Interim Evaluation of the Digital Europe Programme

Final report

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Abstract

This study supports the **Interim Evaluation of the Digital Europe Programme** conducted by Directorate-General for Communications Networks, Content and Technology (DG CNECT). It assesses the EU funding programme's progress towards its objectives, measuring its effectiveness, efficiency, relevance, coherence, and EU-added value. Launched in 2021 with a current seven-year budget of €8.16 billion, the Digital Europe programme has accelerated the digital transformation of the EU by funding digital deployment projects across six specific objectives: High-Performance Computing, cloud, data and artificial intelligence (AI), cybersecurity, advanced digital skills, deployment and best use of digital capacity and interoperability as well as semiconductors.

The study is based on quantitative and qualitative data sources, including a public consultation, surveys of beneficiaries, applicants, and end users, interviews with key stakeholders and implementing bodies, case studies and desk research on the implementation of the programme.

The study finds that Digital Europe has made substantial progress, reaching major achievements, such as the first exascale supercomputer Jupiter, large scale testing and experimentation facilities for AI, a pan European cybersecurity infrastructure, master's programmes in highly specialised digital fields, and a EU wide network of European Digital Innovation Hubs to support public and private organisations in their digitalisation. The programme has also brought benefits to beneficiaries and users of the developed infrastructure, such as in the areas of market positioning, networking and organisational development. However, some challenges have been identified including a lack of awareness of the programme, difficulties in combining, regional, national and European funds and administrative burden when applying security restrictions to funded entities to protect EU's security.

This report provides evidence-based recommendations to enhance the programme's effectiveness in the next Multiannual Financial Framework ensuring that Europe remains a global leader in digital innovation, technological sovereignty, and industrial competitiveness.

Glossary

AI	Artificial Intelligence
ALT-EDIC	Alliance for Language Technology EDIC
CEF	Connecting Europe Facility
CA	Contribution agreements
CSA	Coordination Support Action
DESI	Digital Economy and Society Index
DG	Directorate General
DTA	Digital Transformation Accelerator
EBSI	European Blockchain Services Infrastructure
EC	European Commission
ECCC	European Cyber Security Competence Centre
EDIC	European Digital Infrastructure Consortium
EDIH	European Digital Innovation Hubs
EDMO	European Digital Media Observatory
ERIC	European Research Infrastructure Consortium
ESF	European Social Fund
EU	European Union
FG	Focus Group
FP	Framework Programme
GDP	Gross Domestic Product
GFS	Grants for Financial Support
GIA	Gigabit Infrastructure Act
GP	Grants for Procurement
H2020	Horizon 2020

HaDEA	Executive Agency for Health and Digitalisation
HES	Higher or Secondary Education Organisation
HEU	Horizon Europe
HPC	High-Performance Computing
ICT	Information & Communication Technologies
IPCEI	Important Projects of Common European Interest
IPR	Intellectual Property Rights
IP-SDT	Investment Platform for Strategic Digital Technologies
JRC	Joint Research Centre
JU	Joint Undertaking
JU-CSA	Joint Undertaking - Coordination and Support Actions
JU-GFS	Joint Undertaking – Grants for Financial Support
JU-SIMPLE	Joint Undertaking – Simple Grant
JU-SME	Joint Undertaking – SME Support Actions
KDT	Key Digital Technologies
KIC	Knowledge & Innovation Community (from the EIT)
LE	Large Enterprises
LEIT	Leadership in Enabling and Industrial Technologies
MCP	Multi-Country Project
MFF	Multiannual Financial Framework
MS	Member States
NACE	Statistical classification of economic activities in the European Community
NCCs	National Coordination Centres
NCP	National Contact Point
NGO	Non-Governmental Organisation
ODR	Online Dispute Resolution
OTH	Other

PC	Public Consultation
PPT	PowerPoint
PRC	Private for-profit entities
PUB	Public Bodies
REC	Research Organisation
RRF	Recovery and Resilience Facility
RTD	Directorate General for Research and Innovation
RTO	Research and Technology Organisation
SDG	Sustainable Development Goal
SIC	Safer Internet Centre
SIMPLE	Simple Grants
SME	Small and medium-sized enterprises
SO	Specific Objectives
STI	Science Technology and Innovation
TEF	Testing and Experimentation Facilities
TRL	Technology Readiness Level
TTG	Time To Grant
UN	United Nations
US	United States
VHCN	Very High-Capacity Network
WG	Working Group
WP	Work Programme

Executive Summary

This is the final report of the interim evaluation of the Digital Europe Programme 2021-2027, covering the implementation, and first results achieved from 2021 to 2024 in all six Specific Objectives.

The evaluation assessed the programme based on 38 evaluation questions defined by the Commission. These questions cover the five main evaluation criteria in the EU Better Regulation Guidelines and Toolbox[1]: Effectiveness, efficiency, EU added value, coherence and relevance.

The evaluation informs stakeholders and policymakers on the progress achieved, guide the design of future initiatives in digital deployment and recommend activities to maximise the impact of the programme's investment.

The evaluation follows a theory-based approach, using mixed methods to ensure the robust triangulation of findings. It combines quantitative and qualitative data sources, including a public consultation, surveys of beneficiaries, applicants, and end users, interviews with stakeholders and implementing bodies, case studies and desk research on the programme's implementation. This methodology is aligned with the Better Regulation guidelines and toolbox, ensuring a comprehensive and systematic assessment of the programme's performance.

Digital Europe is designed to propel the digital transformation of the EU. It aims to strengthen Europe's technological sovereignty, enhance the uptake of key digital technologies, and support a digital single market that ensures sustainable economic growth, competitiveness, and resilience.

The programme's specific objectives address several major challenges originally identified in the Impact Assessment (2018)[2], which subsequently led to the Regulation establishing the Digital Europe programme (EU 2021/694)[3].

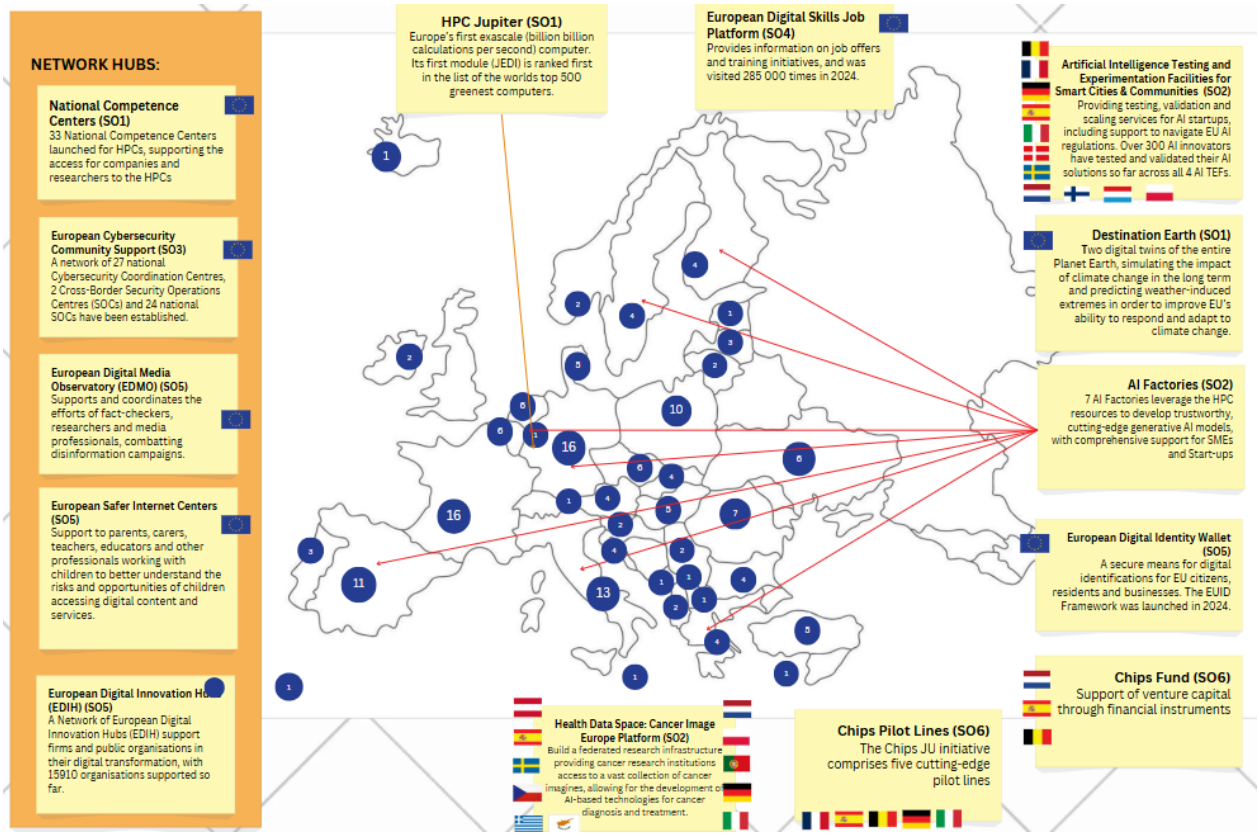
At the end of December 2024, over 600 projects had been contracted with a total EU contribution amounting to €3.02 billion[4], which represents 37% of the total budget for Digital Europe. The commitments by specific objective range from €737 million for SO5 to €264 million for SO6 and €78 million for several cross-cutting projects. SO5 (deployment and best use of digital capacities) accounts for around 24% of actual budget spent as compared with the 12% budgeted in the Regulation[5]. This proportionately higher rate of investment is driven by the 162 European Digital Innovation Hubs (€375.2m in EU contributions) within the SO5 budget line. SO2 (AI) is also substantially ahead of plan, reflecting the programme's flexible response to the dramatic increase in importance of this technology throughout the economy following the breakthroughs in generative AI.

Digital Europe has similarly responded to emerging challenges in other areas, for instance, in the semiconductor field a new specific objective (SO6) was added with the adoption of the

[1] Better regulation: guidelines and toolbox
[2] EUR-Lex - 52018SC0305 - EN - EUR-Lex
[3] Regulation - 2021/694 - EN - EUR-Lex
[4] This figure includes budget committed for grants, procurements, contribution agreements, support actions and financial instruments (individual commitments). It does not include global commitments and the administrative budget.
[5] Regulation (EU) 2023/… of the European Parliament and of the Council of 13 September 2023 establishing a framework of measures for strengthening Europe's semiconductor ecosystem and amending Regulation (EU) 2021/694 (Chips Act)

European Chips Act (2023/1781)[6] following a significant gap in semiconductor capabilities exacerbated by the COVID-19 pandemic and related supply chain disruptions.

An overview of flagships projects of the programme is presented in figure below.



Key Findings & recommendations

1. **Effectiveness: Strong Progress with a Solid Foundation for Future Impact**

- Digital Europe is making **significant progress** towards its objectives, with **most outputs on track with the set milestones or already achieved.**
- Over **55 100 businesses and over 25 800 public organisations** have engaged with the programme, reflecting strong early uptake.
- The **first phase successfully prioritised infrastructure and network development**, laying the groundwork for broader technology deployment, productivity gains, and competitiveness in the next phase.
- Stakeholders highlight **Digital Europe's critical role in supporting the EU's digital transformation** and acknowledge its contributions towards strengthening Europe's technological leadership.

[6] Regulation (EU) 2023/… of the European Parliament and of the Council of 13 September 2023 establishing a framework of measures for strengthening Europe's semiconductor ecosystem and amending Regulation (EU) 2021/694 (Chips Act)

Recommendation 1: Scale Up Infrastructure Exploitation

As Digital Europe moves beyond its initial phase of infrastructure creation, it is crucial to scale up utilisation and accessibility to ensure maximum impact.

The recommendation to develop access incentives for SMEs and public organisations directly supports the need to broaden engagement and enhance the deployment of digital technologies in businesses and public services.

Recommendation 2: Enhance Synergies and integrate Sustainability

Strengthening synergies between Digital Europe and other EU programmes will optimise resource use and accelerate the transition from innovation to deployment, reinforcing Digital Europe's role in technological leadership.

Align with Member States to integrate Digital Europe in national strategies and secure Member States' support for large, "big ticket" initiatives with high visibility.

Ensuring the long-term sustainability of digital investments is key to maintaining and expanding the programme's impact over time.

2. Efficiency: Effective Multi-Channel Implementation with Opportunities for Streamlining

- Digital Europe has been **implemented relatively efficiently** by the European Commission and implementing bodies with a 4.9% overhead rate. Digital Europe's **multi-faceted implementation approach** has leveraged the existing ecosystems and stakeholder networks of various Directorate Generals, an Executive Agency, Joint Undertakings and other implementation bodies to expand its reach.
- Joint Undertakings, in particular, play a significant role as network builders. They coordinate and pool resources from public and private actors in a specific field of technology or application in the EU, adopt a long-term structural approach to bring stakeholders together across the value chains, sectors and countries, creating ecosystems and going beyond what would be possible at the level of Member States.
- The **variety of funding instruments (grants, procurement, contribution agreements)** has facilitated targeted and impactful investments.
- The programme has maintained **a strong success rate for applicants**, with an increasingly **efficient time-to-grant process**.
- The administrative burden for applicants has been reported to be relatively high with coordinators spending between 3.12 to 3.85 person months and EUR 31 100 for additional expenses on applications (as opposed to 1.8 to 2.2 person months for Horizon Europe).

Recommendation 3: Simplify Reporting and Enhance Flexibility

While Digital Europe's multi-faceted delivery model has enabled wide reach, **simplifying administrative procedures** will improve efficiency and encourage wider participation.

Increasing **flexibility in grants and procurement** (use of Lump sum grants, facilitating cascade funding and flexibility in partnership changes) will allow Digital Europe to respond more dynamically to evolving technological and economic contexts.

3. Coherence: Well-Aligned with EU Policy Priorities and National Strategies

- Digital Europe **closely** aligns with key EU policies such as the Digital Decade Policy Programme, European Skills Agenda, and Digital Education Action Plan (2021–2027).
- The programme has established **strong synergies with Horizon Europe**, accelerating the adoption and deployment of research-driven digital innovations.
- The **co-funding model encourages collaboration and investment at multiple levels**, supporting the scalability of digital initiatives across Europe.

Recommendation 4: Develop and Restructure Digital Europe around a Clear Functional Logic and Narrative

Digital Europe's alignment with EU policies is strong, but clarifying its functional objectives (e.g., hard vs. soft infrastructure, capability-building) will help better integrate its role alongside research and innovation programmes like Horizon Europe.

Recommendation 5: Strengthen Coherence and Enhance Deployment Trajectories Through Innovative Instruments and Cross-Border Collaboration

While Digital Europe effectively supports national strategies, introducing new instruments to support deployment (e.g., cross-border access vouchers) will enhance coherence with other EU and national initiatives, ensuring greater alignment.

4 Relevance: Addressing Key Digital Challenges with Adaptive Flexibility

- Digital Europe remains **highly relevant** in advancing **AI, cybersecurity, digital skills, and cloud services**—all of which are critical for Europe's long-term digital leadership.
- The programme has shown **strong adaptability** to emerging needs, such as the **rise of generative AI and the growing demand for semiconductor technologies**, as demonstrated by the introduction of **Specific Objective 6**.

- **Stakeholder engagement has been effective**, with continued opportunities to broaden awareness and maximise participation, particularly among SMEs and public sector organisations.

> **Recommendation 6: Prioritise Strategic Focus and EU Added Value in Investments**
>
> Digital Europe has demonstrated strong adaptability to emerging digital challenges, but refining its strategic focus will ensure that resources are allocated where they have the highest impact. Avoiding fragmentation by prioritising areas where Digital Europe can create the greatest EU-level value will enhance its effectiveness in addressing Europe's digital transition.

5 EU Added Value: Strengthening Europe's Digital Capabilities at Scale

- Digital Europe has successfully **enabled large-scale EU-wide investments** in HPC, AI, cybersecurity, and semiconductor technologies, creating opportunities that would not be feasible at the national level alone.
- The **dual-funding model fosters collaboration across Member States**, driving investments in strategic digital infrastructures.
- The programme plays a key role in **advancing Europe's global competitiveness**, particularly in areas such as high-performance computing, quantum networks, and the digitalisation of businesses and in particular SMEs through deployment of European Digital Innovation Hubs (EDIHS).

> **Recommendation 5: Strengthen Coherence and Enhance Deployment Trajectories Through Innovative Instruments and Cross-Border Collaboration**
>
> To maximise EU added value, fostering cross-border digital collaboration will ensure that all Member States—regardless of their level of digital maturity—can fully benefit from Digital Europe's resources.
>
> Facilitating **ERDF funding for digital deployment** will provide additional financial support to strengthen Europe's digital ecosystem at scale.

RÉSUMÉ

Ce document présente le rapport final de l'évaluation intermédiaire du programme pour une Europe numérique 2021-2027, ou 'Digital Europe'. Il dresse un bilan de la mise en œuvre du programme et des premiers résultats obtenus entre 2021 et 2024 pour les six objectifs spécifiques.

L'évaluation s'est appuyée sur 38 questions d'évaluation définies par la Commission. Ces questions couvrent les cinq principaux critères d'évaluation figurant dans les lignes directrices et la boîte à outils pour une meilleure réglementation de l'UE (EU Better Regulation Guidelines and Toolbox)[7]: efficacité, efficience, valeur ajoutée pour l'UE, cohérence et pertinence.

L'évaluation permet d'informer les parties prenantes et les décideurs politiques des progrès réalisés, de guider la conception des futures initiatives en matière de déploiement numérique et propose des recommandations afin de maximiser l'impact des investissements du programme.

L'évaluation suit une approche théorique et utilise des méthodes mixtes afin de garantir une bonne triangulation des résultats. Elle combine des sources de données quantitatives et qualitatives, notamment: une consultation publique; des enquêtes auprès des bénéficiaires, des candidats et des utilisateurs finaux; des entretiens avec les parties prenantes et les organismes de mise en œuvre; des études de cas et des recherches documentaires sur la mise en œuvre du programme. Cette méthodologie est conforme aux lignes directrices et à la boîte à outils pour une meilleure réglementation de l'UE, garantissant une évaluation complète et systématique du programme.

Le programme Digital Europe cherche à accélérer la transformation numérique de l'UE. Il vise à renforcer la souveraineté technologique de l'Europe, à améliorer l'adoption de technologies numériques clés et à soutenir un marché unique numérique qui garantit une croissance économique durable, la compétitivité et la résilience.

Les objectifs spécifiques (OS) du programme répondent à plusieurs défis majeurs initialement identifiés dans l'analyse d'impact (2018)[8] et qui a conduit au Règlement établissant le programme pour une Europe numérique (UE 2021/694)[9].

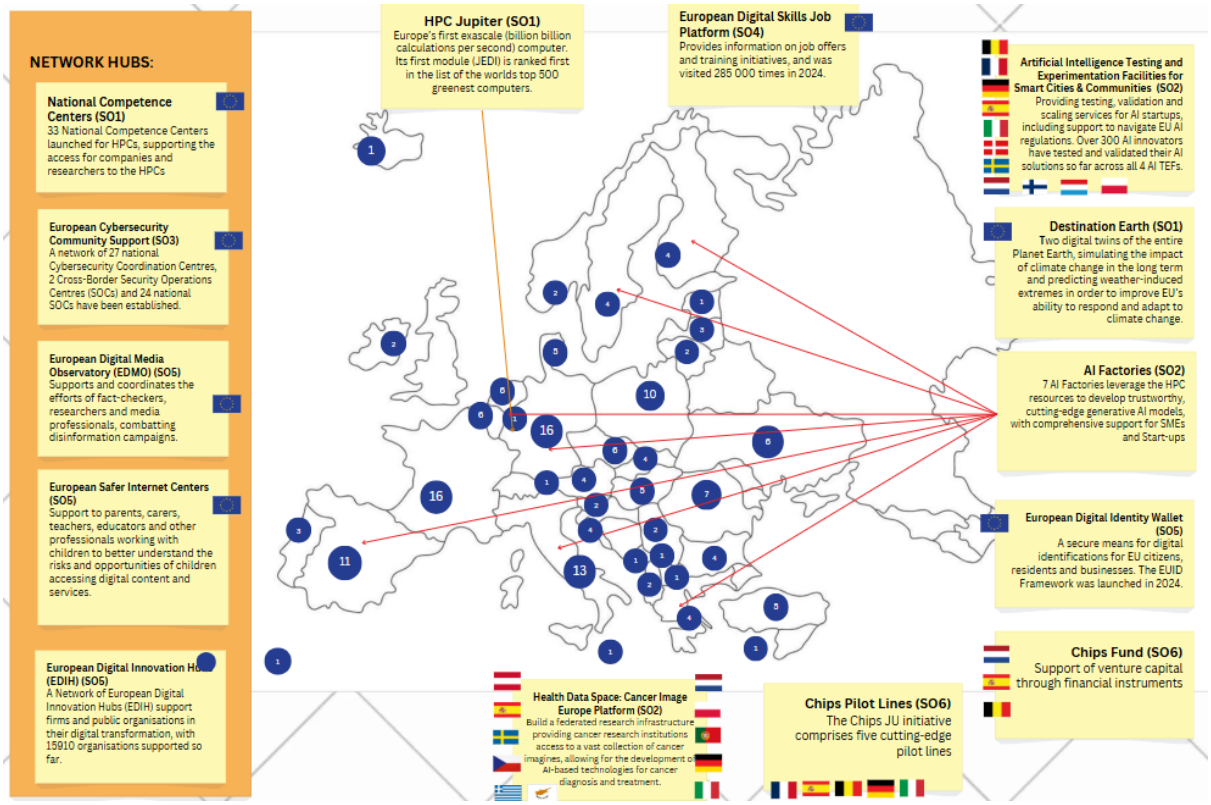
À la fin du mois de décembre 2024, plus de 600 projets avaient été contractualisés, pour une contribution totale de l'UE s'élevant à 3,02 milliards d'euros[10], ce qui représente 37 % du budget total du programme Digital Europe. Les engagements par objectif spécifique vont de 737 millions d'euros pour l'OS5 à 264 millions pour l'OS6 et 78 millions pour plusieurs projets transversaux. OS5 (capacités numériques et interopérabilité) représente environ 24 % du budget dépensé, contre 12 % prévu dans le règlement[11]. Ce taux d'investissement plus élevé s'explique par les 162 pôles européens d'innovation numérique (375,2 millions d'euros de contributions de l'UE) relevant de la ligne budgétaire OS5. L'OS2 (Intelligence Artificielle) est également largement en avance, ce qui reflète la flexibilité du programme qui a réagi face à la

[7] *Better Regulation Guidelines and Toolbox*: https://commission.europa.eu/law/law-making-process/better-regulation/better-regulation-guidelines-and-toolbox_en?prefLang=fr
[8] EUR-Lex - 52018SC0305 - EN - EUR-Lex
[9] https://eur-lex.europa.eu/legal-content/FR/TXT/?uri=CELEX:32021R0694
[10] Ce chiffre comprend les engagements budgétaires pour les subventions, les marchés publics, les accords de contribution, les actions de soutien et les instruments financiers (engagements individuels). Il ne comprend pas les engagements globaux ni le budget administratif.
[11] https://eur-lex.europa.eu/legal-content/FR/TXT/HTML/?uri=CELEX:32023R1781

croissance de l'importance économique de cette technologie à la suite des percées réalisées dans le domaine de l'IA générative.

Digital Europe a aussi réagi à de nouveaux défis dans d'autres domaines. Par exemple, dans le domaine des semi-conducteurs, un nouvel objectif spécifique (OS6) a été ajouté avec l'adoption du règlement sur les puces (2023/1781)[12]. Cela faisait suite à un déficit important en matière de capacités dans le domaine des semi-conducteurs, exacerbé par la pandémie du COVID-19 et les perturbations de la chaîne d'approvisionnement qui en ont résulté.

La figure ci-dessous présente un aperçu des projets phares du programme.



[12] https://eur-lex.europa.eu/legal-content/FR/TXT/?uri=CELEX:32023R1781

Conclusions et recommandations

1. **Efficacité: progrès importants et fondations solides pour l'impact futur**

- Le programme Digital Europe réalise des progrès significatifs dans la poursuite de ses objectifs. La plupart des résultats sont en bonne voie pour atteindre leurs cibles, voire les ont déjà atteintes.
- Plus de 55 100 entreprises et plus de 25 800 organismes publics ont adhéré au programme, ce qui témoigne d'une forte adoption dès le lancement.
- La première phase a donné la priorité au développement des infrastructures et des réseaux avec succès, construisant ainsi les bases d'un déploiement technologique plus large, de gains de productivité et d'une compétitivité accrue lors de la phase suivante.
- Les parties prenantes soulignent le rôle essentiel de Digital Europe dans le soutien à la transformation numérique de l'UE et reconnaissent sa contribution au renforcement du leadership technologique de l'Europe.

Recommandation n° 1: intensifier l'exploitation des infrastructures

Alors que le programme Digital Europe passe à la prochaine étape après sa phase initiale de création d'infrastructures, il est essentiel d'intensifier leur utilisation et d'assurer leur accessibilité afin d'en maximiser l'impact.

La recommandation visant à développer des incitations à l'accès pour les PME et les organismes publics répond à la nécessité d'élargir l'engagement et de renforcer le déploiement de technologies numériques dans les entreprises et les services publics.

Recommandation n° 2: renforcer les synergies et intégrer la durabilité

Le renforcement des synergies entre Digital Europe et d'autres programmes de l'UE permettra d'optimiser l'utilisation des ressources et d'accélérer la transition de l'innovation au déploiement, renforçant ainsi le rôle de Digital Europe en matière de leadership technologique.

