLOGIES GMBH	Company/SME	DE
Edu4Chip	SYOSIL APS	Company/SME	DK
Edu4Chip	TAMPEREEN KORKEAKOULUSAATIO SR	HEI	FI
Edu4Chip	TECHNISCHE UNIVERSITAET MUENCHEN	HEI	DE

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Edu4Chip	TEXAS INSTRUMENTS DEUTSCHLAND GMBH	Company/SME	DE
Edu4Chip	VLSI SOLUTION OY	Company/SME	FI
EMAI4EU	EIT DIGITAL	Association	BE
EMAI4EU	EOTVOS LORAND TUDOMANYEGYETEM	HEI	HU
EMAI4EU	EURECOM GIE	HEI	FR
EMAI4EU	LUDOTIC	Company/SME	FR
EMAI4EU	MEDISPA SRL	Company/SME	IT
EMAI4EU	NUNEZ-MILARA SL	Company/SME	ES
EMAI4EU	POLITECNICO DI MILANO	HEI	IT
EMAI4EU	TECH VALLEY MANAGEMENT	Company/SME	ES
EMAI4EU	TURUN YLIOPISTO	HEI	FI
EMAI4EU	UNIVERSIDAD POLITECNICA DE MADRID	HEI	ES
EMAI4EU	UNIVERSITA DEGLI STUDI DI TRENTO	HEI	IT
EMAI4EU	UNIVERSITE COTE D'AZUR	HEI	FR
EMAI4EU	UNIVERSITE DE RENNES	HEI	FR
EmpowerED	ACCELERACE MANAGEMENT AS	Company/SME	DK
EmpowerED	ASSOCIATION EUROPEENNE POUR LA FORMATION PROFESSIONNELLE	Association	BE
EmpowerED	Association Swiss EdTech Collider	Association	CH
EmpowerED	EdTech Garage	Association	FR
EmpowerED	EDUVATION GMBH	Company/SME	DE
EmpowerED	EUN PARTNERSHIP AISBL	Association	BE
EmpowerED	EUROPEAN EDTECH ALLIANCE EV	Association	DE
EmpowerED	FUNDINGBOX ACCELERATOR SP ZOO	Company/SME	PL
EmpowerED	FUNDINGBOX COMMUNITIES SL	Company/SME	ES
EmpowerED	GSM ASSOCIATION	Association	CH
EmpowerED	HELSINGIN KAUPUNKI	Government	FI
EmpowerED	Ifous	Association	SE
EmpowerED	INSTITOUTO TECHNOLOGIAS YPOLOGISTON KAI EKDOSEON DIOFANTOS	HEI	EL
EmpowerED	KATHOLIEKE UNIVERSITEIT LEUVEN	HEI	BE
EmpowerED	LIETUVOS RESPUBLIKOS SVIETIMO, MOKSLO IR SPORTO MINISTERIJA	Government	LT
EmpowerED	MINISTERE DE L'EDUCATION NATIONALE DE LA JEUNESSE ET DES SPORTS	Government	FR
EmpowerED	MINISTRY OF NATIONAL EDUCATION	Government	TR
EmpowerED	OULUN AMMATTIKORKEAKOULU OY - OULU UNIVERSITY OF APPLIED SCIENCES	HEI	FI
EmpowerED	Stichting The Dutch School	HEI	NL
EmpowerED	UNIVERSITY COLLEGE LONDON	HEI	UK
EmpowerED	VLAAMSE GEMEENSCHAP	Government	BE
EmpowerED	WONDERFUL EDUCATION SRL	Private training	IT
EmpowerED	XEDU OY	Private training	FI
EmpowerED	Zanichelli Editore S.p.A.	Company/SME	IT