S'aligner avec les États membres afin d'intégrer Digital Europe dans les stratégies nationales et obtenir le soutien des États membres pour les initiatives de grande envergure et à forte visibilité.

Il est essentiel de garantir la durabilité à long terme des investissements numériques afin de maintenir et d'étendre l'impact du programme au fil du temps.

2. **Efficience: mise en œuvre multicanale efficace avec des possibilités de simplification**

- Le programme Digital Europe a été **mis en œuvre de manière relativement efficace** par la Commission européenne et les organismes chargés de la mise en œuvre, avec un taux de frais généraux de 4,9 %. L'**approche multiforme de mise en œuvre** de Digital Europe a tiré parti des écosystèmes existants et des réseaux de parties prenantes de diverses directions générales, d'une agence exécutive,

d'entreprises communes et d'autres organismes chargés de la mise en œuvre afin d'étendre sa portée.

- Les entreprises communes en particulier jouent un rôle important en tant que créateurs de réseaux. Elles coordonnent et mettent en commun les ressources des acteurs publics et privés dans un domaine technologique ou d'application spécifique au sein de l'UE, adoptent une approche structurelle à long terme pour rassembler les parties prenantes à travers les chaînes de valeur, les secteurs et les pays, créant ainsi des écosystèmes et allant au-delà de ce qui serait possible au niveau des États membres.
- La **diversité des instruments de financement (subventions, marchés publics, accords de contribution)** a facilité des investissements ciblés et efficaces.
- Le programme a maintenu **un taux de réussite élevé pour les candidats**, avec un **processus d'octroi des subventions** de plus en plus efficace.
- La charge administrative pour les candidats a été jugée relativement élevée, les coordinateurs consacrant entre 3,12 et 3,85 mois-personnes et 31 100 euros à des dépenses supplémentaires liées aux candidatures (contre 1,8 à 2,2 mois-personnes pour Horizon Europe).

Recommandation n° 3: simplifier le rapportage et renforcer la flexibilité

Si le modèle de mise en œuvre multiforme de Digital Europe a permis d'atteindre un large public, la simplification des procédures administratives améliorera l'efficacité et encouragera une participation plus large.

Une plus grande flexibilité en matière de subventions et de marchés publics (recours à des subventions forfaitaires, facilitation du financement en cascade et flexibilité dans les changements de partenariat) permettra à Digital Europe de réagir de manière plus dynamique à l'évolution de contextes technologiques et économiques.

3. Cohérence: alignement avec les priorités politiques de l'UE et les stratégies nationales

- Le programme Digital Europe s'aligne **fortement** avec les principales politiques de l'UE, telles que le programme d'action pour la décennie numérique, la stratégie européenne en matière de compétences ou le plan d'action en matière d'éducation numérique (2021-2027).
- Le programme a établi des **synergies solides avec Horizon Europe**, accélérant l'adoption et le déploiement d'innovations numériques pour la recherche.
- **Le modèle de cofinancement encourage la collaboration et l'investissement à plusieurs niveaux**, favorisant ainsi l'évolutivité des initiatives numériques à travers l'Europe.

Recommandation n° 4: développer et restructurer le programme Digital Europe autour d'une logique et d'un discours fonctionnel

Digital Europe s'aligne fortement sur les politiques de l'UE, mais clarifier ses objectifs fonctionnels (par exemple, infrastructures matérielles ou immatérielles ou renforcement des capacités) permettra de mieux intégrer son rôle aux côtés des programmes de recherche et d'innovation tels qu'Horizon Europe.

Recommandation n° 5: renforcer la cohérence et améliorer les trajectoires de déploiement grâce à des instruments innovants et à la collaboration transfrontalière

Si Digital Europe soutient efficacement les stratégies nationales, l'introduction de nouveaux instruments pour soutenir le déploiement (par exemple, des bons d'accès transfrontaliers) pourra renforcer la cohérence avec d'autres initiatives européennes et nationales, garantissant un encore meilleur alignement.

4. Pertinence: relever les principaux défis numériques avec une flexibilité adaptative

- Digital Europe reste **très pertinent** pour faire progresser l'**IA, la cybersécurité, les compétences numériques et les services cloud** - essentiels pour le leadership de l'Europe numérique à long terme.
- Le programme a fait preuve d'une **forte adaptabilité** aux besoins émergents, tels que l'**essor de l'IA générative et la demande croissante de technologies des semi-conducteurs**, comme le montre l'introduction de l'**objectif spécifique 6**.
- **L'engagement des parties prenantes a été efficace**, avec des possibilités continues d'élargir la sensibilisation et de maximiser la participation, en particulier parmi les PME et les organisations du secteur public.

Recommandation n° 6: donner la priorité à l'orientation stratégique et à la valeur ajoutée de l'UE dans les investissements

Digital Europe a démontré une forte capacité d'adaptation aux nouveaux défis numériques, mais l'affinement de son orientation stratégique permettra de garantir que les ressources soient allouées là où elles ont le plus d'impact. Éviter la fragmentation en donnant la priorité aux domaines dans lesquels le programme peut créer la plus grande valeur ajoutée au niveau de l'UE renforcera son efficacité dans la gestion de la transition numérique de l'Europe.

5. Valeur ajoutée de l'UE: renforcer les capacités numériques de l'Europe à grande échelle

- Digital Europe a permis des investissements à grande échelle au niveau de l'UE dans les technologies de calcul haute performance (HPC), d'IA, de cybersécurité et de semi-conducteurs, créant ainsi des opportunités qui ne seraient pas réalisables au niveau national.
- Le **modèle de double financement favorise la collaboration entre les États membres**, encourageant les investissements dans les infrastructures numériques stratégiques.
- Le programme joue un rôle clé dans la **promotion de la compétitivité de l'Europe dans le monde**, en particulier dans des domaines tels que le calcul haute performance, les réseaux quantiques et la numérisation des entreprises, notamment des PME, grâce au déploiement des pôles européens d'innovation numérique (EDIH).

Recommandation n° 5: renforcer la cohérence et améliorer les trajectoires de déploiement grâce à des instruments innovants et à la collaboration transfrontalière

Afin de maximiser la valeur ajoutée de l'UE, la promotion de la collaboration numérique transfrontalière permettra à tous les États membres, quel que soit leur niveau de maturité numérique, de tirer pleinement parti des ressources de Digital Europe.

Faciliter le **financement du FEDER pour le déploiement numérique** apportera un soutien financier supplémentaire pour renforcer l'écosystème numérique européen à grande échelle.

Introduction

Purpose and scope of the evaluation

This interim evaluation has been prepared in line with Article 26 of the Digital Europe Regulation 2021/694(13) which stipulates an evaluation be conducted by November 2025.

The interim evaluation analyses the design of Digital Europe Programme (from now on Digital Europe), its implementation, and first results achieved from 2021 to 2024. It covers all Specific Objectives implemented under direct and indirect management. Due to the recent launch of the sixth Specific Objective (SO6) supporting chips and semiconductor technologies, this study explores mainly the trends and developments in this context.

The evaluation assesses the effectiveness, efficiency, coherence, relevance, and EU added value of Digital Europe and provides evidence to inform future decision-making and potential adjustments to improve programme implementation and impact. The evaluation responds in total to 38 evaluation questions, structured around five evaluation criteria.

The report will inform stakeholders and policymakers on the progress achieved, guide the design of future initiatives in digital deployment and adjust funding priorities to maximise the impact of EU investment.

The evaluation follows a **theory-based approach**, using **mixed methods** to ensure robust triangulation of findings. It combines **quantitative and qualitative** data sources, including **public consultations, surveys of beneficiaries, applicants, and end users, case studies, interviews with key stakeholders and implementing bodies, and desk research on programme documentation**. This methodology aligns with the **Better Regulation (BR) guidelines and toolbox**, ensuring a comprehensive and systematic assessment of programme performance.

The evaluation also assessed the programme's additionality beyond national and regional efforts. It evaluates the alignment of objectives and activities with EU priorities and examines synergies with other EU and national funding mechanisms. Data is cross-checked using **triangulation techniques**, ensuring consistency and reliability across different sources.

Further details on the evaluation methodology, data collection, and analytical approach can be found in Annex II. Whereas the Evaluation Matrix can be found in Annex III.

What was the expected outcome of the intervention?

Rationale for the intervention

At the time of its adoption, Digital Europe was designed to address critical gaps in Europe's digital transformation and strategic autonomy. The European Commission identified several key challenges, including insufficient investment in high-performance computing (HPC), artificial intelligence (AI), cybersecurity, advanced digital skills, and digital infrastructure. These gaps limited Europe's competitiveness in the global digital economy, increasing reliance on non-EU technologies and exacerbating disparities in digital adoption across Member States.

(13) Regulation (EU) 2021/694 of the European Parliament and of the Council of 29 April 2021 establishing Digital Europe and repealing Decision (EU) 2015/2240 (Text with EEA relevance): Publications Office (europa.eu)

The **impact assessment** (2018) and the explanatory memorandum highlighted that Europe lagged behind global competitors, particularly the United States and China, in key digital capacities.[14] A fragmented investment landscape, a shortage of digital talent, and limited uptake of emerging technologies among businesses and public administrations further compounded these challenges. The preamble to the final legal text of the programme highlights the urgency of these issues, framing Digital Europe as a necessary intervention to enhance Europe's resilience and innovation potential.

Digital Europe is an **€8.16 billion** expenditure programme designed to **facilitate the digital transformation of the EU** by funding a wide range of strategic actions. It aims to strengthen Europe's technological sovereignty, enhance the uptake of key digital technologies, and support a digital single market that ensures sustainable economic growth, competitiveness, and resilience. The programme operates under a **multi-annual framework (2021-2027)** and complements other EU initiatives such as *Horizon Europe, the Recovery and Resilience Facility (RRF), and Connecting Europe Facility (CEF)*.

Digital Europe's **general objective** is to **accelerate the EU's digital transformation** by increasing **investments in digital capacities, infrastructure, and skills**. It supports **cross-border digital projects** and ensures that key digital technologies—such **HPC, AI, cybersecurity, and digital skills**—are accessible to businesses, public administrations, and citizens. The programme is structured around **six specific objectives (SOs)**, each addressing a fundamental pillar of the EU's digital strategy.

SPECIFIC OBJECTIVE (SO)	AIM	CHALLENGES ADDRESSED	ACTIONS SUPPORTED	COMMITTED BUDGET (€M)
SO1 – HIGH-PERFORMANCE COMPUTING (HPC) 🖥️	Deploy and operate EU-wide HPC & quantum infrastructure	Limited access to world-class HPC resources	Fund EuroHPC Joint Undertaking for infrastructure & R&D	579.6m
	Develop EU-based hardware, software & processor design	Dependence on non-EU computing technologies	Support HPC-quantum integration & sovereign EU HPC solutions	
	Support industrial & scientific use of HPC resources	Limited uptake of HPC use	Allocate computing resources to industry & research	
SO2 – ARTIFICIAL INTELLIGENCE (AI) ☁️	Build EU AI capacities, algorithms & quality datasets	Lack of high-quality & accessible AI training data	Establish AI testing & experimentation facilities (TEFs)	598.1m
	Facilitate AI adoption in SMEs & public administration	Low uptake of AI solutions across key sectors	Develop AI-based applications for public & private sectors	
	Ensure privacy & security by design in AI solutions	Insufficient AI security & compliance mechanisms	Support AI Factories, data spaces & cloud infrastructure	
O3 – CYBERSECURITY AND TRUST 🔒	Strengthen EU cybersecurity capabilities & infrastructure	Rising cyber threats & weak cyber resilience	Fund European Cybersecurity Competence Centre (ECCC)	526.2m
	Improve cybersecurity for public sector & SMEs	Fragmented cybersecurity capabilities across Member States	Support deployment of advanced cybersecurity solutions	
	Enhance EU-wide cooperation on cyber threats	Low preparedness for large-scale cyber incidents	Invest in risk-awareness & response initiatives	
	Address digital skills gaps in key tech areas	Shortage of digital talent in AI, HPC & cybersecurity	Fund specialised training, courses & work placements	241.9

[14] European Commission. (2018). *Impact assessment accompanying the document: Proposal for a regulation of the European Parliament and of the Council establishing Digital Europe for the period 2021–2027* (SWD/2018/305 final). EUR-Lex. https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=SWD%3A2018%3A305%3AFIN

SO4 – ADVANCED DIGITAL SKILLS	Support digital upskilling & industry-led education	Mismatch between digital skills & labour market needs	Develop European Master's & micro-credential programmes	
	Promote gender balance & workforce digitalisation	Unequal access to advanced digital training	Support SME-focused digital education initiatives	
SO5 – DEPLOYMENT AND BEST USE OF DIGITAL CAPACITIES & INTEROPERABILITY	Support digital transformation in public sector & key industries	Limited access to cutting-edge digital tools & services	Fund European Digital Innovation Hubs (EDIHs)	736.8m*
	Enhance interoperability and data exchange among public administrations to enable the provision of seamless digital public services across the Union	Fragmented national approaches to digital infrastructure Fragmented interoperability landscape across the Union	Develop EU-wide common digital service infrastructures Provide public administrations with interoperability enablers and capacity building support, build a governance interoperability framework and foster digital-ready policymaking across the Union	
	Foster secure data sharing & digital ecosystems	Barriers to digital collaboration across sectors	Support cross-border AI, blockchain & cloud solutions	
SO6 – EUROPEAN LEADERSHIP IN SEMICONDUCTOR TECHNOLOGIES	Strengthen Europe's semiconductor industry & innovation	Heavy dependence on non-EU chip suppliers	Fund semiconductor competence centres, design platforms & pilot lines	264.1m
	Build EU-wide semiconductor competence centres & skills academy	Shortage of skilled semiconductor professionals	Establish European Semiconductors Skills Academy to e**nhanced collaboration between educational institutions and the semiconductor industry**[15]	
TOTAL COMMITTED SO FAR				3.02 Billion
INCLUDING COMMITTED BY DG CNECT TO JUS, BUT NOT YET TO BENEFICIARIES				4.16Billion

**Including EDIHs *Budget allocation per SO do not include €51m from Programme Support Actions where no SO was identified.*

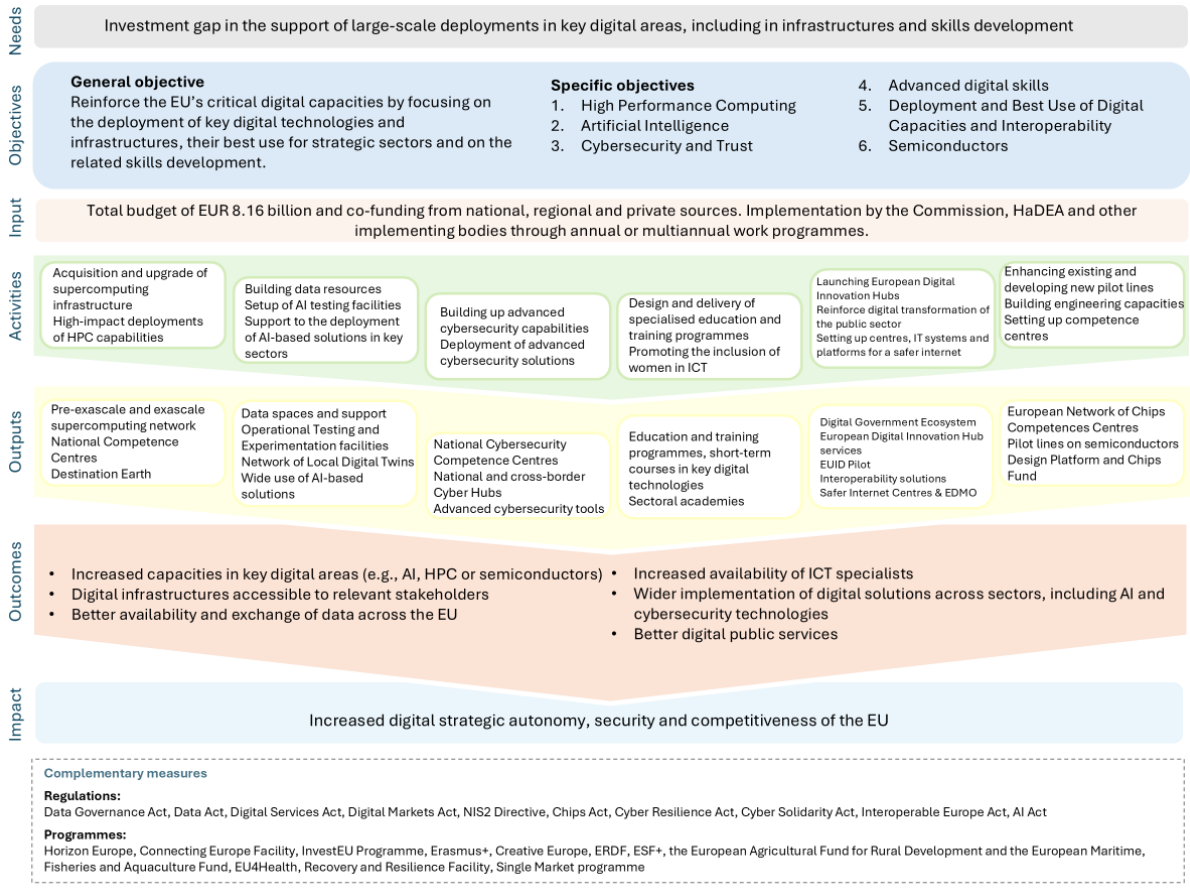
A more detailed description of the SOs can be found in Annex I.

Intervention logic

To guide the evaluation, the study team has developed an intervention logic with structured impact pathways that link each of the programme's six SOs to its intended activities, outputs, outcomes, and impacts. By mapping these relationships, the intervention logic provides a framework for assessing the extent to which Digital Europe is achieving its goals and addressing key digital challenges within the EU.

[15] As part of SO4.

Figure 1 Intervention Logic of Digital Europe



Source: European Commission

Points of comparison

The 2018 Impact Assessment[16] identified the key challenges addressed by the programme. Europe faced insufficient digital capacities, with significant gaps in critical areas such as High-Performance Computing, Artificial Intelligence, and Cybersecurity. The EU's digital infrastructure lagged behind global competitors like the US and China, with HPC funding at 60% of US levels and cybersecurity investments nearly ten times lower. Existing EU programmes were fragmented, hindering large-scale and strategic deployment of digital technologies. Slow and uneven adoption of digital solutions, particularly in areas of public interest and among SMEs, compounded these issues, with only 20% of SMEs highly digitised compared to 58% of large enterprises. Challenges also included a lack of interoperability, poor awareness of AI's potential, and a significant shortage of advanced digital skills, with over 350,000 unfilled ICT job vacancies. These challenges highlighted the urgent need for a new, ambitious EU-wide programme to drive digital transformation, culminating in the creation of Digital Europe.

The Digital Economy and Society Index (DESI), combined with the Monitoring and Evaluation Framework from the programme's staff working document, forms a foundation for assessing its contributions to the EU's 2030 digital targets. The DESI indicators track digital performance across four key areas: Human Capital, Connectivity, Integration of Digital Technology, and

[16] SWD/2018/305 final. COMMISSION STAFF WORKING DOCUMENT IMPACT ASSESSMENT Accompanying the document Proposal for a Regulation of the European Parliament and of the Council establishing the Digital Europe programme for the period 2021-202.

Digital Public Services. Since 2023, DESI has been integrated into the State of the Digital Decade report, which monitors progress towards the EU's 2030 digital targets[17]. Additional sources, such as the Digital Public Administration Factsheets, the European Interoperability Framework (EIF) Monitoring Mechanism, and the Berlin Declaration Monitoring Mechanism (BDM), further support the evaluation with insights into public-sector digitalisation and interoperability.

The table below presents the main challenges identified in the impact assessment and links them to the Digital Europe specific objectives as well as KPIs used to monitor their progress.

Table 1 Challenges identified and KPIs

Challenges	Objective	KPIs
Insufficient capacities in key digital technologies		
Fragmentation and underdevelopment of High-Performance Computing (HPC) capacity, with Europe lacking HPC facilities in the global top 10 and heavily relying on resources outside the EU.	SO1	No. of HPC facilities
Limited availability of Artificial Intelligence (AI) capacities, including high-quality data, AI competence centres, and testing facilities.	SO2	No. data spaces, users reached, No. TEFs, users reached
Fragmentation and low investment in cybersecurity, leaving the EU unprepared for increasingly sophisticated cyber threats.	SO3	No. NCCPs, SOCs, end users reached
Fragmented and below critical investments to acquire core digital capacities		
The EU's investment levels in key digital technologies such as HPC, AI, and cybersecurity are significantly lower than those of global competitors like the US and China.	SO1, SO2, SO3	Budget spent
Highly fragmented investments across Member States hinder the scale required for global competitiveness.	SO1, SO2, SO3, SO4, SO5, SO6	Digital Decade, co-funding mechanisms at national level
Inadequate uptake of digital solutions in areas of public interest		
Slow adoption of digital solutions in sectors like healthcare, judiciary, and public administration, with significant disparities between Member States.	SO5	Uptake of digital services, No. EDIH end users
Lack of interoperability among public administrations, s, impeding seamless cross-border and cross-sectoral digital public services and communication.	SO5	The extent of the alignment of the National Interoperability Framework with the European Interoperability Framework
Inadequate uptake of digital solutions in businesses		
Low levels of digitisation among SMEs, with only 20% highly digitised compared to 58% of large enterprises.	SO5	Digital Decade, No. EDIH end users
Knowledge and financial barriers that prevent businesses from adopting advanced digital technologies.	SO4, SO5	No. EDIH end users, SME's participating in SO4 trainings, TEFs end users
Shortage of advanced digital skills:		
A systemic gap between the demand for and availability of digital skills, particularly in advanced areas such as AI, cybersecurity, and data analytics.	SO4	No. of SO4 end users trained
Over 350,000 unfilled ICT-related job vacancies in the EU, with inadequate funding and initiatives for workforce retraining.	SO4	Digital Decade

Source: Study team based on Digital Europe Impact Assessment

State of play

In this section we provide an overview of the implementation of Digital Europe activities up to the 31 December 2024. This overview includes grants, procurements, financial instruments,

[17] https://digital-strategy.ec.europa.eu/en/policies/desi

contribution agreements (CAs) related to the implementation of the main activities and the Programme Support Actions.

So far, the following Work Programmes have been implemented: the Digital Europe Work Programmes 2021-2022 and 2023-2024, the EDIH Work Programme 2021-2023, the Cybersecurity Work Programme 2023-2024, the High-Performance Computing Work Programmes (and amendments), and the Chips Joint Undertaking Multiannual Work Programme 2023-2027. Some work strands are comprised of topics set out in multiple Work Programmes (e.g. the Cybersecurity work strand comprised topics set out under Digital Europe WP and the Cybersecurity WP[18]). Some work strands are also distributed between different implementing bodies, like the 'Deployment of Public Services' which is comprised of actions implemented by four different units in three different DGs.

A total of **601 projects** have been funded through grants, procurement, CAs, financial instruments, and Programme Support Actions, accounting for a total EU funding of **EUR 3,016 m** spanning from 2020 to the end of 2024. Most projects in the 2023-2024 Work Programmes will end in 2025/2026, with remaining projects ending by 2031 at the latest. In addition, until the end of 2024, in terms of other instruments, 11 venture capitals were supported to help companies involved in digital activities to reduce their financial risk There were 3 Contribution Agreements with the European Space Agency (ESA), the European Centre for Medium-Range Weather Forecasts (ECMWF), and the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) to implement Destination Earth. In addition, there was a contribution agreement with ENISA to support cybersecurity incident and preparedness in key sectors and a contribution agreement with eu-LISA to support cross-border investigations and prosecutions in the EU by funding an IT platform that support safe and quick exchanges of information.

In terms of SOs, the main **EU contribution** – from both grants and other instruments (procurement, CA, financial instruments, and Programme Support Actions) – has been made to SO5 with a total EU funding of EUR **736.7m**. The lowest contributions were assigned to SO4 with EUR 214.9m. Four Programme Support Actions relevant for different specific objectives summed up to EUR 78.4 m. The total committed amount therefore sums up to EUR 3.016b. However, when amounts committed by DG CNECT to the Joint Undertakings and the ECCC but not yet committed by these implementing bodies are included, other administrative costs and the amount placed in global commitment in 2024 are taken into account the total EU contribution so far is EUR 4.16 billion. Note that further analyses will be based on the EUR 3.016b fully committed amounts, for reasons of comparability and consistency[19].

The number of **funded projects** varies significantly from one SO to the other. SO5 has mainly due to the EDIHs the highest number of projects with 281 projects, followed by SO3 with 169. Next, there are 73 projects in SO2, and 51 projects in SO4. SO1 and SO6 present the lowest number of projects with 16 and 11 projects, respectively. In terms of **types of action**, Digital Europe has committed EUR 1.75bn through grants, and EUR 1.26bn (42% of total EU contributions) through other instruments (CAs, financial instruments, procurement, and programme support actions).

[18] SO3 is implemented under indirect management of the ECCC, but the EDIHs are under direct management by the EC and also have a separate WP

[19] As these amounts in practice have not yet materialised in economic terms at the level of beneficiaries, and as such no information/data is available on its characteristics.

Table 2 Distribution of projects and funding across the SOs

	SUM OF EU CONTRIBUTION BY INSTRUMENT TYPE							TOTAL SUM OF EU CONTRIBUTION	TOTAL SUM OF # OF PROJECTS
SO	**Contribution Agreement**	**Financial Instrument**	**Grant**	**Procurement**	**Programme Support Actions**	**Number of Grants**	**Number of Procurements**		
crosscutting		€ 26.693.750,00			€ 51.692.584,24			€ 78.386.334,24	
SO 1	€ 351.108.200,00		€ 80.664.811,58	€ 164.636.999,51	€ 1.230.358,92	7	9	€ 597.640.370,01	16
SO 2			€ 462.430.902,33	€ 135.702.296,33		56	17	€ 598.133.198,66	73
SO 3	€ 28.000.000,00		€ 480.479.511,63	€ 2.699.668,00	€ 15.000.000,00	168	1	€ 526.179.179,63	169
SO 4			€ 211.171.428,64	€ 3.717.090,00		50	1	€ 214.888.518,64	51
SO 5	€ 3.608.000,00		€ 484.571.352,61	€ 248.565.196,88		253	28	€ 736.744.549,49	281
SO 6		€ 65.000.000,00	€ 33.609.500,70	€ 165.475.310,50		3	8	€ 264.084.811,20	11
Grand Total	**€ 382.716.200,00**	**€ 91.693.750,00**	**€ 1.752.927.507,49**	**€ 720.796.561,22**	**€ 67.922.943,16**	**537**	**64**	**€ 3.016.056.961,87**	**601**

When looking at the **funding distribution across types of action**, Simple Grants (SIMPLE) represent the highest share of the total Digital Europe EU contribution with 41% (EUR 1 227 m) distributed across all SOs. It is followed by Procurement with a share of 24% (EUR 721 m) distributed across all the SOs. Meanwhile, Contribution Agreements (CAs) are distributed only in SO1, SO3 and SO5 with a share of 13% (EUR 383 m). DIGITAL-SME, DIGITAL-CSA and Financial Instruments have a share of 6% (EUR 191 m), 5% (EUR 154 m) and 3% (EUR 92 m) respectively. These are followed by DIGITAL GP (3%, EUR 78 m) DIGITAL-GFS (2%, EUR 69 m) and Programme Support Actions (2%, EUR 68 m). DIGITAL-LS had the least share of funds (1%, EUR 34 m), directed only to SO4, while DIGITAL-FPA was not used across any SO.

In terms of other instruments, 11 venture capitals were supported to help companies involved in digital activities to reduce their financial risk. There were 3 Contribution Agreements with the European Space Agency (ESA), the European Centre for Medium-Range Weather Forecasts (ECMWF), and the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) to implement Destination Earth. In addition, there was a contribution agreement with ENISA to support cybersecurity incident and preparedness in key sectors and a contribution agreement with eu-LISA to support cross-border investigations and prosecutions in the EU by funding an IT platform that support safe and quick exchanges of information.

In terms of **stakeholders**, there has been a total of **6,388 participations** in Digital Europe grants. Higher or Secondary Education Organisations (HES) accounted for the highest number of participations with 1,331 participations (21% of the total number of participations), followed by Small and Medium-Sized Enterprises (PRC_SME) with 1,226 participations (17% of the total number of participations). Research Organisations (REC) represented 15% (987 participations) of the total participations, while Public Organisations (PUB) accounted for 12% (792 participations). Finally, Private For-Profit Large Enterprises (PRC_LE) accounted for 13% (842 participations) of the total participations. Other type of organisations (OTH) represented 19% (1226 participations). A remaining share of 2% (109 participations) corresponds to PRC entities where information on whether they are SMEs or LE was not identified.

In terms of **project coordination**, HES organisations (together with OTH organisations) accounted for the highest number of coordinated projects, with 121 projects (20%). PUB and REC follow with 119 and 106 coordinated projects (20% and 17%), respectively. Meanwhile, PRC-SME and PRC-LE accounted for 13 and 9% of the total projects (82 and 57 projects). The remaining 1% (4 projects) are PRCs where information on whether they are SMEs or LE was not identified.

In terms of **funding across beneficiary types**, HES were the highest receiver of EU funding with a share of 23% (EUR 397.0m), closely followed by REC organisations with 22% (EUR 390.1m). PRC_SME, PRC_LE and PUB organisations had 17% (EUR 294.9m), 11% (200.3m) and 11% (184.4m) respectively. OTH organisations have attracted 15% (269.0m) of the funding. The remaining 1% (EUR 17.1m) corresponds to the PRC entities where information on whether they are SMEs or LE was not identified.

Evaluation findings

Effectiveness

Attainment of objectives

EFFECT.01.1 Progress towards expected outcomes

The progress towards expected outcomes can be measured using the adopted key monitoring indicators (Table 3) and additional monitoring indicators, which have been divided into Output, Result and a limited number of Impact indicators. For SO6, the KPIs in Annex II of the Chips Act Regulation[20] are being monitored.

Overall, all **Output KPIs are on track, or ahead of schedule**. This indicates a well-paced implementation of Digital Europe across the different Specific Objectives. The positive appraisal of progress is especially true for SO1 (HPC), given the fact that almost all outputs have been achieved faster than originally targeted. In terms of **Result indicators, we can similarly see that the implementation is on track**, with all milestones achieved except some uncertainty on the employment outcomes of those supported with training (SO 4), where no reliable data from beneficiaries could be collected in time. Stakeholders do report sources of delay in terms of implementation of the programme, such as the impact of the safeguarding measures (elaborated in a later section ('Enabling Factors and Barriers') of this chapter), and alignment/coordination with Member State/regional funding schemes. Nevertheless, the overall picture is that these delays have been overcome, with the programme moving from a phase of investing in hard and soft infrastructures to a results-delivery phase. Concerning **impact**[21] indicators, contextual indicators are used in SO4 (Enterprises having difficulty recruiting ICT specialists and SO5 (Enterprises with high digital intensity), which give insight into current trends and where funds are needed but no direct impact from the funded programmes can be inferred through these indicators.

Table 3 Key monitoring indicators for outputs of Digital Europe

SO	Indicator (DESI LINK)	Baseline	Final Target	Milestone for end of 2024	Current Status (end of 2024)	Progress against final target and milestones[22]
1*	Output: HPC infrastructures jointly procured (**DESI Connectivity**: Gigabit for everyone (VHCN connectivity))	7	21 in 2026	19	19	90.4% (on track with milestones)
1*	Result: Usage of the exascale and post-exascale computers in total and by various stakeholder groups (universities, SMEs etc.) (**DESI Connectivity:** 5G coverage)	0	10% in 2025	7%	7%	70% (on track with milestones)

[20] Regulation - 2023/1781 - EN - EUR-Lex
[21] These should be interpreted as contextual
[22] Dark green = ahead of milestones; light green = on track with milestones; yellow = behind milestones, grey = not applicable

SO	Indicator (DESI LINK)	Baseline	Final Target	Milestone for end of 2024	Current Status (end of 2024)	Progress against final target and milestones[22]
2*	Result: Co-investment in sites for experimentation and testing (**DESI Integration of Digital Technology:** Cloud & AI adoption)	0	EUR 180 million in 2027	EUR 50m	EUR 280 million	>100%
2*	Result: Usage of common European libraries or interfaces to libraries of algorithms, usage of common European data spaces and usage of sites for experimentation and testing related to activities under this regulation (**DESI Integration of Digital Technology:** AI, Cloud, Big data adoption)	0	1 600 in 2030	140	414	26% (on track with milestones)
2*	Result: Cases for which organisations decide to integrate AI in their product, processes or services, as a result of the Programme (**DESI Integration of Digital Technology:** AI, Cloud, Big data adoption)	0	100 by 2030	0	No data yet	(on track with milestones, first results expected in 2025)
3*	Output: Cybersecurity infrastructure and/or tools jointly procured (**DESI Human Capital:** ICT specialists)	0	15 by 2027	0	0	0% (on track with milestones)
3*	Output: Cybersecurity infrastructure and/or tools deployed (**DESI Human Capital:** ICT specialists)	0	165 by 2027	0	38	23% (on track with milestones)
3*	Result: Users and communities getting access to European cybersecurity facilities	0	400 in 2028	0	103	26% (on track with milestones)
4*	Result: People who have received training to acquire advanced digital skills (**DESI Human Capital:** Advanced digital skills)	0	65 000 in 2027	11 880	20 713	31.9% (on track with milestones)
4*	Result: People reporting an improved employment situation after the end of the training supported by the programme (**DESI Human Capital:** ICT (female) specialists)	0	26 200 in 2027	125	No data	No data collected in time[23]
4*	Impact: Enterprises having difficulty recruiting ICT specialists (**DESI Human Capital:** ICT specialists)	55.4% (2020)	NA	66.4%	57.5%	on track with milestones[24]
5*	Result: Take-up of digital public services (**DESI Digital Public Services:** Public services for citizens and businesses)	0	1 progress scale	0.25	0	(on track)

[23] The data received from training participants was incomplete. No data could be reported on time.
[24] In the evaluator's view this indicator is not a good proxy for direct programme at this stage of the programme, given the scale of the current implementation vs. the scale of the EU economy. However, as an official legal indicator this has been included for sake of completeness.

SO	Indicator (DESI LINK)	Baseline	Final Target	Milestone for end of 2024	Current Status (end of 2024)	Progress against final target and milestones[22]
5*	Enterprises with a high digital intensity score (**DESI Integration of Digital Technology:** Digital intensity in businesses)	15.9% (2021)	21% by 2029	17.6%	34.3% (32.2% old methodology)	(on track)
5*	Result: Businesses and public sector entities that have used the European digital innovation hub (EDIH) services (**DESI Integration of Digital Technology:** Digital intensity in businesses)	0	191,400 in 2027	47,400	55 705 (To 28,9%)	(on track)
6	The number of legal entities involved (subdivided by size, type and country of establishment) in the actions supported by the Initiative.[25]	N/A	N/A	N/A	19 legal entities of which 12 are RTOs and 7 are Universities	N/A
6	The number of design tools developed or integrated under the Initiative.[26]	N/A	N/A	N/A	0	N/A
6	The total amount co-invested by the private sector in design capacities and pilot lines under the Initiative.[27]	N/A	N/A	N/A	0	N/A
6	The number of users of semiconductors or user communities seeking, and the number of users of semiconductors or user communities obtaining, access to design capacities and pilot lines under the Initiative.[28]	N/A	N/A	N/A	0	N/A
6	The number of businesses, which have used the services of national competence centres supported by the Initiative.[29]	N/A	N/A	N/A	0	N/A
6	The number of active competence centres in the Union in the context of the Initiative.[30]	N/A	N/A	N/A	0	N/A

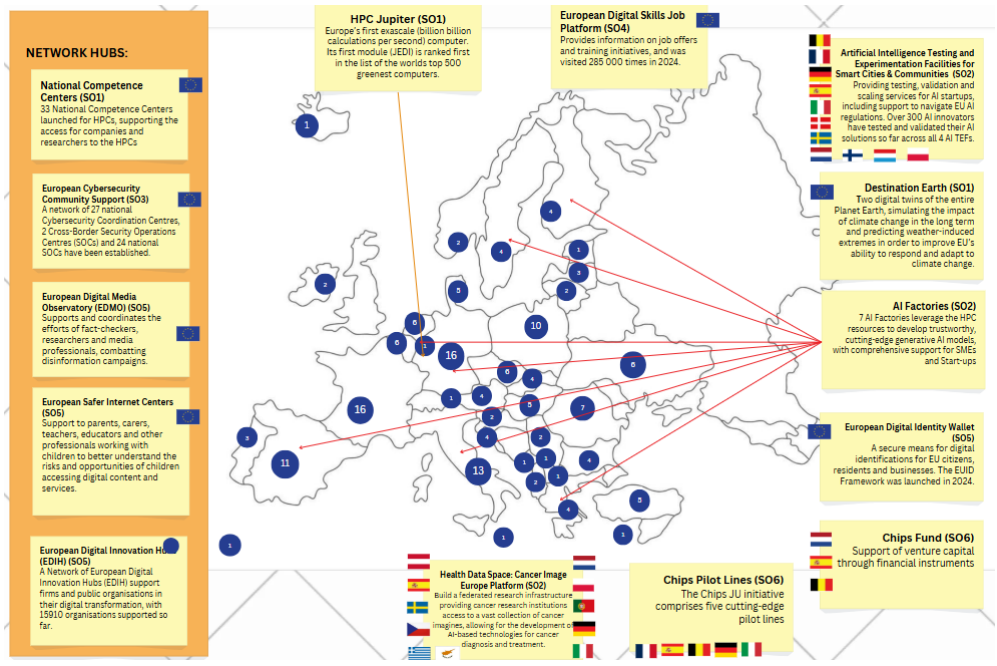
[25] More beneficiaries are expected until 2027 with new calls and the signature of a number of grant agreements.
[26] The Chips Joint Undertaking Work Programme 2025 includes call for the development of open-source EDA tools, results are expected in 2027.
[27] Private investment is expected once the pilot lines are operational and for several future Work Programme topics on design capacities.
[28] The pilot lines and the Design Platform are still being set up, their grant agreements being prepared, and therefore they do not have any users.
[29] The Competence Centres are still being set up, their grant agreements being prepared, and therefore they do not have any users.
[30] Grant agreements for the Competence Centres are still being prepared. It is expected that by end 2025 Competence Centres will be in place in all Member States and Norway.

SO	Indicator (DESI LINK)	Baseline	Final Target	Milestone for end of 2024	Current Status (end of 2024)	Progress against final target and milestones[22]
6	The number of start-ups, scale-ups and SMEs that have received venture capital from the Chips Fund activities and the total amount of capital investments made.	N/A	N/A	N/A	DEP **EUR 67 million top-up** of InvestEU leading to investment by EIF financial partners in **19 EU semiconductor start-up companies.**	N/A

Source: EC Monitoring Statements (February 2024)

In terms of **results**, the following table highlights a selection of 'flagship results' across all Specific Objectives which give a flavour of the achievements so far in Digital Europe, and their distribution across Member States.

Table 4 Flagship examples per Specific Objective



EFFECT.01.3 adequate target group

Digital Europe mostly uses an 'indirect' approach to targeting, relying on the directly funded beneficiaries to deliver support to end-user firms, public organisations or individuals. At the **beneficiary level**, the State of Play Analysis (see Table 5) shows that the activities are implemented in a relatively balanced split by stakeholder type.

Table 5 Distribution of committed funds per SO[31]

Type of Stakeholder	SO 1	SO 2	SO 3	SO 4	SO 5	SO 6	Grand Total
HES	52.533.902	69.635.217	57.790.199	117.432.230	97.449.214	2.200.546	397.041.308
OTH	7.052.898	64.466.720	49.205.111	26.210.088	122.094.727	-	269.029.544
PRC		2.108.050	954.144	236.079	13.832.869	-	17.131.142
PRC_LE	2.430.700	55.402.380	78.432.365	11.815.219	52.181.732	-	200.262.396
PRC_SME	4.384.319	56.395.278	146.482.343	35.509.283	52.216.143	-	294.987.367
PUB	1.918.686	21.729.992	92.849.406	3.102.458	64.797.710	-	184.398.253
REC	12.344.306	192.693.265	54.765.944	16.866.071	81.998.957	31.408.955	390.077.497
Grand Total	**80.664.812**	**462.430.902**	**480.479.512**	**211.171.429**	**484.571.353**	**33.609.501**	**1.752.927.507**

PRC: PRC entities where information on whether they are SMEs or LE was not identified

However, as is evident from the stakeholder interviews, engagement of SMEs in Digital Europe as beneficiaries is more challenging, mainly due to the co-funding requirements. SMEs often face quite significant limitations in their ability to co-invest from both a liquidity and risk appetite perspective. Furthermore, it is perhaps somewhat surprising that research organisations and higher education institutions are relatively strongly present, given the focus on deployment of digital technologies rather than their development. While this presence has advantages, in terms of ensuring the linkages across the innovation value chain, there is also a risk that research performing organisations are not always the closest to end-users and their actual needs, in particular when it concerns SMEs and public organisations that are not among the vanguard users of new digital technologies.

At the **level of end-users**, we can see that Digital Europe is reaching its first end-users in various work streams (See Table 6). The primary groups reached are public organisations, SMEs and citizens, which is in line with the ambitions of the programme. It is noteworthy that some work strands (such as the Safer Internet and Digital Skills Job Platform) manage to attract high visibility in terms of website visitors. At the scale of the EU, the direct engagement of end-users is still relatively limited in terms of the number of people and organisations. For instance, the programme has so far engaged with over 55 thousand SMEs as end users, which is an impressive number in absolute terms, yet only around 0.2% of the EU's almost 26 million SMEs [Annual Report on SMEs, 2023/24]. However, this is in line with the expectations for a relatively young programme. The next few years will reveal whether the actual reach of end-users can be scaled up and sustained.

[31] Committed by implementing agencies, so excluding the commitment by DG CNNCT to JUs and the ECCC that have not yet materialised in actual commitments to beneficiaries (or contractors, in the case of procurement)

Table 6 : Number of end users reached per stakeholder group over different work strands (EC internal monitoring, cut-off December 2024)

	Citizens	No. Academia/ Research Org Users	No. Public Organisation Users	No. Private Company Users (SMEs) [32]	No. Private Company Users (Large Companies)	No information on type of organisation	Website Users	Website Visitors	Total (excl. website users/ visitors)
HPC									4[33]
Digital Skills	20 713	329	25	366 (218 SMEs)	157		30 308	1.13 m	21 590
Destination Earth		600	329	194		813			1 936
Data Space (health)		59	5	10		3			77
TEF		226	20	53					311
Cybersecurity		5	1	7		90			103[34]
European Digital Innovation Hubs			1 621	14 289					15 910[35]
Digitalization of Public Services			360				21 884		36
Safer Internet								125 million [36]	0
EDMO								390 816	0
Blockchain									406
Justice	1 027 392		10 774	40 643		33	1.1 m		1 078 809
Interoperability			12 576					1 m	12 576

[32] In 101 instances there was no company size classification available. We assumed companies were SMEs.
[33] Type of users unknown. Note that the HPC infrastructure funded by CEF, Horizon 2020, Horizon Europe and Digital Europe has more users. Jupiter is the first HPC system directly funded by Digital Europe (not taking into consideration the Digital Europe funded upgrades of HPC systems), and this system was open to researchers for experimental use in 2024 and is expected to substantially extend usage to more stakeholders in 2025
[34] Data on types of organisations available for 13 users.
[35] An additional estimated 38 700 people participated in events (unknown distribution per user type). This explains the difference between the 54,610 value for the legal indicator on EDIH participants.
[36] A substantial part of this figure includes citizens supported by the activities of the Safer Internet Hubs

Cloud to Edge				26					26
Total	1 048 105	998	25 815	55 169	157	939	115.2 m	127.5 m	1 119 208

Source: Self-declaration of relevant EC units regarding their estimated number of end users reached.

Intended effects & benefits

EFFECT.02.1 concrete benefits for public & private organisation and citizen

First, we present the benefits of Digital Europe at the level of **beneficiaries**. While many projects aim to support a large number of end users, beneficiaries benefit from their participation in Digital Europe, and these benefits may yield sustained impacts in the future as well. The main benefits are presented in boxes below. We can see that Digital Europe has allowed these organisations to mobilise substantial funding from other funding sources, strengthening these organisations' capacities and capabilities in terms or implementing their services. This aspect of leverage is further analysed in a later section ('Intended effects & benefits') in this chapter. We also find consistent evidence of a positive impact of Digital Europe on both the ability to form stronger, diverse and inter-MS networks and partnerships (55%), as well as the ability to deliver new products and services (36%). Other benefits mentioned include the standardisation of practices allowing for higher efficiency, which was listed as the top benefit (28% selected) among National Cybersecurity Centres (NCCs). Fewer respondents report benefits to date relating to their international market position (23%) or their internal, organisational processes (34%).

The results of the funded projects show a mix of expected and unexpected outcomes, with varying degrees of impact[37].Several projects reported **positive unexpected results**, such as the high demand for basic training in generative AI to promote work productivity, which exceeded initial expectations. In addition, there was a strong, unexpected interest in AI from a wide range of business sectors. Some projects also discovered synergies with national and regional programmes, accelerating the impact of the project on the cybersecurity market and demonstrating the benefits of collaboration beyond the initial scope of the projects. The projects also revealed unexpected opportunities for innovation and new partnerships. For example, some beneficiaries mentioned that they arrived at potential applications beyond their original scope, leading to faster user adoption of the technology. In another example a supported NGO cited that the higher involvement of young people in networking and discussions about digital rights and a safer internet was higher than originally anticipated. On the other hand, there were **negative unexpected outcomes** that posed challenges to the projects. For example, some projects faced higher than expected administrative burden and funding delays (see 4.2.1), as well as sectoral and geographic differences in digital maturity (see 4.1.2).

EFFECT.02.2 benefits for users

Overall, end-users are positive about the benefits of Digital Europe-funded projects. Across 4 groups of surveyed end-users (HPCs, TEFs, Digital Skills and EDIH), 70% rate the support

[37] Question 31: Were there any unexpected outcomes of the project, positive or negative? Please describe which outcomes and the underlying causes if applicable.

received as effective or very effective in terms of addressing their needs. At a more granular level, both end-users themselves (in four work strands where there are already numerous end users) and beneficiaries provided assessments regarding the level of benefits across these different categories, with remarkable consistency (see also Annex IV, Cost Benefit Analysis, for methodology). These assessments are remarkably similar across the four services (HPC, EDIH, TEFs and Digital Skills) and across organisation types (SMEs, large firms and public organisations). When it specifically concerns firms, the most important benefits identified are higher productivity, lower costs, higher quality of work, and a wider offer of service. More specific benefits, such as higher exports, averted cybersecurity damages and faster scale-up of startups have been experienced to a smaller degree. Interviewees highlight also specifically that there is a significant **co-creation between service providers** (like EDIH) and users, who also bring their own ideas/challenges, allowing for further service improvements. The benefit of Digital Europe support is well illustrated by the example of Mindchip OÜ (see Box below).

SME Benefit example

Established in 2022, the AI & Robotics Estonia (AIRE) EDIH is dedicated to enhancing innovation in AI and robotics. AIRE has been able to support SMEs in the EU in their digital transformation journey and adoption of AI through its test before invest demonstration projects, trainings and digital maturity assessments. For example, Mindchip OÜ is a developer of robotic vessels and situational awareness solutions. The main challenge Mindchip OÜ faced was integrating AI systems to allow reliable identification of other ships and buoys to ensure safer navigation. AIRE worked with Mindchip OÜ, to develop an AI model trained on high-resolution imagery captured by four strategically positioned cameras, integrated into the Robot Operating System (ROS). As a result, Mindchip OÜ has grown significantly in turnover (13-30%)38, and AIRE has helped the MindChip team to source funds through its public funding service, as well as introducing the company to other EDIHs. MindChip OÜ is now collaborating with ARIC Hamburg and Northern Netherlands EDIH to develop a similar robotic vessel.

Source: SME Case and Public Organisations Study

Concerning beneficiaries that are public organisations, they are equally positive about the benefits with 37.7% of beneficiaries indicating an expected positive impact on better public services[39], and 28.6% on lower costs of public service. A good example of the type of support delivered by Digital Europe to public organisations is provided in the text box below. Several beneficiaries in their interviews highlight the important benefit of standardisation due to the European dimension of Digital Europe, in particular in SO5 (Interoperability), which has the potential to increase efficiency as well as the quality of services. Interviewees from public organisations highlight the steep learning curve of engaging with digital transformation activities through Digital Europe in SO5, due to the required capabilities to engage with such projects, as well as the complexities of aligning frameworks across borders. As such, the

[38] https://european-digital-innovation-hubs.ec.europa.eu/knowledge-hub/success-stories/ai-algorithms-and-sensor-integration-robotic-vessels#solutions

[39] Note that a large share of respondents for each benefit category that it does not apply to their project/organisation, due to the heterogeneity of the portfolio. As such, these percentages should not be reversely interpreted, e.g. that the rest of beneficiaries 'failed' in delivering expected impacts.

benefits may in the short term be delayed (due to complexity), but with greater return in the future.

Public Organisation Benefit Example

Digital Europe has contributed to the **digital transformation of public administrations** by enabling the development and deployment of key technical solutions required for the digital authentication of citizens in travel, online payment, verification of educational credentials and accessing public services. For example, Digital Europe is enabling the procurement and technical infrastructure to support interoperability and implementation of the **European Digital Identity Wallet**[40] (EUDI) through the EU Digital Wallet Consortium (EWC). The EU Digital Identity Wallet framework is open source, ensuring that resources will be accessible to the public, allowing Member States to develop their own digital wallet. Digital Europe support has facilitated Member State implementation of the EUDI Wallet by the end of 2026 in line with Regulation (EU) 2024/1183. The support from DEP provided the opportunity for public administrations to develop their capacities in building and testing of IT systems and technologies before they become live.