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GreenChips-EDU	AEDVICES CONSULTING	Company/SME	FR
GreenChips-EDU	BK-BUSINESS KONSENS OG	Company/SME	AT
GreenChips-EDU	CADENCE DESIGN SYSTEMS GMBH	Company/SME	DE
GreenChips-EDU	FH KAERNTEN - GEMEINNUETZIGE GmbH	HEI	AT
GreenChips-EDU	INESC ID - INSTITUTO DE ENGENHARIADE SISTEMAS E COMPUTADORES, INVESTIGACAO E	Non-profit/NGO	PT
GreenChips-EDU	INFINEON TECHNOLOGIES AUSTRIA AG	Company/SME	AT
GreenChips-EDU	INSTITUT POLYTECHNIQUE DE GRENOBLE	HEI	FR
GreenChips-EDU	INSTITUTO SUPERIOR TECNICO	HEI	PT
GreenChips-EDU	JLG FORMATIONS	Private training	FR
GreenChips-EDU	KONCAR - ELEKTRONICA I INFORMATIKADOO ZA PROIZVODNJU I USLUGE	Company/SME	HR
GreenChips-EDU	ONG "THE STERN STEWART INSTITUTE"/LYCEE PRIVE SHORGE	HEI	BF
GreenChips-EDU	POLITECNICO DI TORINO	HEI	IT
GreenChips-EDU	RUSZ - VEREIN ZUR FOERDERUNG DER SOZIALWIRTSCHAFT	Association	AT
GreenChips-EDU	SILICONGATE LDA	Company/SME	PT
GreenChips-EDU	STMICROELECTRONICS (ALPS) SAS	Company/SME	FR
GreenChips-EDU	TECHNISCHE UNIVERSITAET GRAZ	HEI	AT
GreenChips-EDU	TECHNISCHE UNIVERSITAT DARMSTADT	HEI	DE
GreenChips-EDU	UNIVERSITAT POLITECNICA DE CATALUNYA	HEI	ES
LeADS	ALLIANCE FOR IOT AND EDGE COMPUTING INNOVATION IVZW	Association	BE
LeADS	BLUSPECS SL	Company/SME	ES
LeADS	DATA AI AND ROBOTICS DAIRO	Association	BE
LeADS	IDC ITALIA SRL	Company/SME	IT
LeADS	MAGGIOLI SPA	Company/SME	IT
LeADS	MARTEL INNOVATE BV	Company/SME	NL
LeADS	SYDDANSK UNIVERSITET	HEI	DK
LeADS	THE PROVOST, FELLOWS, FOUNDATION SCHOLARS & THE OTHER MEMBERS OF BOARD, OF THE	HEI	IE
LeADS	UNIVERSIDAD POLITECNICA DE MADRID	HEI	ES
Level Up	BERLIN PARTNER FUR WIRTSCHAFT UND TECHNOLOGIE GMBH	Company/SME	DE
Level Up	CENTRO PER LO SVILUPPO CREATIVO DANILO DOLCI	Non-profit/NGO	IT
Level Up	D. KYRIAKATIS - E. VAFEIADIS O.E.	Private training	EL
Level Up	ELLINIKOS SYNERGATIKOS SCHIMATISMOS PSIFIAKIS YGEIAS IDIOTIKI KEFALAIOYXIKI ETAIREIA	Association	EL
Level Up	EMPORIKO KAI BIOMIXANIKO EPIMELITIRIO LEFKOSIAS	Association	CY
Level Up	EUROPEAN UNIVERSITY - CYPRUS LTD	HEI	CY
Level Up	GRANTXPERT CONSULTING LIMITED	Company/SME	CY
Level Up	INFORMATIKAI, TAVKOZLESI ES ELEKTRONIKAI VALLALKOZASOK SZOVETSEGE	Association	HU
Level Up	PAGKYPRIOS SYNDESMOS EPICHEIRISEONPLIROFORIKIS	Association	CY
Level Up	PRIZZTECH OY	Company/SME	FI
Level Up	REGIONALNA IZBA GOSPODARCZA POMORZA	Association	PL
Level Up	STACKFUEL GMBH	Private training	DE