Source: SME and Public Organisation Case Study

Table 7 End-user benefits (see CBA Annex IV for calculation details)

Stakeholder and Benefit type	Activities	Type of Benefit	Qualitative overall judgment	Key underlying Quantitative Indicators
Firms: Increased Productivity	Higher productivity	Economic	(++)	est. 10.5k-11.1k firms indicating medium or high impact
	Lower costs	Economic	(++)	est. 7.8k-9.6k firms indicating medium or high impact
	Number of individuals trained	Economic	(+)	20,713 individuals trained
	Increased quality of work	Societal/ Economic	(++)	est. 9.8k-11.4k firms indicating medium or high impact
Firms: Better Market Position	Increased exports for affected products/services	Economic	(+)	est. 4.1k-4.5k firms indicating medium or high impact
	Faster scale-up of startups	Economic	(+)	est. 5.3k - 6.6k firms indicating medium or high impact
	Wider Service Offering	Economic	(++)	est. 7.8k firms indicating medium or high firms

[40] Regulation (EU) 2024/1183 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:L_202401183

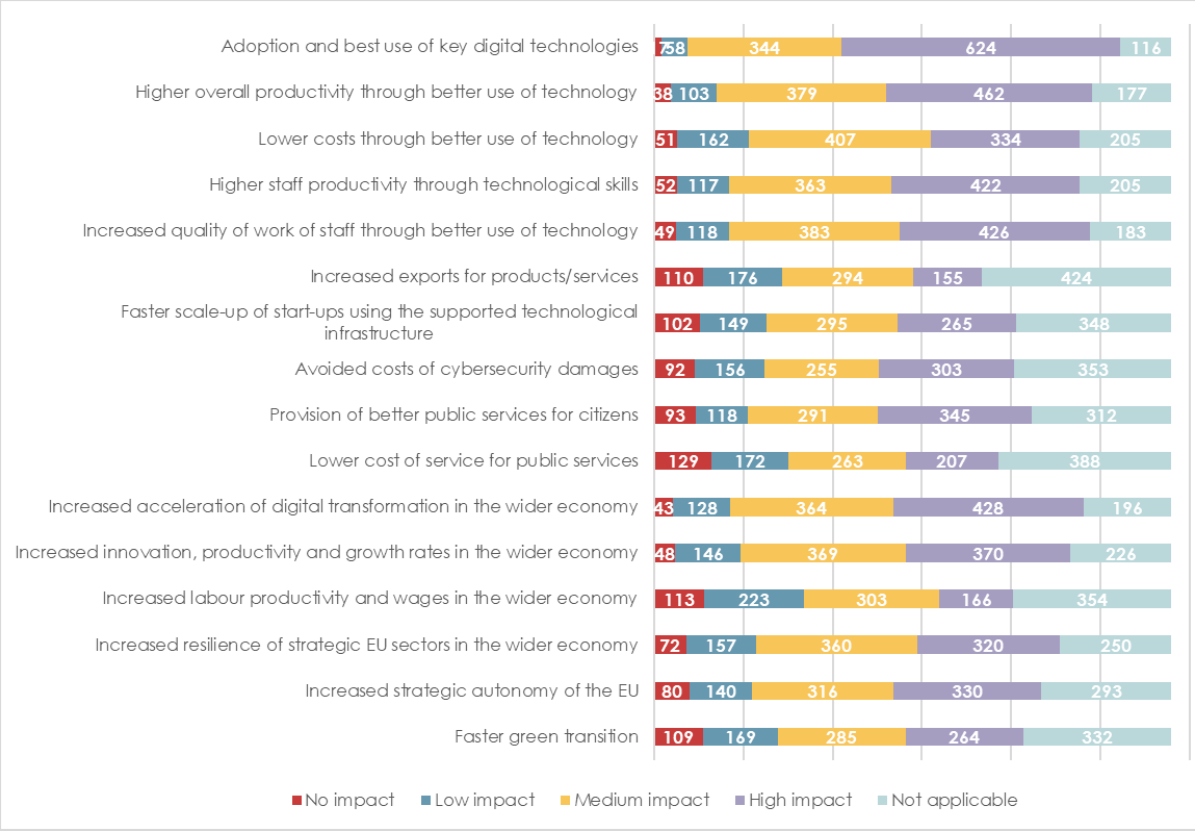
	Avoided costs of cybersecurity damages	Economic	(+)	Est 3.0k-6.9k firms indicating medium-high impact
Governments/ public organisations: better and safer public service delivery	Better public services	Economic/ Societal	(+)	37.7% of beneficiaries indicated a medium or high impact
	Lower cost of service	Economic/ Societal	(+)	28.6% of beneficiaries indicated a medium or high impact

As mentioned before, it should be noted that these benefits are still at relatively limited scale in the EU, as there is only a relatively small number of end users, but it seems that those firms that are supported in general have a positive appraisal of the benefits. Expectations for results in the next 2 years (

Figure 2 below) highlight the relatively high expectations from the beneficiaries in terms of users impacts, with, for instance, over 80% of beneficiaries expecting a medium or high impact regarding the adoption and use of key digital technologies. Expectations are lower regarding impacts on exports, and stakeholders expect that public services benefit more in terms of quality (e.g. easier access for citizens) than their costs of implementation.

The overall positive appraisal of benefits for end-users is further supported by a general willingness to pay for these services beyond the listed costs (if any), showing a value of the services/products for end-users. The analysis of costs and benefits, based on the end-user survey (see Annex V) showed that private sector end-users so far see EUR 115m-222m perceived value, and EUR 6.4m-13.3m for public end-users, based on assessment from the EDIH and Digital Skills services.

Figure 2 Expectations of benefits for end users in 2 years

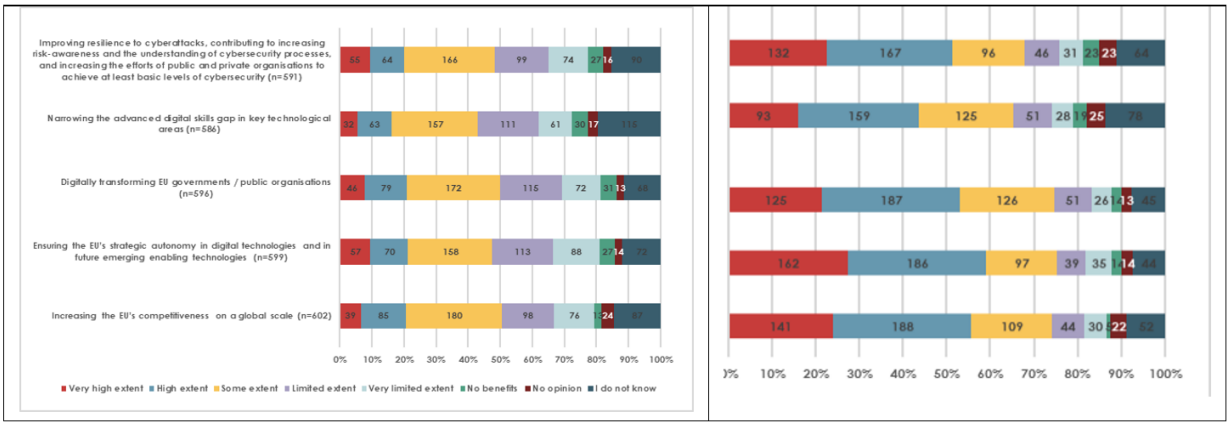


EFFECT.03 Digital transformation, digital competitiveness & strategic autonomy

The high-level objectives of Digital Europe are to accelerate the digital transformation, increase the digital competitiveness and reinforce strategic economy for the EU overall. The summary of the benefits at systemic level based on an analysis of costs and benefits (See Annex IV), is presented in Figure 3 below. Firstly, in terms of contributing to the digital transformation broadly, Digital Europe is seen as having some impact so far on the key goals of digital transformation, including resilience to cyber-attacks, digital skills gap, and digital transformation of EU governments, but that the expectations for the future are relatively positive (See Figure 5). It should be noted here, as also evidenced in stakeholder interviews, that Digital Europe is understood as one of the contributory factors, and that the current scale of Digital Europe is insufficient to single handedly drive the wider digital transformation of the EU economy.

When looking at impacts on productivity, innovation and growth rates, both wider stakeholders (Figure 3) and beneficiaries and end-users in the programme are quite positive about Digital Europe's contribution, with a majority indicating medium or high impact on these aspects. The anticipated positive economic impact is also evident from the results of the macro-economic simulation of Digital Europe carried out by the Joint Research Centre (JRC) using the Rhomolo model (see Annex VII). The model indicates an expected increase of 0.2% GDP (low scenario) – 0.23 (high scenario) after 2 years, representing a cumulative monetary value of EUR 12bn-22bn, although this estimate is heavily based on assumptions.

Figure 3 Public Consultation: Benefits so Far (left) and Expected in the Future (right)



Question 24: To what extent do you think that the Digital Europe programme is helping achieve the following impacts?

Stakeholders are more reserved about the benefits for workers (such as higher salaries, better working conditions), with only a small share of these stakeholders expecting a positive impact in this regard. Stakeholders are more mixed regarding the impact on resilience and strategic autonomy of Digital Europe. While a substantial minority expects a medium or high impact on general resilience of strategic EU sectors, beneficiaries and in particular end-users are less optimistic about the impact on strategic autonomy and reduced reliance on international suppliers. It should be noted that this objective has only recently gained prominence (and urgency), and that SO6, which is oriented towards strategic autonomy, only started to be

implemented beginning of 2024. Interviewees also point out the difficulty of balancing strategic autonomy with productive collaboration with like-minded third countries, although all interviewed stakeholders acknowledge the importance of reduced fragmentation in and a stronger position for the EU. By virtue of the productivity spillover effects modelled in the Rhomolo model, the JRC analysis does show a positive effect on EU exports (see Annex VII), but it should be noted that this does model actual sensitivities in very specific international value chains.

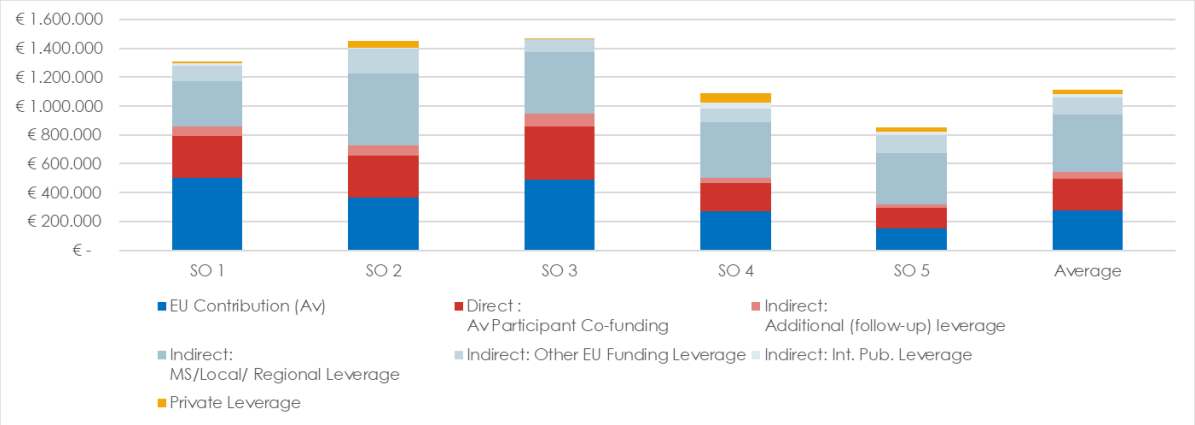
Table 8 Wider Systemic Benefits

Stakeholder and Benefit type	Activities	Type of Benefit	Qualitative overall judgment	Key Quantitative KPIs
Wider economic benefits	Increased innovation and productivity growth rates	Economic	(++)	12-22bn EUR cumulated GDP projected impact by 2030 (Rhomolo) 56.8% (EDIH end-user mini-survey) 52.4% (beneficiary assessment)
	Increased labour productivity and wages	Economic/ Societal	(+)	20.71% (EDIH end-user mini-survey); 26.9% (Beneficiary assessment)
	Reduced reliance on international suppliers / higher strategic autonomy	Economic	(0/+)	16% (EDIH end-user mini-survey), 41.7% (Beneficiary Assessment) 0.010-0.025% increase in exports by 2030 (Rhomolo)
	Increased resilience of strategic EU sectors	Economic	(+)	35.5% (EDIH end-user mini-survey); 43.4% (Beneficiary Assessment)
Wider environmental benefits	Faster Green Transition	Environmental	(+)	30.8% (EDIH end-user mini-survey); 36.5% (Beneficiary Assessment)

EFFECT.04.02 Spillover effects

While we already discussed economic spillover effects at impact level in the previous section (based on the Rhomolo models), Digital Europe also has an important spillover effect in terms of mobilising additional funding for the digital transition from other investment sources. The goal of realising such leverage of EU funding is evident from the design choice to (mostly) work with 50% co-funding ratios, already requiring public and private partners to mobilise their own funding to create large scale EU wide investments into digital deployment. Some of this funding is realised through national co-funding schemes, but there is also a wider array of funding strategies used by beneficiaries: direct co-funding from the beneficiaries; additional co-funding beyond the original total project costs from partner organisations; additional funding from national (MS) and regional public funders; other EU funders; international public funding; and finally private funding. The data related to direct cofinancing is available from the grants data, whereas the other data were collected via the beneficiary survey. The summary of findings is presented in the figure hereunder and the full analysis is available in Annex VI.

Figure 4 Analysis of Leverage – Average scenario



The 50% funding rate[41] for Digital Europe grants has had a significant leverage effect. The 537 grants signed by the end of 2024 received a EUR 1.75 billion EU contribution but had a total cost of EUR 3.17 billion (an effective 55% EU contribution rate for the grant component, direct leverage ratio of 81%). Leverage is therefore much higher in Digital Europe compared with Horizon Europe Cluster 4 (91% EU contribution rate)[42]. Of the EUR 1.41 billion co-funding, EUR 185 million has been covered by large companies, and EUR 200 million by SMEs[43], meaning that the private sector covers 27% of the total co-funding, or 12% of the total Digital Europe grant costs. This co-funding is sourced from both private and public funding triggered by Digital Europe, with some Member States setting up specialised funds to co-finance projects. Some projects, such as the EDIHs, also leveraged combined funding with the ERDF and RRF funds. In addition to the official direct co-funding, beneficiaries also report additional indirect leverage effects on mobilising additional internal and external funding related to the projects, including during and (where already relevant) for the follow-up of the projects. An extrapolation analysis estimates the total leverage factor of Digital Europe at 225%-305% for grants through co-funding of projects and additional funding at national, regional or local levels[44]. Blended operations between Digital Europe and InvestEU also had a leverage and mobilising effect. Through the EU guarantee support to equity investments by the European Investment Fund, EUR 83.63 million has been committed to support strategic digital technologies and EUR 67 million for investments in semiconductor technologies. These equity investments are expected to mobilise 14.77 times the amount committed, facilitating access to finance for key companies across Europe[45].

This shows that Digital Europe is highly successful in mobilising and leveraging other public funding, but that additional leverage of private funding is still relatively limited.

EFFECT.04.01 Horizontal priorities

[41] Grants under Digital Europe generally cover 50% of the total eligible costs for all beneficiaries. Certain types of grants may have a higher funding rate, such as the SME support grants (75%), coordination and support actions (100%) or grant for financial support (100% for the consortium).

[42] European Commission: Directorate-General for Research and Innovation, Viscido, S., Lotito, A. and Boekholt, P., Horizon Europe and the digital & industrial transition – Interim evaluation support study – Final report ('Phase 2' study), Viscido, S.(editor), Lotito, A.(editor) and Boekholt, P.(editor), Publications Office of the European Union, 2024, https://data.europa.eu/doi/10.2777/845650

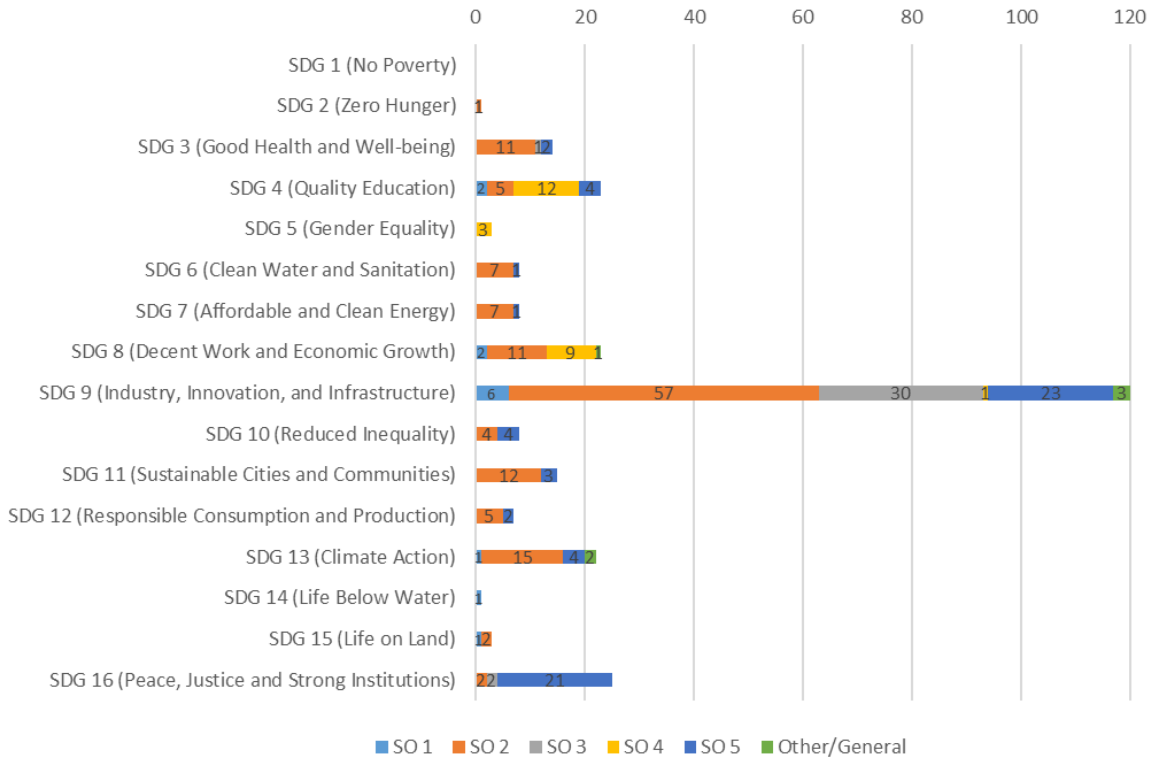
[43] Including EUR 17m of unknown company size, here counted as SME. Please also note that this is not necessarily private co-funding, as some companies receive support through national or regional support programmes. Hence, this is to be interpreted as 'co-funding through private actors' rather than 'co-funding from private actors'.

[44] Based on additional funding at national, regional or local levels exceeding the existing co-funding arrangements (and considering the risk of double counting), including internal investments in follow-up projects.

[45] Interim evaluation of the InvestEU Programme - European Commission.

Based on an analysis of work strands by the EC and implementing agencies at the work strand levels, the contribution to other horizontal priorities is limited with a notable exception for the Destination Earth flagship project (SO1), which has a clear anticipated benefit in terms of climate change mitigation management. There are several other projects (in particular funded under SO2) that support the green transition (climate, biodiversity, clean air) through data spaces. Finally, SO4 (through its skills programmes) and SO5 (through its support for internet safety) indirectly contribute to gender equality. This EC assessment is corroborated by stakeholder feedback, which also view contribution to environmental benefits as relatively modest, but also that there is a growing interest in better linking sustainability and digital technologies. For gender, stakeholders diverge in their opinions. Some stakeholders stress the importance and relevance of gender mainstreaming in skills programmes in order to grow the talent base, whereas others indicate that mandating certain gender quotas for training activities makes it even more challenging to find the right partners and willing employees to participate. DG CNECT also tracks the contribution of the topics to the 17 UN Sustainable Development Goals based on the Commission's KnowSDGs Platform[46]. As expected, SDG 9 (Industry, Innovation and Infrastructure) is by far the most tagged SDG, as it is directly linked to a core objective of Digital Europe. Other notable contributions include SDG 4 (Quality Education), in particular by SO4, SDG 13 (Climate Action) in particular by SO2 as mentioned before, and SDG 16 (Peace, Justice and Strong Institutions), by SO5 in particular.

Figure 5 SDG contributions across workstrand



[46] Home | KnowSDGs

Other/General refers to cross-cutting Digital Europe Actions such as the NCP network.

Enabling Factors and Barriers

EFFECT.05.1 External factors

As highlighted in the Draghi[47] and Letta[48] reports, supported by stakeholders consulted, the Digital Europe programme benefits from strong external drivers favouring digitalisation, while significant external barriers also hamper progress to achieving its objectives.

Positive external factors

- The **global economy's shift towards ICT-driven growth** has established digital competitiveness as a fundamental pillar of Europe's industrial strategy. According to the World Economic Forum, an estimated 70% of the new value created in the world economy over the next ten years will be digitally enabled[49], posing a risk for European companies of falling behind. Europe's Digital Decade Policy Programme (DDPP) is a key driver in promoting the adoption of advanced technologies, facilitating large-scale, cross-border investments and multi-country projects that enhance digital infrastructures, connectivity, and skills, ensuring a structured and coordinated investment approach to digitalisation.
- The **EU Economic Security Strategy**, shaped by intensifying geopolitical tensions and increasing global competition, is causing the EU to strengthen its supply chains for critical digital technologies[50]. The more assertive industrial policies by third countries have increased the risks related to technological dependencies.
- The **Green Deal and the drive towards sustainability** are equally important catalysts for the digital transformation, integrating advanced technologies to enhance energy efficiency and support circular economies, as evidenced by the EC 2022 strategic foresight on the twin green and digital transition.
- **The need for public sector digitalisation** has also been a driver, particularly in education and healthcare, where digital solutions contribute to inclusivity, and resilience, preserving EU standards.

Negative external factors

- A major barrier to Europe's digital transformation is **low private investment and risk aversion among EU businesses**, particularly in adopting new technologies and updating infrastructure. EU business R&D spending is around 1.5% of GDP[51], well below levels in the US and China. Europe's underdeveloped and fragmented venture capital ecosystem also hampers innovative start-ups, driving many to relocate to the US.
- **The EU's regulatory approach**, focused on ex-ante regulation and competition enforcement, has created difficulties in scaling digital initiatives. As highlighted in the Draghi report, the EU now has around 100 tech-focused laws and over 270 regulators

[47] The future of European competitiveness - a competitiveness strategy for Europe (2024), https://commission.europa.eu/topics/strengthening-european-competitiveness/eu-competitiveness-looking-ahead_en
[48] Report on the Future of the Single Market (2024), https://single-market-economy.ec.europa.eu/news/enrico-lettas-report-future-single-market-2024-04-10_en
[49] World Economic Forum (2023), https://www.weforum.org/stories/2023/12/tech-diplomacy-harness-digital-economy/
[50] COM (2023) 570 final, Brussels, 29 September 2023
[51] EUROSTAT data (2024), https://ec.europa.eu/eurostat/statistics-explained/index.php?title=R&D_expenditure&oldid=645219

active in digital networks across Member States. Such oversight entails complex, and costly procedures, consuming the resources of SMEs and discouraging risky investments. On the other hand, if Europe would succeed in driving the set-up of regulatory standards at global scale, for instance in AI and data, Europe's regulatory leadership in data privacy and ethics could offer a significant advantage to EU players when markets begin to give greater weight to secure and trusted applications.

- **Persistent skills shortages** have become a major barrier to the digital transformation of businesses, limiting their capacity to adopt and integrate advanced technologies. Based on Eurostat data, the skills shortage for ICT-related jobs in the EU has been considerably increasing over the last decade and reached 4% of total job posts. According to the Draghi report, almost 60% of EU companies report that lack of skills is a major barrier to investment[52], and a similar share report difficulties in recruiting ICT specialists. While addressed as pillar SO4 in Digital Europe, it remains a key barrier.
- **The high cost of energy** in Europe is also an obstacle to growth in certain digital sectors, making digital infrastructure investments more expensive and limiting the spread of digital transformation. This also impacts the digital transformation of Europe, since for instance training and running AI models and maintaining data centres is highly energy intensive.
- **The EU faces intensifying competition** from the US and China, both of which have prioritised ICT innovation and digital leadership, fostering large industry champions in the digital sector, a key advantage that Europe lacks. According to the Draghi Report, between 2013 and 2023, the EU's share of global ICT revenues declined from 22% to 18%, while the US increased its share from 30% to 38%, and China from 10% to 11%. Consequently, this growing disparity underlines Europe's dependence on certain competences and services ran by US companies, for instance in cloud services. While such dependencies serve as a catalyst for strengthening strategic autonomy, they also present major limitations in areas where the EU holds a weak market position, and where the gap with global competitors may be increasingly difficult to close.

EFFECT.05.02 Awareness of the programme and outreach

Overall, **the level of awareness of the Digital Europe Programme shows mixed results**, particularly when compared to well-established EU programmes such as Horizon Europe, CEF, or Erasmus+. The late adoption of the Programme and the global pandemic also had an impact on events and marketing opportunities at the start of the programme. Survey and interview data, aligned with the findings of the evaluation of the Digital Europe Programme of the European Economic and Social Committee[53], indicate that **awareness of the programme is relatively high among previous beneficiaries of EU funds**, such as those engaged with Horizon Europe and CEF. To fulfil its objective of widespread deployment of digital technologies across Europe, it is essential to **increase awareness of the programme among organisations that have not previously benefited from EU funds**, as well as among the general public. Yet, the data collected suggests that wider awareness remains a challenge, with many new participants citing it as a barrier to applying, as also identified in the Public

[52] ICT specialists - statistics on hard-to-fill vacancies in enterprises - Statistics Explained - Eurostat

[53] Economic and Social Committee, Evaluation of the Digital Europe programme (2024), https://www.eesc.europa.eu/en/our-work/opinions-information-reports/information-reports/evaluation-digital-europe-programme

Consultation (101/647 respondents). In this context, **specific Digital Europe initiatives** have been instrumental in expanding outreach and dissemination efforts, such as the digital National Contact Points (NCPs). These initiatives leverage networks with a place-based approach, engaging directly with SMEs within their local ecosystems. Notable examples include the European Digital Innovation Hubs (EDIHs) and Competence Centres, which play a crucial role in fostering engagement at regional and national levels. See Table 6 for an overview under heading 'networks/hubs.

The outreach to a wider range of beneficiaries and end-users through the use of the **Financial Support to Third Party** (FSTP) scheme, also known as "cascade funding ", could be further incentivised in Digital Europe, and stakeholders consulted suggested expanding its use in the next phase of the programme. The FSTP scheme is a mechanism to distribute public funding in order to assist beneficiaries, such as start-ups, scale-ups, SME and/or mid-caps, developing or adopting digital innovations. The specific rules governing this scheme are outlined in Annex 5 of the model grant agreement[54].