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Level Up	SYNDESMOS VIOMICHANON NOMOU LARISIS	Association	EL
Level Up	THE FACTORY IKE	Company/SME	EL
ManagiDiTH	ADHD HELLAS	Non-profit/NGO	EL
ManagiDiTH	ARISTOTELIO PANEPISTIMIO THESSALONIKIS	HEI	EL
ManagiDiTH	CLINIPOWER FINLAND OY	Company/SME	FI
ManagiDiTH	CVP-Sociedade de Gestão Hospitalar S.A.	Other	PT
ManagiDiTH	EUROPEAN NETWORK OF LIVING LABS IVZW	Association	BE
ManagiDiTH	Finnish Diabetes Association	Association	FI
ManagiDiTH	Health Cluster Portugal - Associacao do Polo de Competitividade da Saude	Association	PT
ManagiDiTH	Hovi Group Oy	Company/SME	FI
ManagiDiTH	INSTITUTO DE TELECOMUNICACOES	HEI	PT
ManagiDiTH	Iscte - Instituto Universitário de Lisboa	HEI	PT
ManagiDiTH	LAUREA-AMMATTIKORKEAKOULU OY	HEI	FI
ManagiDiTH	MUNDISERVICOS - COMPANHIA PORTUGUESA DE SERVICOS E GESTAO LDA	Company/SME	PT
ManagiDiTH	The Union for Senior Services, VALLI	Association	FI
ManagiDiTH	Thessaloniki Women Association with Breast Cancer "Alma Zois"	Non-profit/NGO	EL
ManagiDiTH	UNIVERSITE GUSTAVE EIFFEL	HEI	FR
ManagiDiTH	WHYMOB LDA	Company/SME	PT
MERIT	ASOCIATIA DIGITAL INNOVATION ZONE ZONA DE INOVARE DIGITALA	Association	RO
MERIT	ASOINDEL S.L.	Company/SME	ES
MERIT	EXACASTER, UAB	Company/SME	LT
MERIT	FONDAZIONE BRUNO KESSLER	RTO	IT
MERIT	FUNDACIO CENTRE D'INNOVACIO I TECNOLOGIA DE LA UPC	RTO	ES
MERIT	RIGAS TEHNISKA UNIVERSITATE	HEI	LV
MERIT	SAULETEKIO SLENIO MOKSLO IR TECHNOLOGIJU PARKAS	Association	LT
MERIT	TALLINNA TEHNIKAÜLIKOOL	HEI	EE
MERIT	UNIVERSITAT POLITECNICA DE CATALUNYA	HEI	ES
MERIT	VILNIAUS GEDIMINO TECHNIKOS UNIVERSITETAS	HEI	LT
QTIndu	AARHUS UNIVERSITET	HEI	DK
QTIndu	AIRBUS DEFENCE AND SPACE SAS	Company/SME	FR
QTIndu	FUNDACIO INSTITUT DE CIENCIES FOTONIQUES	RTO	ES
QTIndu	HELSINGIN YLIOPISTO	HEI	FI
QTIndu	MICRO- EN NANOTECHNOLOGIE NEDERLAND	Company/SME	NL
QTIndu	PHYSIKALISCH-TECHNISCHE BUNDESANSTALT	RTO	DE
QTIndu	QUANTUM VALLEY LOWER SAXONY (QVLS) E.V.	RTO	DE
QTIndu	QURECA SPAIN SL	Private training	ES
QTIndu	STIFTERVERBAND FUR DIE DEUTSCHE WISSENSCHAFT EV	Association	DE
QTIndu	TECHNISCHE UNIVERSITAET BRAUNSCHWEIG	HEI	DE
QTIndu	TECHNISCHE UNIVERSITEIT DELFT	HEI	NL

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REBOOT SKILLS	DIMECC OY	Company/SME	FI
REBOOT SKILLS	FLANDERS MAKE	RTO	BE
REBOOT SKILLS	KATHOLIEKE UNIVERSITEIT LEUVEN	HEI	BE
REBOOT SKILLS	LULEA TEKNISKA UNIVERSITET	HEI	SE
REBOOT SKILLS	MADE SCARL	Association	IT
REBOOT SKILLS	OULUN YLIOPISTO	HEI	FI
REBOOT SKILLS	SKILLNET IRELAND COMPANY LIMITED BY GUARANTEE	VET provider	IE
REBOOT SKILLS	UNIVERSITY OF LIMERICK	HEI	IE
SME4DD	BUDAPESTI MUSZAKI ES GAZDASAGTUDOMANYI EGYETEM	HEI	HU
SME4DD	EIT DIGITAL	Association	BE
SME4DD	INSTITUT NATIONAL DE RECHERCHE EN INFORMATIQUE ET AUTOMATIQUE	RTO	FR
SME4DD	KORMANYZATI INFORMATIKAI FEJLESZTESI UGYNOKSEG	Government	HU
SME4DD	TALENT GARDEN ITALIA SRL	Private training	IT
SME4DD	UNIONE CONFCOMMERCIO-IMPRESE PER L' ITALIA MILANO	Association	IT
SPECTRO	AALTO KORKEAKOULUSAATIO SR	HEI	FI
SPECTRO	ALMA MATER STUDIORUM - UNIVERSITA DI BOLOGNA	HEI	IT
SPECTRO	BUDAPESTI MUSZAKI ES GAZDASAGTUDOMANYI EGYETEM	HEI	HU
SPECTRO	CYSCALE SYSTEMS SRL	Company/SME	RO
SPECTRO	EIT DIGITAL	Association	BE
SPECTRO	EOTVOS LORAND TUDOMANYEGYETEM	HEI	HU
SPECTRO	EURECOM GIE	HEI	FR
SPECTRO	GIM OY	Company/SME	FI
SPECTRO	KUNGLIGA TEKNISKA HOEGSKOLAN	HEI	SE
SPECTRO	TURUN YLIOPISTO	HEI	FI
SPECTRO	UNIVERSITA DEGLI STUDI DI TRENTO	HEI	IT
SPECTRO	UNIVERSITATEA BABES BOLYAI	HEI	RO
SPECTRO	UNIVERSITE COTE D'AZUR	HEI	FR
SPECTRO	UNIVERSITE DE RENNES	HEI	FR
SPECTRO	UNIVERSITEIT TWENTE	HEI	NL
Tech Time 2 Skill	AGENCE DU NUMERIQUE	Government	BE
Tech Time 2 Skill	AGORIA ASBL	Non-profit/NGO	BE
Tech Time 2 Skill	ASOCIACION FACTORIA F5	Non-profit/NGO	ES
Tech Time 2 Skill	BECODE	Non-profit/NGO	BE
Tech Time 2 Skill	MICROSOFT EMEA SAS	Company/SME	FR
Tech Time 2 Skill	PIMEC PETITA I MITJANA EMPRESA DE C ATALUNYA	Association	ES
Tech Time 2 Skill	SIMPLON.CO	Non-profit/NGO	FR
TRUST-FOOD	482.SOLUTIONS LLC	Company/SME	UA
TRUST-FOOD	ASOCIATIA CLUSTERUL AGRO-FOOD-IND NAPOCA	Association	RO
TRUST-FOOD	EDEX - EDUCATIONAL EXCELLENCE CORPORATION LIMITED	Private training	CY

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TRUST-FOOD	GEOPONIKO PANEPISTIMION ATHINON	HEI	EL
TRUST-FOOD	Kyiv Academic University	HEI	UA
TRUST-FOOD	LIETUVOS MAISTO EKSPORTUOTOJU ASOCIACIJA (LITMEA)	Association	LT
TRUST-FOOD	RETE INTERNAZIONALE PER LE PICCOLEE MEDIE IMPRESE	Association	IT
TRUST-FOOD	REZOS BRANDS ANONYMI EMPORIKI ETERIA IDON DIATROFIS	Company/SME	EL
TRUST-FOOD	SMART AGRO HUB ANONYMI ETAIRIA	Company/SME	EL
TRUST-FOOD	UBITECH LIMITED	Company/SME	CY
TRUST-FOOD	UDRUGA DIH AGRIHRANA HRVATSKA	Association	HR
TRUST-FOOD	UNI SYSTEMS SYSTIMATA PLIROFORIKIS MONOPROSOPI ANONYMI EMPORIKI ETAIRIA	Company/SME	EL
TRUST-FOOD	UNISYSTEMS LUXEMBOURG SARL	Company/SME	LU
TRUST-FOOD	WAGENINGEN UNIVERSITY	HEI	NL
TRUST-FOOD	ZELENA TOCKA TRANS - CENTER ZATRAJNOSTNI RAZVOJ, Z.O.O.	Company/SME	SI
AI4GOV	Politecnico di Milano (Polytechnic University of Milan)	HEI	IT
AI4GOV	Universidad Politécnica de Madrid (UPM)	HEI	ES
AI4GOV	Friedrich–Alexander University Erlangen–Nürnberg (FAU)	HEI	DE
AI4GOV	Tallinn University of Technology (TalTech)	HEI	EE
DigiAdvance	DUBLIN CITY UNIVERSITY	HEI	IE
DigiAdvance	Mobile World Capital Barcelona	Government	ES
DigiAdvance	University of Aveiro	HEI	PT
DigiAdvance	UAB	HEI	ES
DigiAdvance	INOVA-RIA ASSOCIACAO DE EMPRESAS PARA UMA REDE DE INOVACAO EM AVEIRO		
DigiAdvance	The FinTech Corridor	Non-profit/NGO	IE
DIS4SME	GISIG GEOGRAPHICAL INFORMATION SYSTEMS INTERNATIONAL GROUP ASSOCIAZIONE		
DIS4SME	SIIT SOCIETA CONSORTILE PER AZIONI SIGLABILE SIIT SCPA	Non-profit/NGO	IT
DIS4SME	Gaudeamus	Private training	SL
DIS4SME	EPSILON ITALIA SRL	Company/SME	IT
DIS4SME	KU Leuven	HEI	BE
DIS4SME	University North Croatia	HEI	HR
DIS4SME	AIN	Association	ES
DIS4SME	OGC Europe	Association	BE
DIS4SME	GIM OY	Company/SME	BE
DIS4SME	CNR IMATI	HEI	IT
DS4Skills	Digital Europe	Association	BE
DS4Skills	TNO innovation for life	RTO	NL
DS4Skills	Mydata	Non-profit/NGO	FI
DS4Skills	ZIT Association of Slovenia	Association	SL
DS4Skills	Adecco Group	Company/SME	IT
DS4Skills	Headai	Company/SME	FI
DS4Skills	University of Koblenz	HEI	DE