Box 3 Example of Digital Europe Calls including Financial Support to Third Party (FSTP)

A few calls within Digital Europe WP 23-24 encourage the use of FSTP for broader outreach. Some examples:

- The **Common European Mobility Data Space** supports cross-border use cases in mobility and logistics data sharing, promoting interoperability and best practices..
- The **Networked Local Digital Twins** allocates at least €17m via cascading grants to support cities in developing and expanding local digital twin services and AI-driven use cases.
- The **Alliance for Language Technologies** funds language data collection and adaptation of large language models, particularly assisting SMEs to adopt and customise advanced language technologies

Awareness of **synergies between Digital Europe and other key EU programmes,** such as Horizon Europe remains an area for improvement. While many previous beneficiaries of EU funding are familiar with Digital Europe, they often face challenges in distinguishing the boundaries between programmes. Most stakeholders acknowledge the importance of maintaining clear distinctions between R&I and deployment programmes, while ensuring that strong coordination efforts effectively bridge the gap between them. The topic is further analysed under the Coherence section of this evaluation report.

EFFECT.05.03 Measures in place to safeguard EU's interest

The primary aim of Digital Europe is to strengthen the digital capacities within the EU and across EU member states. For that purpose, it notably allows for the participation of third

[54] European Commission, Digital Europe Programme General Model Grant Agreement (2024), https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/digital/agr-contr/mga_dep_en.pdf

countries in project consortia. Funding is available for entities from EU Member States and associated countries *"unless participation is restricted given the risk that their participation would represent for the EU's security"*. For sensitive topics, particularly in cybersecurity (SO3), participation has been restricted under Article 12.5 of the Programme Regulation. Some other topics are subject to Article 12.6, requiring compliance with security conditions. EFTA/EEA countries are fully associated, and other associated countries are Albania, Bosnia and Herzegovina, Kosovo, Moldova, Montenegro, North Macedonia and Serbia, Ukraine and Türkiye.

Box 4 Example of measures and activities to safeguard EUs interest:

Under SO3: Cybersecurity directly supports Europe's strategic autonomy by reducing vulnerabilities and dependencies, preventing foreign influence, and protecting critical infrastructures.

Under SO5: Stakeholders consulted mentioned that significant collaboration exists with third countries aligned with EU interest, notably Western Balkans and Ukraine, who adopt EU interoperability standards. Both regions are now part of the NIFO monitoring framework. Ukraine also benefits from the GovTech Incubator, with Iceland, Norway, North Macedonia, and Serbia soon joining.

Under SO6: As part of the Expert Group on Semiconductors[55], **the significance of collaboration** with third countries was underscored by several Member States in a context where the European Union is not and will not be self-sufficient. Discussions are currently ongoing with the United States under the Trade and Technology Council framework and there is a reported ongoing dialogue with Japan.

When asked about the **impact of the security restrictions** imposed by Digital Europe on legal entities established in or controlled by third countries, the majority of survey respondents (70%) indicated that their projects were not affected. A limited share (7%) reported that their projects were directly affected by these security restrictions. From an efficiency perspective, the resources required for proposal/tender preparation were also heavily impacted, as further reported in the efficiency section. In terms of effectiveness, beyond the delays in project implementation, the most significant challenge faced was assembling a consortium with the right skills despite the restrictions, as some of the skillsets of non-EU partners are rather unique. On the other hand, a perceivably high degree of **openness** in some areas also creates challenges, for instance related to data sharing within European Data Spaces in sectors like agriculture or manufacturing where companies are hesitant to share sensitive information. Accessibility rules to the data shared within European data spaces could be adapted or better communicated to foster trust within the EU.

Regarding **stakeholders' views on the measures in place to safeguard EU's interest**, the feedback collected through interviews, focus groups and public consultation highlights the tension between Europe's strategic autonomy goals and the need for international collaboration with world leaders in specific areas. Many noted that to remain competitive in deep digital technologies, Europe must not isolate itself but rather position as a hub for global talent and capital, while protecting critical strategic areas. It was seldom emphasised that

[55] https://ec.europa.eu/transparency/expert-groups-register/screen/expert-groups/consult?lang=en&groupID=3838

Digital Europe imposes more stringent safeguard measures than Horizon Europe, which most find justified by the programme's focus on deploying digital technologies in a highly competitive market environment.

In the current geopolitical context, and once more efficiently implemented, some stakeholders would also support **extending the restrictions on participation to EU entities** to all Digital Europe calls where international collaboration is not essential, making it the default option in the programme. Further to this, stakeholders stressed the importance of constantly maintaining the alignment of Digital Europe with the European Economic Security Strategy to ensure coherence in digital security policies. Structured partnerships with like-minded international players under reciprocity agreements could be explored in strategic areas. Additionally, to the safeguard measures, stakeholders consulted also reflected upon the EU's role in **setting robust international standards**, for instance for AI, data security or interoperability. The EU could potentially further leverage Digital Europe to drive global adoption of European digital norms. The programme could also further support companies to comply with European frameworks while maintaining competitiveness, as it is already the case in some areas (e.g., AI).

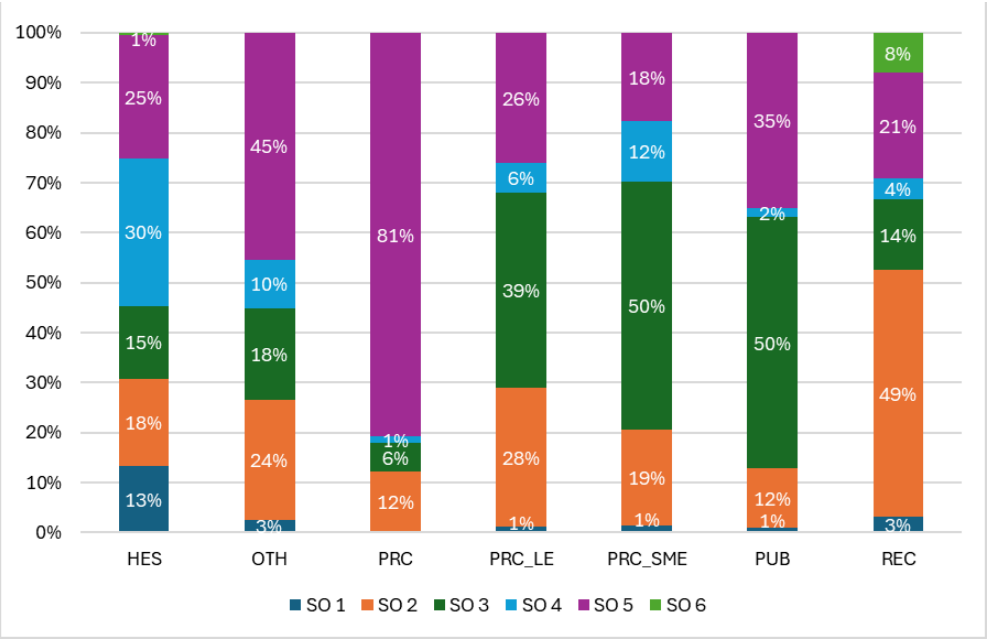
EFFECT.05.04 Drivers & barriers for participation, reasons for limited participation

Several drivers and barriers to stakeholders' participation in the programme have been identified through the evidence collected and are presented below.

Access to a wide range of stakeholders across types of beneficiaries

Digital Europe fosters the creation of ecosystems encompassing the five main types of beneficiaries on close to equal footing.

Figure 6 Participation patterns among main stakeholder groups (per SO)



Source: Technopolis Group 2024, reference date 01/05/2024.

When looking at the **evolution of EU funding per type of beneficiary over time**, it is evident that at the starting stages of the programme, in 2022, REC received the most Digital Europe funding of that year, this share getting gradually smaller in the subsequent years, reaching 12% in 2025. PRC_SME started receiving funding in 2022 with a share of 8%, increasing up to 23% in 2024 and decreasing again to 16% in 2025. HES started receiving funding in 2022 with a share of 21% and remained around this percentage in the subsequent years. PUB funding started in 2022 with merely 6% of the funds allocated that year but rose steadily to 17% in 2025. The PRC entities for which information on whether they are SMEs or LE is not identified still represented 3% of the funding in 2022 but decreased to 0% from 2024 onwards.

Table 9 Share of EU funding across type of stakeholder over time

Type of Stakeholder	2022	2023	2024	2025	Grant total
HES	21%	23%	24%	19%	23%
OTH	20%	13%	12%	23%	15%
PRC	3%	1%	0%	0%	1%
PRC_LE	5%	13%	13%	13%	11%
PRC_SME	8%	18%	23%	16%	17%
PUB	6%	11%	12%	17%	11%
REC	38%	20%	16%	12%	22%
Grand Total	**100%**	**100%**	**100%**	**100%**	**100%**

PRC: PRC entities for which information on whether they are SMEs or LE is not identified.
Source: Technopolis Group 2025, based on data received from the client (cut-off date 31/12/2024).

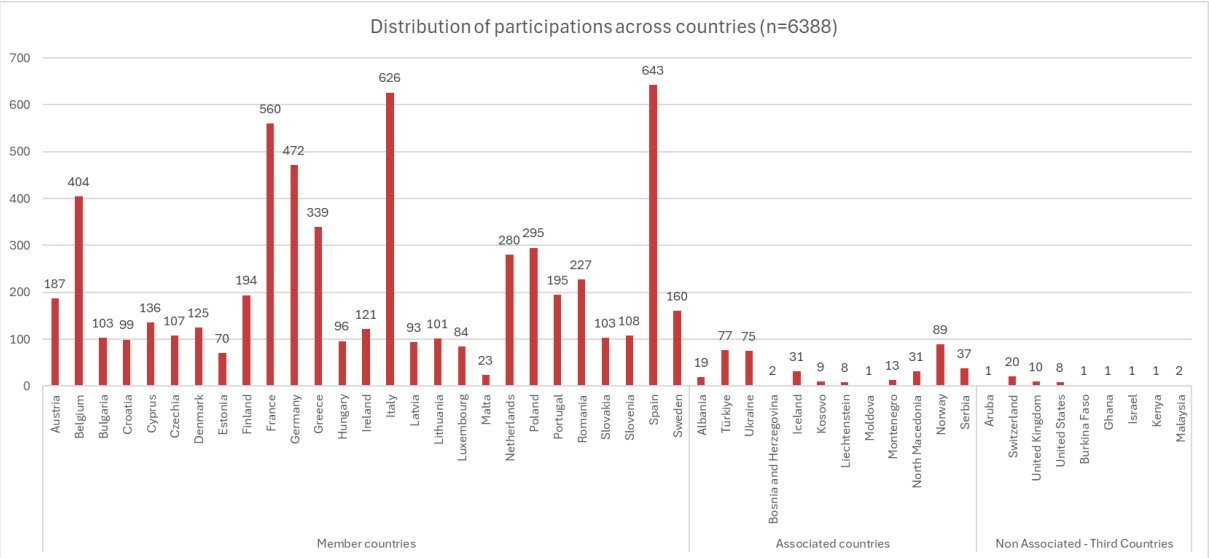
In addition to the direct participants, **public and private end-users are indirectly targeted** through the capabilities developed by the programme, including infrastructures such as TEFs, and skills. Access regimes to infrastructures are therefore essential enablers to foster access to such infrastructures to end-users, and the involvement of industry and public bodies in the governance frameworks of those infrastructures. Further to this, stakeholders interviewed have reported the role of the Digital Europe in **establishing strong networks**. Similarly, the Chips Competence Centres and the design platform illustrate targeted outreach to SMEs, designers, and industrial stakeholders, notably via the European Network of Chips.

Overall, the data and stakeholder insights collected also illustrate the differences in **market readiness** of the activities funded under the different SOs. For instance, with HPC still being closer to the research side (lower TRLs) with higher interest from research organisations; while SO3 (cybersecurity and trust) and SO5 (deployment and interoperability) directly include much more end-users, both from the private and from the public side. Other SOs such SO2 (Artificial Intelligence) and SO4 (advanced digital skills) cover a mix of technology providers and end users.

Access to a wide range of stakeholders across geographies

Further to the integration of the different stakeholder types into the programme, fostering the consolidation of ecosystems, the programme also seeks to **alleviate the digital divide in Europe**. The participation pattern reflects that the programme succeeds in attracting participants from the 27 EU member states.

Figure 7 Number and distribution of participations across countries



Data only for grants. Source: Technopolis Group 2024, data reference date 31/12/2024.

When analysing the **distribution of funding across participating countries per SO**, overall Member States have a varied distribution. Some Member States present a higher concentration of EU funding in specific SOs, **showcasing their national/regional specialisation** in specific advanced technologies. For instance, Malta, Slovakia and Cyprus receive most of their EU funding from SO3 (cybersecurity and trust), while France, Finland and Belgium present higher shares for SO2 Artificial Intelligence. Poland, Bulgaria, and Hungary are more heavily benefiting from the EDIH instrument. Ireland, Portugal, and Lithuania are relatively highly involved in SO4 Advanced digital skills compared to other countries (although it is still not the biggest category for these countries), and beneficiaries from Slovenia and Luxembourg participate relatively the most in SO1 HPC, though this remains a relatively small share (16% and 9% respectively).

Stakeholders also note that, while the programme's objective should remain aligned with the Digital Decade's goal to alleviate the digital divide, especially for the **broad roll-out of mature digital technology through incremental development and uptake** this approach might not be the most strategic pathway for all advanced technologies. In areas like Semiconductors, the programme has **strengthened the creation of European champions** which can build the scale needed to compete at global scale. This strategy has been complemented by the establishment of a network of Competence Centres, designed to facilitate access to the three Chips Pilot Lines across the EU and the upcoming Design Platform that will support the emergence of a new generation of European fabless start-ups.

Drivers in fostering participation

In the Public Consultation, respondents identified key factors driving large, cross-border digital ecosystems: funding cross-border initiatives (69%), strategic continuity in key digital areas (64%), and long-term funding covering preparation to deployment (57%). Several stakeholders highlighted the demand-driven nature of digital transformation, particularly for SMEs which mainly seek solutions to their challenges, regardless of the technology proposed to solve them. They have strong incentives to engage in the Digital Europe programme to **remain competitive** and **reduce external dependencies**. Focus groups discussions and

stakeholders interviewed have also highlighted the important **capacity building role of the programme**, which also constitute an important driver for participation. This includes, for instance, the **access to digital skills** as enablers of digital deployment, highlighted by many as a cross-cutting capability across the different SOs, as well as **access to infrastructures**, as essential to lower the risks of technology uptake. An example is the HPC initiative, which invests in advanced supercomputers and EU-wide networking, enabling public-sector deployment in areas such as health, climate, and administration.

Challenges in fostering participation

From the Public Consultation, most respondents (60%) responded that, while the Digital Europe programme strives to close the gap between research and commercial deployment of digital technologies, further efforts are needed to strengthen Europe's digital ecosystem in this respect. Interviewees and stakeholders consulted through surveys and focus groups note that, while the Digital Europe programme's participants overall cover all types of stakeholders, the limited participation from key European businesses demonstrates the **need to further expand the programme's outreach**. They suggested strategically positioning the programme to create a sense of opportunity loss, encouraging greater engagement, particularly from SMEs and startups. The **skills shortage** often limits SMEs and start-ups in participating in the programme. Further to that, the **lack of awareness of the opportunities** offered by the programme is another element hampering participation.

In addition, the **complexity and fragmentation** of the programme make it difficult for industry to navigate, and the multitude of instruments and initiatives, each with its own communication and branding strategies, makes it more difficult for stakeholders to grasp the full scope of the programme. As a result, Digital Europe is often perceived as a "collection of instruments and initiatives" rather than a cohesive programme with a unified narrative, which may impact its visibility and branding. A key challenge also lies in **bringing together groups that have not traditionally collaborated**, such as those covering the cloud and telecommunications sectors, in a **close-to-market environment**. In that context, the **large-scale nature of projects funded** might act as deterrent for industry participation. Another major barrier is the **low funding rate**, which discourages SMEs and large industry players from participating. Many companies **struggle to see the return on investment** from their participation, particularly when competing against cheaper, non-EU alternatives, such as US-based hyperscalers.

During interviews and focus group discussions, stakeholders advocated for a shift towards a **more application-driven approach** along users' challenges, rather than structuring work programmes and calls around technology entry points, clarifying the potential return on investment of their participation. Stakeholders also emphasised the importance of adopting a **clearer demand-side language**. Such an approach was already tested under the HPC programme.

Efficiency

Efficiency in implementation

EFFIC.01 Management modes

Overall, the choice of management modes has been **strategic, flexible and appropriate for the first phase** of Digital Europe, though efforts should continue to be made to mitigate some of the disadvantages of the resulting complex management structure.

Digital Europe uses a mix of both **direct and indirect management modes**. Direct management includes grants and procurement directly managed by DG CNECT, and by DG DIGIT in the case of the Interoperable Europe chapter, with 27 units having been involved so far and several other DGs for specific work strands (DG DIGIT, JUST, GROW FISMA). There are two executive agencies (HaDEA, REA) managing grants on behalf of DG CNECT. The European Investment Fund [EIF]) is managing the financial instruments related to Digital Europe. There are also Joint Undertakings (JUs), including the EuroHPC JU and Chips JU. Finally, there is the European Cyber Security Competence Centre and Network (ECCC). The choice of management modes and implementing partners are well in line with their known strengths, capabilities, and operational and governance structures, allowing DG CNECT to quickly launch a rather heterogenous set of specific objectives.

EU stakeholders highlight the **complexity of the arrangements of Digital Europe**, which makes it difficult to gain an overview of the programme 'at a glance.' Disadvantages include more challenging oversight and monitoring of the programme's performance, visibility and awareness, as well as proactive management of synergies arising during implementation. However, the different **management modes also have advantages**. Firstly, agencies, such as HaDEA and REA (and EIF for investment funds) are set up to manage the implementation of grants with existing robust processes and with generally a clear understanding regarding the division of roles between the policy officers and the agency. Secondly, Joint Undertakings have a clear place when it concerns investments in infrastructure, where certain Member States have a higher willingness to invest, and there is a need for a specific governance modality. A downside of the Joint Undertakings are the rather long timelines of preparation due to the negotiations between MS and the EC, and legal requirements (issues such as taxation etc) involved. Third, the management modes chosen also to reflect a degree of pragmatism to work with existing structures (e.g. EuroHPC) in order to launch projects relatively quickly.

EFFIC.01.1 Efficiency in the calls' design

Overall, the main design choice affecting the efficiency of the call concerns the chosen funding modality, i.e. whether to opt for a grant (with certain co-funding requirements), procurement, joint procurement (e.g. through a JU), contribution agreement or financial instrument. For each element in the work programme, the EC (with consultations where relevant) makes an informed decision to opt for a specific funding modality (the most appropriate solution from an efficiency *and* an effectiveness standpoint). From an efficiency perspective, stakeholder interviews show clear patterns regarding the relative ease and cost-efficiency of each of the modalities. Overall, grants are relatively efficient for the EC administration, as only relatively short objective descriptions need to be prepared, and there are relatively standard communication, selection and management procedures. Procurement is typically more costly, as detailed terms of reference need to be drawn up, at times with the use of specialist expertise. During the implementation phase, procurements also require typically more guidance from policy officers to ensure objectives are met, although this may differ both between grants and procurements. The most complex modalities are joint procurements and contribution agreements, which require extensive negotiation and alignment. Of course, these differences also reflect intrinsic differences between the objectives of these calls, although stakeholders also indicate that in a limited number of instances the instrument choice was misaligned.

Various stakeholders point out that it was at times a significant challenge to speedily launch the more complex parts (e.g. those linked to the JUs) of Digital Europe, given the need to

develop new processes, as well as the recruitment and training of enough staff. Overall stakeholders acknowledge that the **Digital Europe teams have made significant progress in the first 2 years of the programme in learning how to set up processes, systems and governance** for managing the heterogeneous landscape of instruments and modalities, and that the fruit of these investments will come in the next few years.

Despite this positive assessment, stakeholders also indicate that it is important to keep reviewing the best fit in terms of funding modalities and to reduce complexity where possible, especially as the programme is now (also) moving into a strong phase of promoting deployment and exploitation of infrastructure. In addition, it is important to also take a longer view in terms of efficiency by taking into account sustainability aspects of funding modalities. For instance, grants, (joint) procurement have very different implications in terms of ownership of intellectual property. While using more procurement has allowed DG CNECT to quite quickly launch a number of (soft) infrastructures, the ownership of all project outputs also creates expectations and exploitation duties for the future. It is not clear whether a full 'portfolio' strategy with a sustainability aspect in mind is already present. Another key source of inefficiency mentioned by stakeholders is that projects supported by multiple EU funding programmes (e.g. ERDF), require double application and management modes, with no possibility to harmonise/consolidate such reporting.

EFFIC.01.2 Management of the calls & application process

The **overall success rate** (see *Table 10*) was around one in two (49%), which is high compared with the rates for Horizon Europe (12.9-15%[56]), but comparable to (smaller) national schemes such as the Dutch Eureka funding[57] (45%). There is significant variation across SOs, with SO4 having 26% (1:4) and SO6 91% (1:1) success rates. This suggests a well-targeted programme; however, the overall relatively high rates may also signal limited visibility for some of the calls[58] and possibly lower levels of competition than might be desirable. The success rates in financial terms, rather than application numbers, are higher still. Oversubscription rates, based on EUR requested vs granted, are higher with a total of 58%.

For procured projects the number of proposals received was typically 3-6 proposals, with a small number of requests receiving more than 7. EC staff indicate that the safeguarding measures are one factor reducing the number of proposals, as well as the often highly specialist expertise requested. This indicates an overall adequate balance of competitiveness (and hence price-quality) and applicant burden for procured projects.

For grants, there is slight variation between success rates per organisation type (see Annex VI), with SMEs being the least successful (51%) and large companies and public organisations being the most successful (65%). According to EC information, in total 12.5% of the proposals were inadmissible due to low quality or missing information.

[56] https://op.europa.eu/en/publication-detail/-/publication/1be13af7-5dd4-11ef-a8ba-01aa75ed71a1/language-en
[57] https://open.overheid.nl/documenten/ronl-5d01790c-b5bc-4e3f-91ab-7c68110eb21c/pdf
[58] HaDEA feedback on policy report.

Table 10 Success rates per SO (grants)

SO	Successful Proposals (N)	Eligible Proposals (N)	Success Rate (N) (%)	Oversubscription Rate (EUR) (%)	Av EU Funding (EUR)
EDIH	147	320	46%	47%	2.128.835
SO 1	9	12	75%	86%	9.609.421
SO 2	68	158	43%	66%	8.324.022
SO 3	171	318	54%	58%	2.820.751
SO 4	45	176	26%	36%	4.123.017
SO 5	86	118	73%	83%	1.737.319
SO 6	32	35	91%	91%	3.999.662
Grand Total	**558**	**1.137**	**49%**	**58%**	**3.424.265**

Source: Technopolis Group 2024, based on Digital Europe Dashboard Data (reference date 08/01/2025)

Time to Grant (TTG) is calculated by subtracting the project signature date and the call deadline date. Digital Europe commits itself to a 9-month maximum TTG[59]. All SOs are within this maximum commitment on average, so Digital Europe is reaching is TTG target. The only exception was EDIH in 2023 when its TTG was 11 months (341 days). Overall, EDIH and SO6 have the highest TTG of 9 months (272 days and 271, respectively), while SO1 has the lowest TTG of 6 months (185 days). However, when looking at the share of calls that do not meet the target, this was rather high at first (48% in 2022) but steadily decreasing to 26% in 2024. This evolution shows a clear efficiency gain thanks to the setup of internal processes and a learning curve, as also evidenced by the EC stakeholder interviews. For CEF[60], the average was 249 days and for Horizon Europe, 273 days in the first two years (with 41% within target). This shows that Digital Europe is performing as well as comparable programmes. The related administrative costs are discussed in the other section (on cost-effectiveness) of this chapter.

The **Time to Inform** (TTI) rates (related to the application process) have decreased from 111 days in 2022 to 99 days in 2024.

The level of **satisfaction of beneficiaries** varies across different aspects. The clarity of the scope and description of the calls for proposals / invitations for tender received the widest satisfaction (71% of respondents reported being satisfied or very satisfied). The clarity of rules of participation and eligibility criteria and clarity of application instructions and administrative requirements also scored well in terms of (high) satisfaction (66% and 64% respectively). The timing and scheduling of calls for proposals was also considered appropriate by 59% of respondents. The areas that attracted fewer positive responses related to funding levels, the

59 https://digital-strategy.ec.europa.eu/en/activities/get-funding-digital
60 https://commission.europa.eu/document/download/278fdd03-ad61-4504-b049-ca7ffdc52f30_en?filename=mid-term_evaluation_cef_swd_2018_44_1.pdf

proportionality of the effort required to bid, and likely success rates: 29% and 23% of respondents were (very) dissatisfied with the funding rate and the volume of funding available. Higher Education Institutes and Research Organisations were relatively more negative on these aspects compared to companies (both large companies and SMEs[61]). Unsuccessful applicants showed a similar pattern across the different process aspects, albeit about twice the share of respondents reported they were dissatisfied on all aspects compared with successful applicants. More detail regarding specific bottlenecks is discussed in the other section (on cost-effectiveness) of this chapter.

EFFIC.01.3 Implementation of projects

Overall, a small majority of participants was satisfied with the Digital Europe administrative arrangements, from reporting requirements to audit principles. In most cases, a small minority (10-20%) was critical of the implementation arrangements.