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DS4Skills	Vastuu group	Company/SME	FI
DS4Skills	Visions	Company/SME	FR
DS4Skills	DATA AI AND ROBOTICS DAIRO	Association	BE
Euridice	Vrije Universiteit	HEI	NL
Euridice	Universita di Napoli	HEI	IT
Euridice	University of Innsbruck	HEI	DE
Euridice	TU Wien	HEI	AT
Euridice	Lusofona University	HEI	PT
Euridice	The Value Engineers	Company/SME	NL
Euridice	SBC4D	Company/SME	FR
Euridice	Pavol Josef Safarik University	HEI	SK
Euridice	Palacky University Olomouc	HEI	CZ
Euridice	Leeuw Film	Company/SME	NL
Euridice	Koninklijke Bibliotheek	Government	NL
Euridice	Karazin Kharkiv National University	HEI	UA
Euridice	IL3-UB	HEI	ES
Euridice	IIIM	RTO	IS
Euridice	Healthink	Company/SME	GR
Euridice	Haus der Kulturen der Welt	Government	DE
Euridice	FRAUNHOFER GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG EV		
Euridice	Copenhagen Business School	HEI	DK
Euridice	Babafla	Company/SME	NL
Euridice	AKMC	Company/SME	NL
HCAIM	TUD	HEI	IE
HCAIM	Utrech University of applied sciences	HEI	NL
HCAIM	Universita di Napoli	HEI	IT
HCAIM	CONSIGLIO NAZIONALE DELLE RICERCHE	RTO	IT
HCAIM	CeADAR	RTO	IE
HCAIM	ESI CEE	RTO	BG
HCAIM	RealAI	Company/SME	NL
HCAIM	Nathean	Company/SME	IE
HCAIM	Fiven Future Driven	Company/SME	IT
HPC Spectra	National University of Ireland Galway	HEI	IE
HPC Spectra	GWDG	Company/SME	DE
HPC Spectra	BSC	RTO	ES
HPC Spectra	University of luxembourg	HEI	LU
MAI4CAREU	University of Cyprus	HEI	CY
MAI4CAREU	Alma Mater Studiorum - Università di Bologna	HEI	IT
MAI4CAREU	Technische Universität Dresden	HEI	DE