A majority of respondents (60%) considered that the required accounting practices are reasonably aligned with existing local practices (including both those who agreed and strongly agreed), although 13% (strongly) disagreed. In terms of the clarity of the cost calculation rules, responses were more mixed. While 60% of respondents (strongly) agreed that the rules are clear, 18% (strongly) disagreed and 18% neither agreed nor disagreed. Most participants, about 60%, felt that the project reporting requirements are reasonable in terms of effort and cost. The standard templates provided for project reporting were generally seen as helpful, with 58% of respondents (strongly) agreeing that they facilitate the reporting process. However, 20% of respondents neither agreed nor disagreed. The user-friendliness of IT tools and resources received mixed reviews. While 50% of respondents (strongly) agreed that these tools are user-friendly, a significant proportion, 19%, expressed dissatisfaction.

Given the recency of their introductions, and the increasing focus on strategic autonomy, we also investigated the impact of the **safeguarding** measures (WTO Articles 12.5 and 12.6). According to EC records, in total 15-20 grants and 5-6 procurements were affected by these procedures. For grants, in total 57 guarantees for grants and 4-5 for procurements were given out by Member States under Article 12.6, with none of them rejected. In some cases, the implementation of the safeguarding measures can result in considerable delays, as evidence needs to be gathered from applicants (with no specific time limit according to the financial regulation), and guarantee letters from Member States need to be obtained. Some companies are reluctant to share sensitive and confidential information. All these aspects can result in delays of several months. This barrier was also explicitly mentioned as a measure in the Fit4Future review of Digital Europe (page 4).

Over time, Digital Europe has improved the efficiency of these processes, resulting in DG CNECT taking a leading role in the interservice working group for the implementation of the safeguarding measures. From the perspective of beneficiaries, in the small number (6%) of cases where there was an impact, around half of respondents reported a medium or large impact on their ability to engage long-standing partners (48%) or new partners (43%). Around a third indicated an impact on the resources required to prepare bids. Finally, the main issue raised by beneficiaries, in line with the observations of EC staff, are the delays involved with getting the safeguarding measures (such as getting MS support). The effectiveness of the safeguarding measures is further discussed in the chapter on effectiveness.

61 It should be noted here that SMEs often could benefit from the increased co-funding rates.

EFFIC.01.4 Visibility of Digital Europe & support on NCPs

As a new programme, ensuring visibility is an important operational challenge. We see mixed results regarding the visibility of the programme, with beneficiaries being more positive compared to the broader group of public consultation respondents. Among the broader group of public consultation respondents, inadequate knowledge about the programme was listed among the top reasons hindering potential applications to the programme (101/647 respondents). HADEA, as primary implementation agency for grants under Digital Europe, also notes that interactions with applicants and beneficiaries show that Digital Europe lacks sufficient visibility, in particular compared to longstanding programmes such Erasmus+ and Horizon Europe. Interviewees added that the complexity of the Digital Europe, with many different types of initiatives and 'sub brands' like HPC and EDIH, makes it difficult for stakeholders to understand the scope of the programme. There is a lack of a clear 'programme narrative' that is simple enough for stakeholders to understand, also in terms of positioning with other programmes.

For beneficiaries, the survey shows that overall satisfaction with the Digital Europe's communication activities was positive across channels, with a satisfaction rate of 55-60% for the Digital Europe website, EC information events, Q&A on the Funding and tenders portal. Events and communications from NCPs scored lower with a 42% satisfaction rate.[62]

Beneficiaries became aware of Digital Europe in various ways. The most common source of information, cited by 60% of respondents, were colleagues/partners. This was followed by the 'EU Funding and Calls for Proposals' portal, selected by 35% of respondents, and the Digital Europe website, chosen by 28% of respondents. 17% of respondents heard about the Digital Europe through the info days organised by the Commission/Executive Agencies. Other sources included the Digital Europe National Contact Points (12%), events organised by national governments (9%), social media (5%) and industry events (2%).

In terms of different **support services offered by the National Contact Points**, a large share of beneficiaries (40-55%) did not use or had limited knowledge of their services. This can be largely explained by the relative youth of the specialised NCP network for Digital Europe. Those that did use the services, were mostly satisfied or neutral in terms of service delivery, with around one-fifth being dissatisfied. Interviewees and the EESC evaluation also highlight the fact that the NCP network needs further strengthening. The next few years should provide opportunities to better monitor and assess which NCP configuration (e.g. digital-focused or embedded in broader service provision) is most effective in supporting organisations in accessing Digital Europe.

Analysis of costs and benefits

EFFIC.02.1 Administrative and financial burden on EC/implementing bodies

Annex IV presents the overview of total funding and administrative costs for Digital Europe in the period 2022-2024. The total committed EU contribution for the programme amounts to EUR 3.06bn for the period, with EUR 41m in administrative expenses, EUR 18.3m in estimated staff costs for preparation of the programme, and EUR 93.9m costs, for staff costs for the implementation of the programme. In total the administrative costs for the EC and implementing agencies amount to 4.9% of the total programme costs. Annex IV also shows

[62] Note that for these percentages between 10-20% had no opinion. Only between 5-12% were dissatisfied.

the distribution of the administrative costs (HR costs) among the different implementing bodies, highlighting that HADEA and the EuroHPC JU faced the highest implementation costs.

In terms of **simplification measures**, Digital Europe has implemented several measures for grants. These include the use of personal unit costs (for specific grant types), a flat-rate 7% indirect cost rate, as well as a single audit principle. More recently Lump Sum Actions were introduced. First launched in 2024, they represent only 1% of actions but are expected to increase in the future. In general, the simplification measures were perceived by a substantial share of participants as being effective in reducing the burden (43-54%) where they apply.

However, DG CNECT has decided not to extend the current simplification efforts in Horizon Europe to adopt similar unit costs for personnel expenses for all grant types, which creates confusion for Digital Europe beneficiaries that are part of multiple programmes.

The EC is also introducing other types of simplification by providing better user experiences in the online applications environment (the EU Grants & Tender portal). At this time no quantitative assessment can be made regarding the potential monetary benefits of these measures, although we make suggestions for future estimates in our recommendations chapter later in the report.

In terms of further suggestions for simplification[63], stakeholders argue that the simplification on unit costs and lump sum funding should be extended to Digital Europe, and to investigate a further simplification of the safeguarding measures. One important change this would entail would be to ensure clear deadlines and timelines for all parties (including applicants), to reduce unnecessary delays. Secondly, one important aspect of simplification would be to align and consolidate monitoring and reporting requirements when multiple funders are involved (e.g., a Digital Europe model that all funders / implementing bodies would adopt). The lack of current consolidated reporting is introducing a lot of duplication and unproductive efforts for beneficiaries. Third, more use of automation using digital tools, such as for budget preparation, application entry and real-time tracking of reports would reduce the administrative burden on participants.

[63] Question 21: Do you have any suggestions for how the administrative burden for applicants and participants could be further reduced (regarding application process, reporting requirements, cost calculation etc.)?

Box 12 Stakeholder Feedback Digital Europe programme simplification

Application Process

- Use lump-sum funding with clearer reporting requirements and a one-page Lump-Sum Reporting Guide focused on deliverables. (Beneficiaries)
- Eliminate duplication of requirements across platforms/authorities; use pre-defined templates for application and reporting with clear examples of cost calculations. (Beneficiaries)
- Automate and digitise the process: budget auto-builder, application auto-fill, automated error checks, live report tracker, standardised forms, electronic signatures, and a fully digital application flow. (Beneficiaries; Applicants)
- Improve platform usability and stability (e.g., Sygma is "not intuitive and crashes"): create a more intuitive, user-friendly interface, and ease restrictions on table formats. (Beneficiaries; Applicants)
- Provide clear and consistent guidance at both application and reporting stages, with greater clarity before launching calls and avoiding changes during implementation. (Beneficiaries; Applicants)
- Coordinate better between national and EU rules, especially on co-financing, and provide clearer guidance on co-funding opportunities; coordinate with national authorities to speed up Seal of Excellence follow-up. (Beneficiaries; Applicants)
- Simplify applications and reviews: reduce the maximum number of pages in the application form and simplify the review process. (Applicants)
- Develop user-friendly digital platforms to facilitate submission and project management. (Applicants)
- Reassess funding and indirect-cost rates (7% flat rate) to reflect real overheads—especially where no national co-funding is available. (Policy workshop)
- Clarify Ownership Control Assessment (OCA) up-front: publish required documentation, eligibility criteria, and indicative timelines to reduce 2–3-month start-up delays. (Policy workshop)
- Make call texts more homogeneous and precise: define eligible activities and funding conditions consistently across calls. (Policy workshop)
- Adapt the Funding & Tenders Portal to DEP specifics: reduce duplicate data entry and improve onboarding for newcomers. (Policy workshop)
- Complement lump sums with shorter milestones, unit-cost elements, or voucher-based (FSTP) mechanisms to reduce SME risk and enable newcomers. (Policy workshop)
- Coordinate with Member States to identify and publicise the responsible ministry/authority for DEP co-funding and their rules up-front. (Policy workshop)
- Strengthen DEP NCP capacity and training to Horizon-like levels to improve early-stage support. (Policy workshop)

Project management:

- Reduce the frequency and complexity of reporting with clearer guidelines and better use of standardised templates. (Beneficiaries)
- Automate and digitise the process: budget auto-builder, application auto-fill, automated error checks, live report tracker, standardised forms, electronic signatures, and a fully digital application flow. (Beneficiaries; Applicants)
- Improve platform usability and stability (e.g., Sygma is "not intuitive and crashes"): create a more intuitive, user-friendly interface, and ease restrictions on table formats. (Beneficiaries; Applicants)
- Provide clear and consistent guidance at both application and reporting stages, with greater clarity before launching calls and avoiding changes during implementation. (Beneficiaries; Applicants)
- Allow more flexibility in amending grants and restructuring projects to adapt to fast-moving digital technologies; streamline processes and keep the work programme flexible to respond quickly to new needs. (Beneficiaries; Focus Group SO1; Focus Group SO3)
- Set up post-call guidance/support (e.g., an office for Seal of Excellence awardees) and improve National Contact Point support and capacity-building for applicants. (Applicants). NCPs should be equipped with specific training on DEP's legal and financial aspects so they can provide more comprehensive support to beneficiaries during the project lifecycle. (Beneficiaries)
- For end users, standardise documentation to streamline processes. (End users)
- Integrate EU and national reporting where feasible and align timelines; specify ex-ante what will be checked to reduce rework. (Policy workshop)
- Apply proportionality to change management: fast-track minor administrative changes (e.g., vetted partner legal-name updates) without triggering full OCA. (Policy workshop)
- Enable data re-use between proposals, grant agreements, and reporting; add a live status/progress tracker to cut cycle time. (Policy workshop)
- Mitigate SME cash-flow exposure under lump-sum schedules by using shorter milestones and staged acceptances. (Policy workshop)
- Address the post-award support gap by clarifying NCP/implementing-body hand-offs and naming contacts for legal/financial queries. (Policy workshop)
- Improve stability and usability of Sygma/Funding & Tenders during implementation; reduce data re-entry and ambiguity in instructions. (Policy workshop)
- Create agile structures that allow SMEs to exit or adjust roles without destabilising consortia. Use shorter tasks, milestones, hybrid models (lump sum + unit cost), and vouchers to lower risks and barriers for SMEs.
- Clearly articulate the distinct missions and impacts of HE (research) and DEP (deployment). Develop joint calls or phased mechanisms that integrate both streams and simplify participation.

Source: Authors

EFFIC.02.3 Administrative costs on stakeholders

In terms of administrative costs on stakeholders, the analysis distinguishes between the application phase (borne by both successful and unsuccessful applicants), and the implementation phase for successful applicants. For the application phase, based on extrapolated results of the beneficiary survey[64], applicants spend between 1.86-2.5 person months and around EUR 7.1k additional expenses (e.g. consulting fees, travel) for each proposal, with coordinators spending between 3.12-3.85 person months and EUR 31.3k additional expenses (see CBA, Annex IV, for more details)[65].This compares to 0.6-1.2 person months for partners and 1.8-2.2 person months for coordinators in Horizon Europe This suggests that Digital Europe is comparatively burdensome in terms of application costs compared to Horizon Europe. This is also corroborated by the results from the beneficiary survey, which showed that only 50% of the beneficiaries believe the administrative efforts related to the proposal process are proportional to the scope and chances of funding.

For the implementation phase, the analysis of costs and benefits also included an extrapolation of total management costs for beneficiaries[66]. This ranged from an average of 2.7-3.5 person months for partners to 9.4-10.4 person months for the coordinator. In total this represents a sum of EUR 148m-186m for the entire Digital Europe period, representing a beneficiary-level overhead of between 7-9% of grant costs (see CBA Annex for more details regarding calculations). This is similar to the 6-10% for Horizon Europe[67]. However, given the lower funding contributions compared to Horizon, beneficiaries see the administrative costs as relatively high, especially as they often need to report to multiple funders due to the co-funding situation**,** leading to a lot of duplication in efforts.

EFFIC.02.2 Implementation inefficiencies

Based on the interviews, open questions in the survey, as well as observations by HADEA from their direct experience managing the calls and grants[68], the Fit4Future review of Digital Europe[69], a number of implementation inefficiencies were identified, related to the programme management, as well as the national co-funding aspects. There are a number of inefficiencies identified related to the direct programme management of Digital Europe:

- As also identified in the EESC evaluation of Digital Europe (para 2.8), a recurring challenge was the **50% co-funding rate**, which made it difficult for some organisations, especially smaller ones such as SMEs, to participate. This was seen as a deterrent, with stakeholders stating that the comparatively low funding rate limited their ability to include key partners in their consortium due to the financial burden. This concern is heightened when compared to other EU-funded programs that offer more favourable funding conditions, such as higher rates or simplified cost options. SO2 beneficiaries were particularly dissatisfied with the co-funding rate.

[64] Limited to grants only.
[65] Note that preparation costs for tenders are not included, as the commercial logic of the market dictates that these costs are reflected on average in the tenderer's final price. Preparation costs for other types of instruments (contribution agreements, financial instruments) are covered by the staff expenses of the implementing bodies.
[66] As these costs are eligible project costs and therefore funded, they are not listed separately in the benefits and cost table.
[67] https://op.europa.eu/en/publication-detail/-/publication/1be13af7-5dd4-11ef-a8ba-01aa75ed71a1/language-en, Section 6.6
[68] HADEA (2024). Feedback to Policy Report 2024 Digital Europe Programme
[69] Fit4Future Opinion Digital Europe, https://commission.europa.eu/system/files/2023-11/final_opinion_2023_2_digital_europe.pdf

- Stakeholder report confusion around the funding rules tied to the SME status, with some organisations assuming that SME status always results in higher funding rates, while this is only the case for specific SME support actions.
- Difficulties were mentioned with regards to the **declaration for ownership control,** in particular for larger multinational companies. The Fit4Future opinion[70] similarly raises this issue, suggesting applying Horizon Europe models for approval of guarantees or measures proposed by controlled entities.
- The Fit4Future Review highlight the issue of **too short project duration** in the case of some procurement contracts (e.g. 1 year), which results in a lot of process costs through reissuing calls/tenders. Multiannual projects would be more efficient in this regard.
- The **application process** itself was described as challenging due to the extensive administrative requirements by some applicants. A small minority highlighted the difficulty of navigating the **EU Funding and Tenders Portal**, describing it as user-unfriendly, particularly for first-time applicants or small organisations.
- Challenges in **working with partners** under the Digital Europe grant rules were frequently mentioned, particularly in cases involving multiple legal entities or where project staff changed during the application process, making it difficult to maintain project momentum. For example, in a project where a beneficiary wanted to involve selected experts from five legal entities in their own organisation, this resulted in a lot of extra administrative work. Working with more flexible consortium arrangements by allowing subcontracting or using financial support to third parties (FSTP) could provide solutions[71].
- **Large consortia** struggled to maintain consistent communication and governance. One respondent noted that "the total number of partners should be limited, as too large project consortia are difficult to manage". Another issue raised was that some project coordinators imposed a top-down approach, which reduced the collaborative nature of the projects.
- **Eligibility requirements** are sometimes perceived as too specific, requiring very specific combinations of consortia, which takes time to form, such as covering at least a certain number of EU member states. This has led to lower submission rates (e.g. Advanced Digital Skills) or extensions of call deadlines (EUID Wallet).
- Many organisations, particularly non-profit and research organisations, reported that the **7% indirect cost allocation** was insufficient to cover actual administrative and operational costs. One respondent commented: "With 7% indirect costs, it is difficult to sustain the project (…)".

There were several inefficiencies related to **national co-funding:**

- There is a lack of **synergy between EU and national funding**, which led to confusion and delays. Many organisations struggled to secure **national co-funding,** citing changes in rules, scope, and responsible authorities as significant obstacles. Several

[70] https://commission.europa.eu/system/files/2023-11/final_opinion_2023_2_digital_europe.pdf
[71] See also Fit4Future Review Digital Europe

respondents reported long delays in **obtaining approval for national co-funding**, in rare cases up to 22 months.

- At times uncertainty or risks regarding state-aid issues delay or reduce the incentive for Member States to provide co-funding arrangements[72]
- Other specific challenges included securing **letters of support from Member States** as part of the safeguarding measures, dealing with the administrative burden of national requirements, and facing delays in the project timeline due to lengthy pre-selection processes at national level. In addition, the process of securing the necessary approvals from local governments or boards was highlighted as a significant hurdle for some organisations.
- The administrative burden was identified as a significant challenge, with many respondents pointing to the need for **double reporting** – both to the European Commission (EC) and to national authorities. As one participant explained, "We currently have to report our results in 4 different ways: to the DTA (Digital Transformation Accelerator, which is coordinating and evaluating the EDIHs) portal, to the normal EC reporting, to the Spanish ministry and to each individual service". The **SyGMa platform** used for EC reporting was also criticised for being time-consuming and user-unfriendly by some beneficiaries.

EFFIC.02.2 Overall cost-effectiveness

As described in the analysis of costs and benefits (CBA) approach (see CBA Annex IV), there are significant limitations in terms of the ability to assess the full cost-effectiveness of a relatively new programme, which has for now primarily focused on investments in infrastructure, with expected use and deployment and related benefits being expected in the years ahead. Furthermore, while costs are relatively easily monetised, some benefits are hard to quantify or monetise.

Overall, the CBA showed that the total cost of Digital Europe (including direct co-funding) in the evaluation period encompassed EUR 4.9b[73]. Benefits could not yet be monetised at this stage. A few monetizable indicators include EUR 115m-222m perceived value by the private sector, and EUR 6.4m-13.3m by public end-users for end users of EDIH and skills programmes. The JRC's Rhomolo GDP model shows a projected EUR 11-25bn of cumulated GDP impact by 2030, indicating a multiplier in the range of 1.22-5.01 depending on the spillovers assumed. This compares against similar analysis result of 2.46 for Horizon 2020. It should be noted that this model is built on assumptions that are based on literature of digital technological economic impact, and not on empirical estimates of actual spillover rates.

As such, a picture emerges of a programme that is delivering meaningful but limited early economic impacts with the potential to generate much greater value for users and the economy as a whole, which could be realised in the coming years as the Digital Europe infrastructural investments start to bear fruit at scale. Moreover, we can envisage a strongly positive cost-effectiveness result if the medium to long-term technology productivity spillovers materialises, as assumed by the Rhomolo model.

[72] Fit4Future Review Digital Europe
[73] Excluding EUR 1.1b of budget committed by DG CNNCT to implementing agencies, which has not yet been committed to economic actors through grants or procurement.

Internal Coherence

Complementarity and synergies in Digital Europe (COH.01)

The programme demonstrates strong internal synergies and complementarities, both within individual work strands and Specific Objectives (SOs), and across different SOs. According to beneficiary survey data, 35% of respondents indicated that the programme is fully coherent with other Digital Europe projects, suggesting that the interventions are broadly consistent and mutually reinforcing. We found several different types of synergies:

- **Sequencing of actions within a portfolio of project** ensuring that technological deployment is supported by the necessary expertise and infrastructure
- **Explicit connections between initiatives by design** through the work programmes fostering internal coherence between parallel projects both within and across SOs
- **Technological integration across SOs** where synergies emerge as different digital technologies interact and reinforce one another
- **Function of instruments** such as competence centres and digital hubs to foster bridges between technology blocks

The Programme is **structured as a portfolio of projects** organised into work strands within each Specific Objective (SO). The structured portfolio management approach allows to maximise impact in both deployment and capacity building by sequencing projects. For example, in SO1, the sequencing began with infrastructure acquisition and development, followed by the creation of competence centres, the establishment of support services, and continuous training initiatives. This phased approach ensures that technology deployment is accompanied by the necessary expertise and capacity-building efforts. Similarly, in SO2, the programme fosters synergies by integrating the Testing and Experimentation Facilities (TEFs) and Data Spaces into a coordinated framework following its deployment. The Work Programme 2023-24 introduced a Coordination and Support Action (CSA) aimed at improving collaboration across AI sectoral TEFs. This initiative facilitates exchanges between TEFs and other relevant projects, including European Digital Innovation Hubs (EDIHs), Data spaces, networks of excellence research centres, and additional Digital Europe-funded actions[74]. At the same time, the Data Space Support Centre plays a crucial role in ensuring a harmonised approach to data spaces. It defines common requirements and best practices, fostering interoperability across sectors. Additionally, it supports the Data Innovation Board in developing guidelines for European data spaces, covering cross-sectoral data-sharing standards, security protocols, and access procedures to ensure a structured and efficient digital ecosystem[75].

Work Programmes establish **explicit linkages among parallel projects**, making the strategic programming a key mechanism to foster complementarities and encourage connections among initiatives. Under SO5, synergies between EDMO and other SO5 objectives are outlined in WP 2023-2024, with specific linkages identified between EDMO hubs and Safer Internet Centres (SICs). The "CYberSafety IV" project[76], which continues the development of the Safer Internet Centre in Cyprus, is connected to the MedMO project under EDMO, serving

[74] Work Programme 21/22. https://digital-strategy.ec.europa.eu/fr/activities/work-programmes-digital
[75] https://www.digitaleurope.org/news/data-spaces-support-centre-launched-to-facilitate-interoperable-data-sharing-2/
[76] https://cybersafetyproject.com/

as the regional hub for Greece, Cyprus, and Malta. Under SO1, synergies have emerged between High-Performance Computing and Destination Earth (under SO5 for WP21-22 but moved to SO1 for WP 23-24). Destination Earth became a user of EuroHPC infrastructures, advancing weather forecasting and climate modelling.

Digital Europe is structured around technological blocs underlying each SO. One of the primary ways these **synergies emerge between the different SOs is through technological integration and cross-fertilisation**, where deployment activities in one area drive innovation in others and is incorporated in their own programming (e.g. AI for HPC, HPC for AI). Key connections, such as between SO1 (HPC) and SO2 (Data, Cloud, and AI), have yet to materialise fully, with anticipated collaborations, such as leveraging Data Spaces for AI applications, expected in the 2025-2027 Work Programme and enablement of the Simpl project for AI. The introduction of the AI factories is perceived as conducive of this integration, as highlighted in the latest Draghi report[77]. While the Digital Europe encourages technological synergies across SOs, the integration of emerging technologies such as quantum remains challenging due to varying levels of technology readiness. In some areas, like quantum sensing, practical applications (e.g. sensors for navigation, quantum communication systems) are emerging. However, many quantum technologies remain in early stages of maturity, limiting their immediate use alongside other digital capacities and causing uneven opportunities for cross-SO collaboration. Stakeholders emphasised the need to build a holistic European digital ecosystem where key technologies—such as AI, cybersecurity, HPC, and semiconductors—are seamlessly interconnected. However, current initiatives frequently lack the necessary integration mechanisms or targeted funding to effectively bridge multiple technological domains, hindering the full realisation of these synergies[78].

Specific instruments act as bridges between technological blocs such as competence centres and digital innovation hubs, ensuring complementarity between different initiatives. These entities serve similar functions within their respective domains, acting as instruments for collaboration and knowledge exchange. For instance, European Digital Innovation Hubs (EDIHs) under SO5 have established cross-SO synergies, particularly with competence centres in SO1 (HPC), SO3 (Cybersecurity), and SO6 (Semiconductors). EDIHs also collaborate with Testing and Experimentation Facilities (TEFs) and Data Spaces under SO2. A notable example is the Data Space Support Centre (DSSC), which works closely with EDIHs, leveraging their regional and local presence to support SMEs and other stakeholders in adopting data spaces while simultaneously feeding valuable insights back into the ecosystem and has contributed to the development of SIMPL-Live. However, challenges remain in fully operationalising these synergies. Stakeholders in SO1 have reported mixed experiences in collaboration between HPC National Competence Centres (NCCs) and EDIHs. While successful partnerships exist, issues such as competition and trust have obstructed further integration. Interviewees highlighted the need for a neutral coordination forum to facilitate open dialogue, foster cooperation, and ensure entities work together effectively across technological domains.

SO4 on Advanced Digital Skills has, by design, synergies with the technological blocs, as it includes targeted actions in key areas such as AI, HPC, cybersecurity, interoperability, and semiconductors, directly contributing to the development of EU-wide expertise in these domains. Nevertheless, stakeholders have raised concerns about the fragmentation of skills

[77] Draghi, M, The future of European Competitiveness, Part B. In depth analysis and recommendation, September 2024, pp.78
[78] CEA position paper

development efforts across SOs. While SO4 provides a structured framework for digital skills training, parallel initiatives exist within other SOs, often lacking coordination.

Complementarity and synergies direct and indirect management (COH.02)

Direct management mode ensures synergies through formal governance bodies, internal working groups, and structured bilateral interactions between topic owners. Active coordination and orchestration of synergies, along with the co-design of work programmes, help maintain alignment[79]. In SO2 (Cloud, Data & AI), coherence is maintained through formal governance bodies that involve Member States and stakeholders, as well as internal Commission coordination. For instance, DG CNECT convenes regular team meetings to streamline the design and implementation of cloud-related topics, while the Taskforce for Smart Middleware brings together units responsible for cloud infrastructure and middleware development. Bilateral meetings with DG DIGIT further align cloud middleware, the data ecosystem, and building blocks in other SOs (e.g. SO5). For advanced digital skills (SO4), through cross-DG interface, DG CNECT collaborates with DG EAC and DG EMPL to coordinate initiatives under the Digital Education Action Plan, the University Strategy, and the Skills Agenda. This is also the case in SO5 (Digital Government & Public Services), where DG CNECT ensures strategic alignment across seven main work strands in collaboration with DIGIT, JUST, and HOME.

Moreover, under SO4 and SO5, HaDEA also played a role in fostering synergies across projects under its management, **acting as both a coordinator and orchestrator to improve alignment**. A common synergy mechanism is the complementarity of parallel projects where projects funded under the same thematic area together to achieve shared objectives. For example, in SO4 (advanced digital skills) and SO5 (Digital Government & Public Services), HaDEA has facilitated collaboration between projects addressing digital identity, security frameworks, and public sector digitalisation. A concrete illustration of this approach is the European Union Digital Identity Wallet pilots, where large-scale testing of use cases generates valuable feedback for the Architecture Reference Framework and the reference wallet implementation. Regular meetings coordinated by the European Commission, in cooperation with HaDEA, enabled projects to collectively tackle technical challenges and ensure coherence of the portfolio.

CSAs play a key role in operationalising synergies by fostering collaboration between different units and DGs within the European Commission, ensuring structured interaction and complementarity. This is notably the case in SO4 where different units are involved in a CSA that supports the rollout of initiatives for advanced digital skills development by gathering inputs on the existing education offers/gaps in digital areas and the related needs of the labour market.

Indirect management modes foster specific types of synergies in the Digital Europe by leveraging domain-specific capabilities and network of specialised organisations, providing a more direct engagement with the relevant industrial, research or public sectors community, or key capabilities to streamline implementation in complex field (e.g. InvestEU). Indirect management modes enable cross-sector synergies which allows to leverage capacities of different entities and coordinate funding.

[79] Digital Europe governance framework

Destination Earth (DestinE) is implemented through contribution agreements with EUMETSAT (deployment and operation of the distributed and federated Data Lake), ECMWF (Digital Twin Engine and first two Digital Twins, providing high-fidelity simulations), and ESA (system integration, deployment, and operation of the core service platform). EuroHPC & Chips JU and the ECCC play a crucial role in the implementation of specific work strands. It provides a structured governance and ensures coherence in programming (through their specific SRIA/WPs) and implementation within the technology field, and the broader EU funding landscape (incl. integrating multiple funding streams under one governance body). Besides contribution agreement, JUs & ECCC, the Investment Platform for Strategic Digital Technologies (IP-SDT) is a financial instrument implemented by EIF and designed to support eligible projects through equity and quasi-equity financing, allowing to combine funding from Digital Europe with the Invest EU guarantee.

Specific coordination mechanisms have been put in place to ensure coherence with the broader programme. The Governing Boards of the JUs, composed of representatives from the European Commission and Participating States, serve as the primary decision-making bodies. The Commission, represented at the DG CNECT level, ensures a degree of alignment with the broader strategic priorities of the Programme. DG CNECT has introduced measures to ensure coherence between JUs and other SOs, regardless of the management mode. One of these key mechanisms is regular reporting on synergies at the Digital Europe Sherpa Group, where CNECT acts as a liaison with the EuroHPC JU and Chips JU & ECCC, facilitating strategic coordination and integration with the rest of the programme. Structured coordination mechanisms such as the Destination Earth Joint Steering Board (JSB), and the Invest EU Governing Group also contribute to ensuring coherence within the Digital Europe programme.

Indirect management modes introduce a certain degree of complexity and fragmentation, stakeholders have raised concerns about the challenges posed by the combination of direct and indirect management modes, particularly when the same SOs are implemented under different structures. For example, while HADEA manages the advanced digital skills component and the Cybersecurity Skills Academy, the ECCC oversees other cybersecurity-related activities, leading to potential fragmentation. Stakeholders suggested that consolidating programme components under a single implementing entity could improve clarity, improve coordination, and strengthen the overall effectiveness of cybersecurity initiatives within the Digital Europe. Similarly, the coordination of financial instruments under SO6 with the Chips JU remains limited, as Invest EU / EIF operate outside the standard governance framework of the Chips JU, making structured collaboration more challenging.

External coherence

Coherence with wider EU policies and priorities (COH.03)

Digital Europe is embedded within a clear policy framework guided by EU priorities and the Digital Decade Policy Programme[80]. It contributes to several key EU priorities, including "A Europe fit for the Digital Age," "An Economy that Works for People," "A Stronger Europe in the World" and "The European Green Deal".

Digital Europe is embedded within the broader framework of the Digital Decade, contributing to the priorities set by the Digital Decade Policy Programme (DDPP). In this regard, key achievements of the programme, funding the deployment of innovative new digital solutions,

80 Decision - 2022/2481 - EN - EUR-Lex

infrastructures & related services[81] contribute directly to the four pillars of the DDPP, namely skills, digital transformation of business, secure and sustainable digital infrastructures and digitalisation of public services[8283].

The set-up of multi-Country Projects (MCPs) and the introduction of a new legal instrument through the European Digital Infrastructure Consortium (EDICs) aims at providing a tool to drive collective investment efforts in high priority areas of the Digital Decade[84]. As of 2024, three EDICs have been established via Implementing Decision, namely the Alliance for Language Technologies EDIC, Local Digital Twins towards the CitiVERSE EDIC, and the EUROPEUM-EDIC (set up to foster the activities of the European Blockchain Partnership to expand and deploy the EBSI network and its use cases).

Digital Europe directly supports the set-up of EDICs and their implementation and the MCPs, such as IPCEIs (e.g. call on the support to the implementation of MCPs, cloud-IPCEI exploitation office) and prepares the ground for EDICs in preparation, such as the Genome EDIC or the Connected and Innovative Public Administrations (IMPACTS) EDIC. For instance, building upon EUCAIM, the planned EDIC on Cancer Image Europe will permit to sustain the data infrastructure beyond EUCAIM project ends, and enable synergies with the forthcoming European Health Data Space[85].

Digital Europe also supports the EU's environmental sustainability objectives, such as those outlined in the European Green Deal, through projects like the SO1 "Destination Earth" initiative. Launched in 2021, it aims to create digital twins of the Earth, with a cloud-based platform expected to host four to five operational digital twins by 2025.[86]

Additionally, Digital Europe contributes to the EU's Digitalisation of Energy Action Plan[87] by advancing energy-saving technologies. A key example is the forthcoming deployment of the second-generation Common European Reference Framework (CERF) for energy-saving applications[88]. Specific actions under SO5 also contribute to the Circular Economy Action Plan's Sustainable Product Initiative and EU Digital strategy's Circular Electronic Initiative (through The Digital Product Passport).

The programme also contributes to Europe's digital transformation by underpinning strategic frameworks**,** such as the European Skills Agenda and the Digital Education Action Plan (2021–2027). As such, Digital Europe directly supports the implementation of key regulations**,** ensuring their practical application across Member States. The programme's actions are complemented by an array of regulatory measures aiming to eliminate barriers in several critical technological areas, for instance, to incentivise business-to-business and business-to-government data sharing in across the EU (Data Governance Act, Data Act), the creation of a safer and fairer online environment for users and businesses (Digital Services Act, Digital

81 SWD (2024) 260 final, Digital Decade in 2024: Implementation & Perspective, July 2024
82 The Digital Decade Framework. Available here.
83 https://publications.jrc.ec.europa.eu/repository/handle/JRC134647
84 SWD (2024) 260 final, Digital Decade in 2024: Implementation & Perspective, Annex 2 – Update on MCPs / EDICs
85 SWD (2024) 260 final, Digital Decade in 2024: Implementation & Perspective, Annex 2 – Update on MCPs / EDICs
86 SWD (2024) 37 Final Performance and Evaluation Framework for Digital Europe.
https://www.parlament.gv.at/dokument/XXVII/EU/172887/imfname_11340736.pdf. Information also available here:
https://commission.europa.eu/strategy-and-policy/eu-budget/performance-and-reporting/programme-performance-statements/digital-europe-programme-performance_en
87 COM/2022/552 final - Digitalising the energy system - EU action plan
88 https://digital-strategy.ec.europa.eu/en/news/delivering-our-promise-deploy-common-european-reference-framework-energy-saving-applications

Markets Act), the improvement of the level of security of network and information systems across the Union (NIS2 directive), to strengthen public sector interoperability (Interoperable Europe Act) and to ensure artificial intelligence in the EU is safe, respects fundamental rights and democracy (AI Act). Digital Europe also plays in role through SO3 in the implementation of the regulation establishing the European Cybersecurity Industrial, Technology and Research Competence Centre and the Network of National Coordination Centres[89]. The programme contributes to the implementation of regulatory frameworks within the scope of SO5, including the European Digital Identity Framework, the Once Only System under the Single Digital Gateway Regulation, and Regulation (EU) 2022/850 of the European Parliament and Council, which establishes the e-CODEX system for the cross-border electronic exchange of data in judicial cooperation for civil and criminal matter.

Alignment of Digital Europe with relevant EU regulations was generally viewed positively, with 37.8% of beneficiaries indicating the programme was fully coherent. The analysis of open-ended questions highlighted the successful alignment of Digital Europe with the AI Act and cybersecurity regulation. The programme has contributed to the deployment of the Cybersecurity Act through the development of Security Operation Centres/cyber hubs (SOCs). It has facilitated compliance with the AI Act by advancing AI testing and experimentation facilities and supporting the preparation and compliance with the AI Act by an innovation accelerator, an EU database on stand-alone high-risk AI systems and innovation regulatory and testing mechanisms (regulatory sandboxes and Union testing facilities). Respondents, also noted that while Digital Europe is conceptually aligned with broader EU goals, practical implementation is often hampered by the slow adoption of regulations at national level.

Coherence with EU programmes (COH.04)

Synergies between Digital Europe and other EU funds and programmes are outlined in the Annex III of the Digital Europe Regulation[90], which includes the Horizon Europe (HE), Connecting Europe Facility (CEF2), Invest EU Fund, Erasmus+, Creative Europe as well as programmes under shared management, including the ERDF, the European Agricultural Fund for Rural Development and the European Maritime, Fisheries and Aquaculture Fund (EMFAF) and the European Social Fund (ESF+). A large share of project beneficiaries to the programme values Digital Europe as complementary to other EU funding programmes and fostering synergies with other type of EU funding instruments. At the European level, Digital Europe is seen as fully coherent with other EU funding instruments by 38.9% of respondents and about 30% of respondents indicated it was at least partially coherent.

Digital Europe positioning in the wider EU funding landscape and exploitation of synergies

In terms of specific programmes showing high degree of complementarities, **respondents to the public consultation identified Horizon Europe as the most complementary programme (directly managed) to Digital Europe**, followed by Creative Europe, Connecting Europe Facility, InvestEU & the European Defence Fund. Horizon Europe also emerged from the public consultation as the EU programme with the most exploited synergies. Specifically, 18% of respondents indicated that synergies were fully exploited, while 38% reported that

[89] Regulation (EU) 2021/887 of the European Parliament and of the Council of 20 May 2021 establishing the European Cybersecurity Industrial, Technology and Research Competence Centre and the Network of National Coordination Centres
[90] Regulation (EU) 2021/694 of the European Parliament and of the Council of 29 April 2021 establishing the Digital Europe Programme and repealing Decision (EU) 2015/2240 (Text with EEA relevance)

several synergies had been explored. To a lesser extent, the public consultation also highlights exploited synergies with Connecting Europe Facility, Erasmus+ & the EU4Health programme.

The Digital Europe programme **demonstrated high level of synergies with both H2020 & Horizon Europe** through the uptake and deployment of innovative digital solutions developed under Horizon. The DEEP project[91] series is a prominent example, beginning with the initial DEEP and extending through DEEP-ER, DEEP-EST, and DEEP-SEA. Funded under Horizon and EuroHPC, these projects contributed to innovative software components, such as "software bricks," which enable dynamic modularity of applications on multi-partition systems. These components are being deployed in EuroHPC systems, including JUPITER at Jülich financed through Digital Europe. Similarly, there are synergies between R&I activities related to data spaces and data sharing under Horizon 2020 and Europe and the Data Spaces deployed under the Digital Europe programme. Examples of project funded under Horizon Europe notably include technologies and solution for data privacy and green data operations[92] or technologies for data management.[93]

Despite synergies between RD&I activities and deployment efforts, stakeholders expressed concerns about **the pace of technological development** citing delays in translating research outcomes into tangible applications and scaling up solutions. Interviewees acknowledged that the HPC procurement process is progressing with a clear focus on adopting European technologies when it comes to the acquisition of quantum computers. For instance, the first quantum processors have been acquired from the French startup Pasqal, and EuroHPC is procuring additional quantum machines including a photonics-based quantum computer from Quandela, another French company, alongside five additional European quantum solutions. However, teething problems remain according to research organisations & industry stakeholders linked to the **uptake of EU-funded technological R&D in public procurements**, particularly in encouraging the integration of European technologies in infrastructure projects. In this regard, despite progresses, the heavy reliance on off-the-shelf solutions and the limited integrated pipeline between research and production remains a challenge. The approach developed in the U.S, where research agencies fund early-stage technology development, and public authorities commit to purchasing first-of-its-kind solutions is key to provide the digital ecosystem (and especially startups) with financial security to invest in R&D and bring new innovations to market with confidence.

Moreover, Digital Europe funded infrastructures such as the European Digital Innovation Hubs (EDIH), Testing and Experimentation Facilities (for AI), Data Spaces (for data-driven technologies), SIMPL (open source, smart and secure middleware platform that supports data access and interoperability among European data spaces.), and Pilot Lines (for semiconductors) **can play an important role in linking research outcomes with practical applications**. These initiatives facilitate collaboration across varying technology readiness levels and offer valuable feedback to researchers based on industry needs.

Stakeholders consulted during the analysis highlighted persistent challenges in operationalising synergies in key technological areas due to fragmentation across initiatives, such as the AI-on-Demand Platform, AI Factories, TEFs, EDIHs, Deploy AI, and the EU AI Innovation Accelerator. This fragmentation undermines efficiency and capacity, as significant

[91] https://deep-projects.eu/
[92] HORIZON-CL4-2021-DATA-01-01: Technologies and solutions for compliance, privacy preservation, green and responsible data operations (AI, Data and Robotics Partnership) (RIA)
[93] HORIZON-CL4-2021-DATA-01-03: Technologies for data management (AI, Data and Robotics Partnership) (IA)

coordination and communication efforts are required. Stakeholders also pointed to mismatched timelines, differing eligibility conditions, and overlaps between funding instruments, such as TEFs funded under Digital Europe and Horizon Europe's TEF on Energy, which raised concerns about duplication and misalignment.

Digital Europe benefits from established networks, where participants have **previously collaborated on other EU-funded initiatives or worked as consortium partners.** The substantial **overlap of participants between Digital Europe and Horizon Europe and Horizon 2020**, with 1601 organisations (representing 46% of all unique Digital Europe grant participants) in common between the Digital Europe and Horizon Europe, and 1763 (representing 51%) between Digital Europe and Horizon 2020. Survey respondents pointed to their previous collaboration as facilitative, and use of this knowledge acquired within the Digital Europe funded project as well as their role in a network of similar projects where exchange of findings and best practices were fostered. Moreover, at proposal stage, 90% of respondents stated that they explicitly indicated how their project would foster synergies, highlighting the role of programming processes. About 40% of the respondents to the targeted synergy survey have communicated with the European Commission or other authorities on ways to exploit synergies before the start of their DEP project. This figure increases to 63% during the project implementation.

Digital Europe also complements Erasmus+ which supports education and training, and which has concrete synergies with SO4. **Cross-participation analysis shows an overlap of targeted stakeholder groups between Digital Europe and Erasmus+** with about 856 unique organisations (representing 25% of the unique Digital Europe participants) in common between the Digital Europe and Erasmus+. Participants in the focus groups pointed to potential avenues for further collaboration by **exploring synergies between Erasmus+ Centres of Vocational Excellence (CoVE) and Digital Europe**. Many CoVEs are involved in digital projects, and combining these efforts through joint calls could enhance the involvement of VET institutions in shaping Europe's digital future.

Digital Europe also has complementarities with the Connecting Europe Facility (CEF) and the Connecting Europe Facility (CEF2) as the latter supports the high capacity broadband and 5G corridors necessary to deploy digital services and technologies across the EU[94] Cross-participation analysis indicate existent but more limited overlap of targeted stakeholders. There are 94 unique organisation (3% of all unique organisations that participate in Digital Europe) that participate in CEF-funded. Some complementary between activities can be observed between the CEF and Digital Europe as, for instance, the first eight EDMO regional hubs (under SO5) and operations were initially funded and supported by the CEF before receiving Digital Europe funding. Additionally, some JUs such as EuroHPC JU implementing parts of the Digital Europe receive funding from Digital Europe, CEF, and Horizon Europe to support high-performance computing infrastructure and research across Europe.

Enhancing inter-programme synergies through coordination & strategic alignment

Digital Europe **developed specific mechanisms integrated into its programming to better foster synergies and ensure complementarities** in the programme. In accordance with article 13 of the Digital Europe Regulation[95], the work programme 2023-2024 put a specific

[94] SWD (2024) 37 Final Performance and Evaluation Framework for Digital Europe
[95] *Ibid*.

emphasis on possible complementarities at topic & call level, highlighting, for instance, the possibilities for alternating or cumulative funding[96]. These topics notably include areas, such as Data (e.g., Genome of Europe, Data Spaces for Tourism, Cultural Heritage, Energy, Agriculture), AI (e.g., Developing CitiVerse, EU AI Innovation Accelerator preparatory action), and Advanced Digital Skills (e.g., Cybersecurity Skills Academy, Specialised Education Programmes in Key Capacity Areas). The topics and calls also highlights key outcomes, networks or stakeholder communities funded and supported under other initiatives and programmes. This allows beneficiaries as highlighted in the survey to establish high degree of synergies to better prepare their proposal & include from the start possible exploitation of existing resources.

Main challenges in fostering synergies between R&I programme and investment in deployment of capabilities through the Digital Europe lies in their separate programming and disjoint coordination according to focus groups participants. Interviewees noted also the need to ensure the development of a strategic vision across programmes, ensure that development trajectories could emerge. Better alignment and coordination between funding instruments such as Digital Europe, Horizon Europe, and the European Innovation Council were called for to ensure a seamless pathway of projects from research to deployment. In this regard, participants highlighted the mismatch between the long duration of EU programming and the rapid pace of technological advancement. Delays between goal setting and project implementation were deemed incompatible with the agility required according to stakeholders consulted. European Partnerships play here an important role to align and support complementary initiatives through their strategic programming, such as R&I initiatives and connectivity projects (e.g. Horizon Europe Digital Europe, CEF2)[97]. Other avenues for improvement suggested were the mapping of funding programmes to ensure their complementarities, aligning timeframes and strategic priorities to create a more streamlined approach. A dedicated share of budget could be allocated for building synergies between these programmes.

Coherence with national and regional initiatives (COH.05.1)

The targeted survey for beneficiaries showed that most respondents were not aware of the level of complementarity of Digital Europe with actions in their country and only a small number of respondents viewed the programmes as complementary (2 out of 14, or 14%) or very complementary (2 out of 14, 14%).

Some initiatives co-funded through the Digital Europe programme show by nature a greater alignment with national and regional priorities and strategies. This is notably the case of EDIHs **and Competence Centres such as NCCCs, and NCCs** which are being implemented at the Member State level and contribute to promoting alignment between European, national, and regional priorities. Extensive efforts are deployed in the set-up phase focus on defining

[96] **Alternative (Sequenced) funding:** Alternative or sequenced funding involves splitting an operation or action into distinct parts, with each funding instrument supporting a different segment or phase. Separate grant agreements apply, and robust coordination is needed to prevent overlap or double funding, ensuring each portion of expenditure is claimed only once. **Cumulative Funding**: Cumulative funding occurs when multiple funds, programmes, or instruments (shared or directly managed) support a single action. Separate grant agreements are required for each instrument, and coordination is essential to guarantee that the combined funding does not exceed 100% of eligible costs.

[97] Shirinzadeh, S., Viscido, S., Endo, C., Lotito, A. et al., Horizon Europe and the digital & industrial transition – Interim evaluation support study – EuroHPC joint undertaking, Publications Office of the European Union, 2024, https://data.europa.eu/doi/10.2777/561873

national roadmaps, ensuring that competence centres operate with a national mandate from their respective countries.

Networks and European Partnerships play a role in ensuring alignment between European, national and regional priorities. As part of Specific Objective 3, organisations like the European Cyber Security Organisation (ECSO) are fostering partnerships between companies and regions. Nevertheless, the need for a comprehensive Cybersecurity Industrial Roadmap was highlighted to clarify Europe's strategic goals and align efforts across various cybersecurity initiatives. Moreover, the tripartite nature of the JUs and the presence of representatives of participating states within the governing board of the JUs as well as during the elaboration of the SRIA also contribute to ensuring that European initiatives are aligned with national priorities. Participants to the workshop for SO6 also emphasised the potential for redistributing priorities within existing bodies within existing bodies, such as the European Semiconductor Board and (ESB) and the Public Authority Board of the Chips JU to improve alignment between national and European priorities. Participants proposed that the ESB focus on strategic decision-making for semiconductors, while the Public Authority Board of the Chips JU should oversee alignment and implementation between European and national levels.

Digital Europe was generally found (according to more than 50% of respondents) to be at least partially coherent with national, regional/local and other EU funding opportunities/instruments with the same purpose. When it comes to indirectly managed European funds, a (very) small proportion of stakeholders perceived those synergies with the ERDF (18%), with the ESF+ (2%) were fully or somewhat exploited. Most respondents expressed no opinion or did not have enough knowledge to reply to the question.

Evidence collected shows that EDIHs, which have a strong regional dimension, received co-funding from the ERDF. Mechanisms have been put in place to try to facilitate synergies in funding (e.g. Local Digital Twins (SO5) where a key deliverable focuses on the establishment of a helpdesk to support the procurement of services and deployment at scale of local digital platforms). The Commission published a notice on the synergies between Horizon Europe and the ERDF[98]. This notice also provides a practical example of cumulative funding between ERDF and Digital Europe.

Certain countries, such as Malta and Sweden, rely on **EU Structural Funds, including the ERDF, to co-finance Digital Europe-related initiatives especially EDIHs**. However, according to stakeholders, combined funding between Digital Europe and ERDF remains very difficult to implement, mostly due to differences between cost eligibility rules and coordination with the shared management (specificities of the relevant MS operational programmes need to be understood and considered, coordination with the managing authorities, timing of the calls). Initiatives launched in 2024 such as the Strategic Technology for Europe Platform and the new STEP Seal aim to improve project visibility and enhance combined funding, their use is expected to grow in the future. In this regard, the 2025 Work Programme identifies topics under the scope of the STEP Seal. Challenges also arise from the perception among ERDF managing authorities **that co-funding with programmes like Digital Europe reduces their control over regional budgets, creating resistance to synergy building.**

In practice, co-funding mechanisms for Digital Europe vary significantly among EU member states. While some countries have structured frameworks in place to complement Digital

[98] Synergies between ERDF Programme and Horizon Europe. Available here.

Europe funding, others rely on ad hoc measures or do not have specific systems for Digital Europe support. Countries, like the **Netherlands, Denmark and Austria**, have established mechanisms specifically tailored to align with Digital Europe priorities, offering clear pathways for applicants to secure complementary national funding. These mechanisms often define priorities aligned with their national priorities. In contrast, numerous countries do not have centralised or Digital Europe-specific co-funding mechanisms. Instead, they provide ad hoc support through ministries or existing programmes. For example, in Belgium, funding decisions are made on an ad hoc basis by ministries and agencies (e.g. for HPC projects and semiconductor related initiatives).

Box 5 Danish National Fund provides co-funding for Danish participants in Digital Europe

The Danish National Fund was set up in April 2024 as part of a national digitalisation strategy; The total budget amounts to DKK 30 million (EUR 4 million) in 2024-2025. It co-funds up to 25% of the total costs. It is possible to apply for co-funding for all Digital Europe calls, however in 2024 priority was given to projects in EU data spaces, cybersecurity and AI. The Danish Board of Business Development[99] co- finances EDIHs. A decentralised effort for business growth and development will ensure a more focused effort, e.g. by concentrating on the needs of the enterprises and the regional differences in order to increase business growth and development in Denmark. The Board also has the task of ensuring that the decentralised business initiatives are coherent across different sectors, states and municipalities.

Source: Digital National Fund

Measures to improve Coherence related to national and regional initiatives (COH 05.2)

Alignment between Digital Europe and national/regional strategies remains a key challenge. National funds highlight **dependency on Digital Europe schedules, where delays can significantly disrupt application rounds**. Moreover, stakeholders also note a **lack of communication** between Digital Europe initiatives and national or regional programmes, resulting in overlaps or gaps in funding. To mitigate this, early notification of call schedules is essential to allow effective prioritisation of funding, coordination of application processes, stakeholder engagement, and sequential funding alignment.