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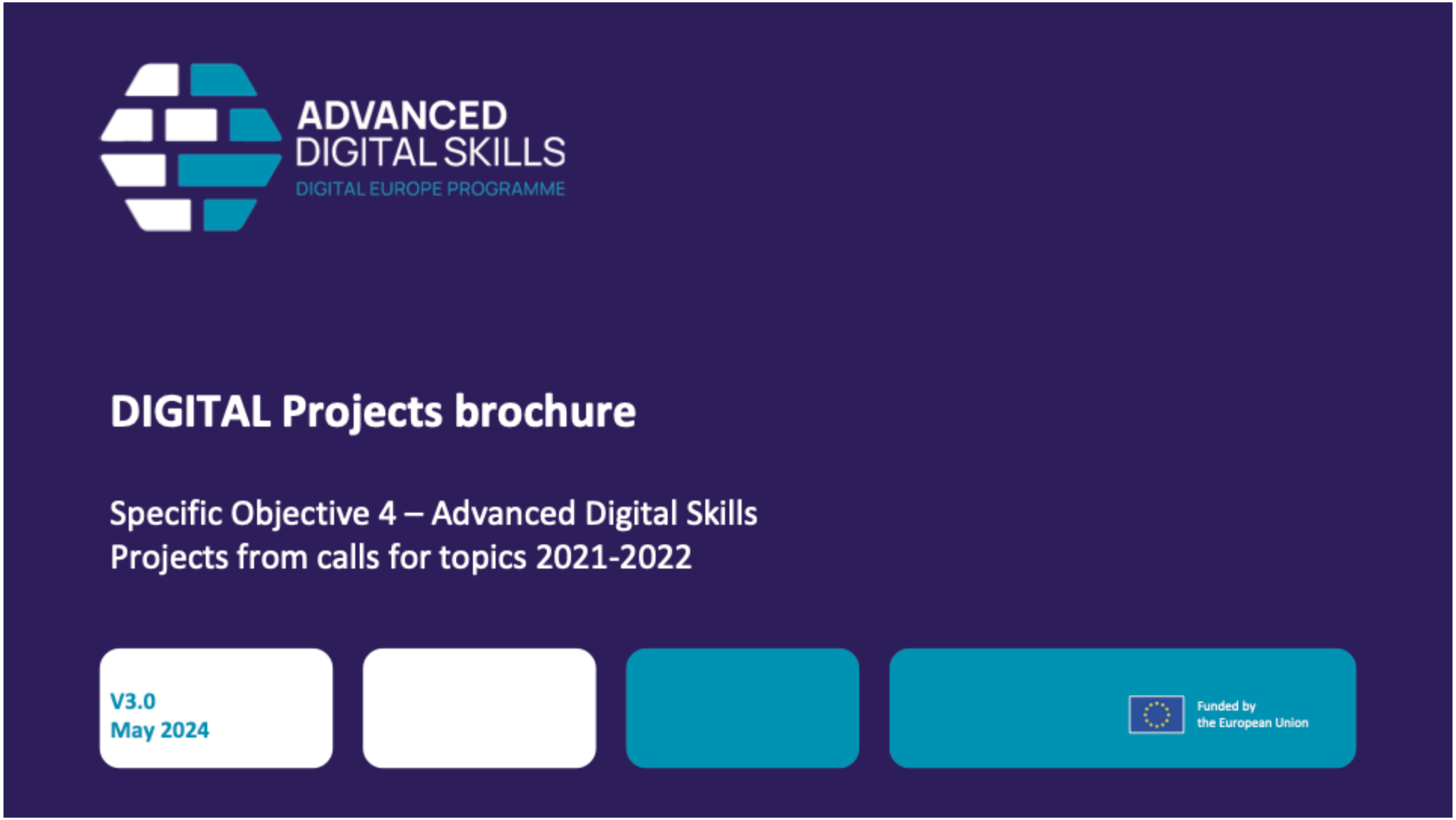
MAI4CAREU	"Angel Kanchev" University of Ruse	HEI	BG
MAI4CAREU	CYENS Centre of Excellence	RTO	CY
Skills4Deca	RIGAS TEHNISKA UNIVERSITATE	HEI	LT
Skills4Deca	Tallinn University of Technology (TalTech)	HEI	EE
Skills4Deca	VILNIAUS GEDIMINO TECHNIKOS UNIVERSITETAS	HEI	LT
Skills4Deca	SIA DMS	Company/SME	LT
Skills4Deca	GETWEB	Company/SME	LT
Skills4Deca	ISSP UL	HEI	LT
xAIM	University Goethe Frankfurt	HEI	DE
xAIM	University of Leibniz	HEI	DE
xAIM	Keele University	HEI	UK
xAIM	University of Ljubljana	HEI	SL

9 ANNEX 3


ADVANCED
DIGITAL SKILLS
DIGITAL EUROPE PROGRAMME
DIGITAL Projects brochure
Specific Objective 4 – Advanced Digital Skills
Projects from calls for topics 2021-2022
V3.0
May 2024
Funded by
the European Union

DIGITAL-EUROHPC-JU-2022-TRAINING

HPC SPECTRA

HPC Skills Platform and European Collaboration for TRAining

HPC SPECTRA

Description

The European High Performance Computing Joint Undertaking (EuroHPC JU) is leading the way in European supercomputing. To exploit the ambitious European investments in research and infrastructure, training of future HPC users is key. HPC SPECTRA will address two timely challenges of EuroHPC JU's training strategy: developing an innovative EuroHPC Training Platform and co-organising the International HPC Summer School (IHPCSS) editions of 2024 and 2025. Through these actions, the project will provide an intuitive gateway to a comprehensive database of European HPC training activities and sustain the successful series of the IHPCSS, started in 2010.

Start date: 01/01/2024

End date: 31/12/2025

Coordinator

National University of Ireland Galway

Participating Countries

DE ES HU IE LU

Total Budget

€ 1.999.799

Number of Participants

6

01/03/24 | 44

Funded by the European Union

DIGITAL-EUROHPC-JU-2022-TRAINING

Placeholder

Call for proposal: EuroHPC traineeships in Hosting Entities, Centres of Excellence and Competence Centres, SMEs and Industry

[EU Funding & Tenders Portal (Europa.eu)]

Description

The awarded project will contribute to bridge the gap between education and labour market, providing future HPC users across the EU with the opportunity to work in HPC environments, having access to the latest technological developments and valuable know-how.
Future HPC specialists will acquire the necessary advanced digital skills needed for the deployment of a specific technology via the provided traineeships in either an HPC competence centre, companies or SMEs using HPC systems or EuroHPC Hosting Entities.

01/03/24 | 45

Funded by the European Union

DIGITAL-2022-SKILLS-02-INNOVATE-EDU

Promoting European innovation in education

EmpowerED

EmpowerED, thriving Edtech ecosystem for better learning

empowerededtech.eu

Start date: 01/01/2023

End date: 31/12/2025

Total Budget

€ 2.976.333

Description

EmpowerED aims to establish a pan-European network and platform for exchanges between European EdTech initiatives, support organisations, practitioners, and policymakers. The project will map the EdTech landscape in Europe to reflect the current state of play in the sector. This will provide insight into trends linked to new schooling models and innovative education solutions.

Additionally, the project will provide new databases, training modules, events and open-source guidelines to support, strengthen and grow the European EdTech community.

Coordinator

European Schoolnet

Number of Participants

24

Participating Countries

BE, CH, DE, DK, EL, ES, FI, FR, IT, LT, NL, PL, SE, TR, UK

01/03/24 | 46

Funded by the European Union

European Core Platform for Digital Skills and Jobs

DIGITAL SKILLS AND JOBS PLATFORM (DSJP)

The home of Digital Skills & Jobs (DSJ) initiatives in Europe and the heart of the DSJ Community

Digital Skills & Jobs Platform

digital-skills-jobs.europa.eu

Start date: 01/09/2020

End date: 31/08/2024

Total Budget

€ 7.434.180

Description

The DSJP provides a wide range of high-quality information, resources and opportunities in the area of digital skills and jobs across all levels, from very basic to advanced. Additionally, a collaborative space is available for Community members to network, interact and grow together. The DSJP offers insights into EU and national initiatives and actions supporting digital skills and jobs, training opportunities and career development support, good practices, expert advice, resources and tools, data, research-based facts and figures, funding opportunities and financial instruments, thriving interactive community spaces, news, opinions and events.

Coordinator

European Schoolnet

Number of Participants

6

Participating Countries

BE RO LT

01/03/24 | 47

Funded by the European Union

DIGITAL-2021-PREPACTS-DS-01
Preparatory actions for the data space for skills

DS4Skills

Support actions for the set-up of a European data space on skills

DS4Skills Data Space for Skills

skillsdataspace.eu

Start date: 01/09/2022
End date: 31/08/2024

Total Budget

€ 997,622

Description

Data Space for Skills (DS4Skills) aimed to identify relevant data sources for the skills data space based on stakeholders' needs and propose conceptual approaches for the future deployment of European Data Space for Skills.

Via the wide and multidisciplinary network of partners, the project build consensus and engaged with the broad community of skills stakeholders.

Coordinator

DIGITALEUROPE AISBL

Number of Participants

14

Participating Countries

BE DE FI FR IT NL SE SI

01/03/24 | 48

Funded by the European Union