Despite alignment in objectives, **the combination of national, regional, and European funds** faces legal complexities, such as State Aid regulations, which create uncertainty for stakeholders. The "Research to Reality – Digital Solutions for European Challenges" paper[100] recommends improving synergies and coherence by considering the provision of “coordinated and streamlined guidelines on the application of State aid rules” for relevant calls across Member States. Additionally, it suggests exploring ways to further support Member States in this process. This approach would help ensure that Member States are not discouraged from

[99] Danish Board of Business Development | Danmarks Erhvervsfremmebestyrelse

[100] Publication of the outcomes from the "Research to Reality – Digital Solutions for European Challenges" conference held on February 5-6, 2024

disbursing or providing new public national funding due to the potential risk of encountering unintended State Aid issues at a later stage.

Finally, **variation in co-funding availability at the national level underscores the differing levels of readiness among Member States to co-fund Digital Europe initiatives**. While structured systems offer clarity and strategic focus, fragmented or ad hoc approaches may restrict accessibility and reduce overall effectiveness and coherence. Some Digital Europe beneficiaries indicate that a factor that slows down the ability to foster synergies is related to co-funding**.** Improve coordination in co-funding mechanism at national and regional level could also contribute to improved coherence and sequential funding.

Is the intervention still relevant?

Alignment of objectives with technological, political, socio-economic needs

Alignment of the objectives with current and emerging needs (REL.01.1)

While the EU is on track to meet some of the Digital Decade targets, many of the same **structural weaknesses** that originally justified the Digital Europe intervention remain. The persistent challenges across the key digital domains reaffirm the continued relevance of the Digital Europe' specific objectives to improve competitiveness of Europe in the global digital economy, contribute to bridging the digital divide across Europe and reinforce the EU' open strategic autonomy and to strengthen and promote Europe's capacities in key digital areas through large scale deployment.

European **HPC capacities** have expanded since 2018 but still trail global leaders like the US or China. While the EU has procured exascale supercomputers, the overall capacity remains insufficient to meet rising demand. In 2018, the EU consumed about one-third of global HPC resources but provides only around 5%[101]. The global supercomputer market is projected to grow at a compound annual rate of 7,5% between 2023 and 2030[102]. Market turnover is expected to rise from $41 bn (EUR 35 bn) in 2020 to $66.5 bn (EUR 56.7 bn) by 2028[103]. In Europe, projection between 2021 and 2026 show an expected compound annual rate of 9.3% for supercomputers, demonstrating an increased demand[104]. In parallel, the overall capacity steadily grew in Europe. In 2024, European machines account for roughly 15 to 20% of the TOP500 systems (by number) and just over 20% of the aggregate performance on that list[105]. While the EuroHPC JU has strengthened the EU's computing infrastructure, fragmented investments hinder the development of a more competitive ecosystem.

Similarly, Europe has accelerated efforts to build an AI ecosystem, but gaps in **AI capacity and data availability** persists. Europe's share of cutting-edge AI resources remains limited in comparison to the U.S. and China. According to the Draghi competitiveness report, roughly 70% of foundational AI models since 2017 have been developed in the US, and Europe lags in the compute infrastructure and platforms needed for AI at scale[106]. Only a few American tech firms dominate the cloud and data landscape (three U.S. "hyperscalers" account for about 65% of global cloud services). This imbalance has implications for AI, as access to cloud computing and big data is critical for training advanced models. The Letta report on the Single

[101] EIB, financing the future of supercomputing: how to increase the investment in high performance computing in Europe, June 2018
[102] Draghi M., The future of European Competitiveness, Part B, a competitiveness strategy for Europe, September 2024
[103] Europe's Quest for Technological Power. Available here.
[104] Joseph. E., Hyperion research, ISC Breakfast Briefing, 2023, available here
[105] Top 500 – Development over time – continents performance share, available online
[106] Draghi M., The future of European Competitiveness, Part B, a competitiveness strategy for Europe, September 2024

Market also highlights that Europe's fragmented digital regulations and underutilisation of its own data and startup talent have hampered the growth of a robust AI industry, calling for a "fifth freedom" for data and knowledge to unify the internal market[107]. The Draghi Report highlights that Europe must scale up its HPC infrastructure, integrate AI and quantum computing, and provide a more coordinated approach to computing infrastructure[108]. By 2028, Europe aims for 75% of businesses to use at least one of AI, cloud, or big data up from roughly 15% in 2025[109]. On the ground, the uptake of AI by EU firms is slowly improving, by 2024, 13,5% of enterprises in the EU with 10 employees or more used AI, indicating a 5,5pp growth from 8% in 2023[110].

In terms of **cybersecurity**, the EU's cyber risk has increased following the digital transformation of society intensified by COVID-19, the dependence of essential services in the EU on ICT and the use of cyberattacks in the Ukraine war[111]. In addition, the reliance of the EU on other countries for key digital technologies further exposes the EU to cyber risks. Yet, the EU struggles with capacities to secure its public devices and critical infrastructures due to low public investment in cyber security and the fragmentation of resources and know-how across the EU, industry and the public sector. Niinistö's recommendations push for elevating cybersecurity as a common EU priority, scaling up cyber workforce development[112]. Currently 15 Member States score the Top Tier rank (95-100 score) in the ITU Global Cybersecurity index, 10 MS Tier 2 (Score 85-95), and 2 MS Tier 3 (55-85)[113].

In the areas of **semiconductors**, the global shortage that emerged following the COVID-19 pandemic exposed the EU's vulnerability in this critical sector[114]. Europe remains heavily dependent on external suppliers for its semiconductor needs, with the shortage impacting industries from automotive to healthcare[115]. The Digital Europe, through initiatives like the Chips Act, seeks to address the **current fragmentation of the semiconductor ecosystem**, but the pace of progress has been slow[116]. Continued investment in research, innovation, and capacity-building is needed to reduce Europe's dependency and secure the supply of semiconductors for the digital economy[117].

The **uptake of digital solutions by businesses in the private sector remains** uneven among MS and across sectors (particularly between high tech and traditional areas) as well as between large companies and SMEs. The 'Digitalisation in Europe 2022-2023' report by the European Investment Bank (EIB) shows that the digitalisation gap between the US and Europe has been decreasing in the past four years. The gap remains significant, however, stemming from the lower investment in digital of EU micro and small enterprises compared to their US peers[118]. Eurostat data confirm that 29.7% of the EU's large enterprises had a very

[107] Letta, E. Much more than a market, empowering the Single Market to deliver sustainable future and prosperity for all EU citizens, April 2024
[108] Draghi M., The future of European Competitiveness, Part A, a competitiveness strategy for Europe, September 2024, pp. 82–83, Chapter 3.2
[109] Digital Decade – EU Trajectories 2024. Available here
[110] Eurostat, usage of AI technologies increasing in EU enterprises, https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20250123-3
[111] Cybersecurity Work Programme 2023-2024.
[112] Digital Decade – EU Trajectories 2024. Available here
[113] Global Security Index 2024, available here
[114] European Chips Act - Questions and Answers, 30 Novembre 2023. You can access it here.
[115] DG GROW, European Chips Survey Report, July 2022
[116] SWD (2022) 147 final, A chips act for Europe, May 2022
[117] Ibid.
[118] EIB (2023). Digitalisation in Europe 2022-2023: Evidence from the EIB Investment Survey. Retrieved 25 August 2024, from https://www.eib.org/en/publications/20230112-digitalisation-in-europe-2022-2023.

high Digital Intensity Index (DII) and 54% a high level, while only 10.2% of medium-sized companies registered a very high-intensity level and 46% a high DII. Only 2.3% of small enterprises reached a very high digital intensity, with only 24,1% scoring a high DII. The uptake of key digital technologies, particularly AI and cloud computing, remains uneven among large companies and SMEs. The uneven level of digitalisation among businesses implies an **unequal distribution of economic opportunities for companies**. Therefore, there is a need to support SMEs to harness the digital transformation in their production processes, allowing them to contribute to the growth of the European economy.

The **uptake of digital technologies in areas of public interest** has been slow. The EU aims to have all key public services for businesses and citizens fully online by 2030.[119] However, the use of digital technologies to improve public services has been uneven between citizens and entrepreneurs: digital public services for citizens and for businesses stand respectively at 77% and 84%. Similarly, there is a gap between local & regional governments and central governments: 88% of central government services are completely online, compared to 76% for regional government and 62% for local[120]. Wider adoption is impeded by **interoperability** issues. Ensuring the use of digital technologies in areas of public interest requires the EU to support governments integrate interoperability in their digitalisation efforts. In this regard, the recent Council conclusions on the Future of EU Digital Policy[121] and the Letta report[122] and backed by clear evidence[123] of the 2024 Digital Decade report that cross-border availability remains limited for digital public services for citizens and for businesses, both reaching a score of around 70 points out of 100. The untapped potential of interoperability is enormous – the potential estimated annual cost-savings credited to cross-border interoperability range between EUR 5.5m and EUR 6.3m for citizens and between EUR 5.7b and EUR 19.2b for businesses. This aspect is also highlighted by the latest Draghi report[124] pointing out the need to reduce compliance & administrative costs on SMEs and midcaps to support their competitiveness. The Interoperable Europe Act, with mandatory interoperability assessments starting in January 2025, will boost the availability of user-centric and cross-border key digital public services. Crucially, the Expert Group on the Interoperability of European Public Services argues that the adoption of innovations must be done with consideration for **reducing the digital gap between front-runners and Members States falling behind**, identifying actions so the latter might catch up. The rationale being that cross-border cooperation ensures more effective delivery of public services in an increasingly digital world. A digital gap only serves to reduce these efficiencies resulting in challenges even for front-runners as they need to find pathways of cooperating across the digital divide.[125]

The **shortage of advanced digital skills** was identified as a key issue in the 2018 impact assessment. Despite various initiatives and efforts to increase the availability of digital training programmes, the **demand for highly skilled workers continues to outpace supply.** The Commission's own projections estimate that, under current trends, the EU may only have around 12 million ICT specialists by 2030 – leaving a shortfall of about 8 million relative to the

[119] EC (2021) Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, 2030 Digital Compass: the European way for the Digital Decade, COM (2021) 118 final.
[120] EC (2023) EGovernment benchmark 2023 Insight Report - Connecting digital governments.
[121] Council of the European Union, Council Conclusions 9957/24 – The future of EU Digital Policy, May 2024
[122] Letta E., Much more than a Market, empowering the Single Market to deliver sustainable future and prosperity for all EU citizens, April 2024
[123] Digital Decade report, 2024
[124] Draghi M., The future of European Competitiveness, Part A, a competitiveness strategy for Europe, September 2024
[125] Expert Group on the Interoperability of European Public Services (2021). Recommendations of the Expert Group on the Interoperability of European Public Services for the Next European Interoperability Policy. Available at: https://ec.europa.eu/transparency/expert-groups-register/core/api/front/expertGroupAddtitionalInfo/43164/download

goal.[126] Additionally, Europe faces intense competition from regions like North America and Asia, which have made substantial investments in digital technologies and advanced skills. The EU's ability to compete globally depends heavily on its capacity to develop, maintain and attract a robust digital workforce capable of supporting innovation and economic growth. Besides investing in specialised trainings for the long-term, **digital skills shortages are acute now** with some interviewees indicating they may become worse as current skilled workers retire. Employers have an important need for digital skills, ranging from basic digital skills to more specialised skills, and providing more short-term training courses in Europe could help bridge the digital skills gap more quickly. Furthermore, enterprises and the public sector usually need specific, digital skills applied to their sector of work (consider digital systems used in the healthcare sector for instance), and this tends to require that workers train themselves at least partially, on the job. In this context, the Edge-Skills funded project will analyse the adequacy of digital skills to develop cutting-edge technologies for the benefit of all European citizens.

There is a **recognition of the critical role of the six SOs of Digital Europe in driving Europe's digital transformation and maintaining its global competitiveness**, with all objectives being either very relevant or mostly relevant both for current and future needs according to survey respondents. Looking ahead to future needs, the relevance of these objectives is expected to increase with a specific focus on **adoption of digital technologies across sectors** which experienced a more significant increase, with 63.4% respondents who found this objective very relevant in terms of future needs (compared to 54.9% in terms of current needs). Similarly, investment in **High Performance Computing** show a significant increase in relevance according to survey beneficiaries, reflecting the emphasis on **Artificial Intelligence** developments and key expectations towards **quantum computing** paradigm shift. In order to increase the EU's capability to prevent cyber-attacks and protect critical infrastructures, cybersecurity is also expected to see higher relevance in the future according to stakeholders surveyed. Although **advanced digital skills maintained a high degree of relevance,** this dimension is seen as increasingly important for private businesses, which are recognising its role in innovation.

Alignment with technological developments REL.01.02

In view of strengthening Europe's competitive and strategic autonomy, Digital Europe has shown a strong alignment with current technology developments in both areas where the EU presents a competitive edge (e.g. Quantum) or shows strong dependences on other global players such as AI, data & cloud, cybersecurity, photonics or micro-electronics.

For instance, in relation to AI, data & cloud, the European Industrial Strategy of March 2020 highlights key strategic dependencies in cloud technologies and specific opportunities related to **edge computing**[127]. The Work Programme aligned to these developments from a technological perspective by supporting the development of smart middleware for a European cloud federation and data spaces, which enhances the EU's cloud-to-edge supply chain and increases its strategic autonomy. It also includes the establishment of a marketplace for federated cloud-to-edge services, providing secure and compliant digital infrastructure for crucial sectors. Recognising the **growing importance of AI**, the 2023-2024 work programme devotes one fifth of its funding to strengthening AI support and launched new actions and topics that aim to strengthen the adoption of AI technologies in Europe. These include actions

[126] Digital Decade – EU Trajectories 2024. Available here
[127] SWD (2021)352 final, Strategic dependencies and capacities, May 2021

for building an ecosystem around large language and AI models in Europe through the Alliance for Language Technologies and open-source foundation model, support for the AI Act and a focus on AI in the healthcare sector through a Platform for advanced virtual human twins, on improving pathways for AI in healthcare through health data access bodies and other entities and AI in support of Quantum-Enhanced Metabolic Magnetic Resonance Imaging Systems. Related to HPC, the programme included a segment on **quantum computing** which should speed up the development of AI allowing for the acceleration of deep learning and neural network with both civilian and military applications[128]. The EuroHPC Work Programme 2023-2024 included the hosting and operation of European quantum computers or quantum simulators, which are integrated within the EuroHPC supercomputing framework.

Strategic investments carried out under Digital Europe could also be conducive in fostering reverse dependencies and make Europe's digital technology strengths indispensable to other regions. In this regard, expanding capabilities in chip design and production, especially for **automotive and industrial applications**, can ensure European technologies remain critical to global industries[129]. For AI and data, Europe's regulatory leadership in data privacy and ethics offers a significant advantage in promoting secure and trusted applications. The healthcare sector, where European firms have established expertise in areas like medical imaging and diagnostics, is one area where Europe could strengthen its position. Developing AI-driven tools that align with privacy regulations and ethical standards could help the EU support healthcare modernisation efforts in other regions. In cybersecurity, Europe can strengthen its position by advancing post-quantum encryption and establishing secure frameworks for critical infrastructure protection. Standardising these solutions would make European cybersecurity tools indispensable for nations seeking reliable systems. Similarly, promoting frameworks for digital technologies and ensuring secure data exchange, the EU can encourage the adoption of European norms in global systems, fostering reliance on its solutions.

In terms of future prioritisation of technological developments within Digital Europe, **Artificial intelligence technologies** emerged as the top priority, selected by 78% of respondents. This was followed by **advanced connectivity, navigation and digital technologies** (including cybersecurity, virtual reality, Internet of Things, distributed ledger and digital identity technologies), prioritised by 66% of respondents. **Robotics and autonomous systems** were highlighted by 40% of respondents, while advanced sensing technologies were selected by 38%. **Quantum technologies** (31%) were also identified as important, while **advanced semiconductor technologies** were chosen by 24% of respondents as a priority for future development. Participants also called for the programme to focus more on emerging technologies such as AI, quantum computing, and cybersecurity, while ensuring that these innovations address key societal challenges such as digital inclusion, climate change, and healthcare.

Future prioritisation across all six specific objectives (SOs) of Digital Europe should adopt an integrated approach that aligns hardware and software development to achieve technological sovereignty and address Europe's strategic challenges according to stakeholders consulted throughout interviews & during focus groups highlighted. Investments in chiplet technologies and 3D design enablement, combined with advances in below-7nm logic circuits, quantum sensors, and photonics, will underpin Europe's leadership in advanced computing and

[128] Multi-Annual Strategic Programme 2021-2027
[129] DGAP (2024), Reverse dependency: Making Europe's digital technological strengths indispensable to China

semiconductors. These should be supported by robust software ecosystems, including hybrid HPC/quantum software stacks, AI-augmented EDA tools for design automation, and interoperability frameworks that enable seamless data sharing across AI-driven platforms and immersive environments. In parallel, strengthening AI capabilities across domains such as cybersecurity, personalised healthcare, and low-power edge computing should be prioritised. This includes developing regulatory sandboxes and compliance tools to build trust and foster innovation. Supporting immersive technologies like VR/AR and digital twins would also further accelerate Europe's leadership in cutting-edge applications. To ensure uptake and scalability, emphasis should be placed on capacity-building through tailored education programmes, enabling the workforce to adapt to emerging technologies, and simplifying access to funding for SMEs and start-ups. A stronger cross-border collaboration and enhanced interoperability will ensure these advancements deliver tangible impacts, including across sectors, reinforcing Europe's position as a global leader in digital innovation.

Adaptation of the programme with socio-economic and political developments and challenges REL.01.03

The Digital Europe was designed within a rapidly evolving socio-economic & geopolitical landscape defined by a **poly-crisis**[130] and intensifying global competition. Initially conceived to strengthen Europe's technological capacity and digital transformation, the programme has since been shaped by a series of global crises and shifting competitive dynamics which highlighted the critical need for advanced digital technologies for long-term capacity building. The Russian invasion of Ukraine, the COVID-19 pandemic, and growing geopolitical tensions have exposed structural vulnerabilities in critical supply chains and digital infrastructure, demonstrating the need for long-term capacity-building in digital technologies to enhance preparedness and economic recovery.

Beyond crisis response, Digital Europe has also evolved in a context of growing global competition in digital technologies, challenging Europe's position as an innovation leader[131]. While the EU remains a scientific and technological powerhouse[132], its dependency on externally developed and manufactured technologies continues to grow, raising concerns over strategic autonomy and technological sovereignty. Dependencies on non-diversified or unstable supply chains[133] increase the EU's exposure to external shocks, particularly in semiconductors, AI infrastructure, and cybersecurity.

As emphasised in the strategic orientation for Digital Europe 2025-2027[134], the programme adopted an approach that ensures continuity, progressive development, and long-term viability of funded actions, while also maintaining sufficient flexibility to address emerging needs. This **built-in flexibility in addressing emerging needs** is demonstrated through its timely responses to various crises. During the COVID-19 pandemic, Digital Europe provided funding for the deployment and maintenance of the COVID Passport and Passenger Locator Form, enabling safe travel. In response to the semiconductor supply shortage, which was intensified by the pandemic, the programme integrated a new objective to promote leadership in semiconductor technologies, driven by the adoption of the Chips Act. The increased cybersecurity threats resulting from Russia's aggression against Ukraine led to the

[130] EC (2023), Dixson-Declève, S., Renda, A., Isaksson, D. et al., *Transformation in the poly-crisis age*, Publications Office of the European Union, 2023, https://data.europa.eu/doi/10.2777/360282
[131] EC (2023), *Horizon Europe strategic plan 2025-2027 analysis*, 2023
[132] SWD (2024)77 final, first annual report on key findings from the European Monitor of Industrial Ecosystems (EMI)
[133] Di Girolamo V., Mitra A., Ravet J., Peiffer-Smadja O., Balland P., The global position of the EU in complex technologies, R&I Paper Series, European Commission, April 2023
[134] DG CNECT, Strategic Orientations for Digital Europe Programme – work programme 2025-2027, April 2024

introduction of the Cyber Emergency Mechanism to enhance preparedness and response to large-scale incidents. Moreover, new training initiatives were launched to address skills shortages in cybersecurity, semiconductors and HPC.

The programme aligns strongly with the EU's digital security interests from a strategic programming perspective, covering most of the strategic technologies that could pose risks to the EU's economic security[135]. It directly supports initiatives addressing digital security interest across most SOs (e.g. data, cybersecurity & communication, data privacy, blockchain, disinformation) or addressing narrow gaps in European technology autonomy (e.g. highly Secure Collaborative Platform for Aeronautic and Security Industry). As described in the effectiveness chapter, the programme has also introduced specific provisions to safeguard the EU's digital security interests.

The **application of Articles 12(5) and 12(6)** within the Work Programmes 2021/2022 is aligned with the focus of the programme on safeguarding the Union's security and maintaining trust in its digital infrastructure. Article 12 (5) has been systematically applied to the cybersecurity specific objective, particularly those involving advanced technologies like quantum communication. These projects are of strategic importance as they deal with the development and deployment of secure communication systems that protect sensitive governmental data and critical infrastructures within the EU. Article 12(6) was integrated within various topics mostly in **SO2** – **AI, data and cloud**, that involve the management of sensitive data, including cloud computing, artificial intelligence, and sector-specific data spaces such as those for the Green Deal, mobility, manufacturing, and health. The article also applies to the TEFs, ensuring that AI technologies developed within the TEFs are protected against security breaches and data breaches from third countries (e.g. in the case of the AI-on-demand platform).

Alignment with stakeholder needs

Alignment of the Digital Europe with sector specific needs REL.02.1

The programme benefits a broad range of sectors with a particular proportion of beneficiaries found in sectors that drive innovation, digital capabilities expansion, and skills development. Across all SOs, scientific research and development, computer programming and consultancy, and education emerge as key sectors. The strong presence of industries and public sector, such as telecommunications and public administration, highlights Digital Europe's role in reinforcing Europe's digital infrastructure and reinforcing the uptake of digital solutions. The high degree of alignment between the programme's sectorial focus and needs of participating organisations is confirmed by **64% of survey respondents, who considered Digital Europe to be very relevant to their sector needs.**

While SOs show distinct sectoral composition aligned with the focus of the solutions currently being deployed, the involvement of non-digital sectors is still limited. SO2 and SO5 engage with a broader range of industries (e.g., manufacturing, construction, telecommunication, financial services, healthcare, cultural industries) illustrating the cross-cutting application of AI & Data, and the focus on cross-border digital services. SO1 sectorial composition reflects more strongly its focus on computational advancement, while SO3 focus on sectors critical for

[135] EC (2023), Commission Recommendations on critical technology areas for the EU's economic security for further risk assessment with Member States, https://defence-industry-space.ec.europa.eu/commission-recommendation-03-october-2023-critical-technology-areas-eus-economic-security-further_en

digital infrastructure protection (e.g. telecommunication, public administration), SO4 relies mostly on education sector, reinforcing its role in workforce development.

Table 11 Sectorial distribution of participants across the 6 SOs of Digital Europe

Sectors	SO1 (n=45)	SO2 (n=189)	SO3 (n=222)	SO4 (n=213)	SO5 (n=362)	SO6 (n=13)	Grand Total
A - Agriculture, forestry and fishing	0,0%	1,1%	0,0%	1,4%	1,9%	0,0%	1,2%
C - Manufacturing	0,0%	4,8%	1,4%	3,8%	4,4%	7,7%	3,5%
D - Electricity, gas, steam and air conditioning supply	0,0%	0,0%	1,4%	0,0%	0,8%	0,0%	1%
F - Construction	2,2%	1,1%	0,5%	1,4%	1,1%	0,0%	1,1%
H - Transporting and storage	0,0%	0,5%	1,8%	0,5%	1,1%	0,0%	1,0%
J.60 Programming and broadcasting activities	2,2%	0,0%	0,0%	0,0%	0,0%	0,0%	0%
J.61 Telecommunications	6,7%	1,6%	11,7%	0,5%	2,2%	0,0%	4%
J.62 Computer programming, consultancy and related activities	26,7%	16,4%	22,5%	8,5%	10,8%	15,4%	15%
J.63 Information service activities	11,1%	5,3%	8,1%	6,6%	5,5%	0,0%	6%
K - Financial and insurance activities	0,0%	1,1%	0,9%	0,5%	0,6%	0,0%	0,7%
M.70 Activities of head offices; management consultancy activities	0,0%	1,6%	0,9%	1,9%	2,8%	0,0%	2%
M.72 Scientific research and development	26,7%	23,3%	12,2%	15,0%	18,0%	30,8%	18%
M.74 Other professional, scientific and technical activities	4,4%	11,6%	5,0%	9,4%	13,0%	7,7%	10%
N - Administrative and support service activities	0,0%	3,7%	2,3%	7,0%	6,6%	0,0%	4,9%
O.84 Public administration and defence; compulsory social security	2,2%	2,6%	11,3%	0,9%	7,5%	7,7%	6%
P.85 Education	15,6%	7,9%	12,2%	34,7%	11,9%	23,1%	16%
Q - Human health and social work activities	0,0%	7,9%	4,5%	1,4%	3,9%	0,0%	4,0%
R - Arts, entertainment and recreation	0,0%	2,1%	0,0%	1,9%	0,8%	0,0%	1,1%
S - Other services activities	2,2%	4,2%	1,8%	3,8%	4,1%	0,0%	3,4%
Grand Total	100%	100%	100%	100%	100%	100%	100%

Source: Technopolis Group 2025 – self-declared sectorial affiliation based on participant survey results (n=1044)

The mapping of targeted application sectors shows a strong sectoral and application orientation, embedded into the strategic programming. While an important part of the programme has focused primarily on ICT sectors and reinforcing the capacity of the ecosystem (HPC, AI, big data, cybersecurity, Semiconductors, EdTech or GovTech), specific attention has been given to critical sectors of the economy (e.g. aerospace & defence, communication, energy) and broader application sectors (e.g. health & personalised medicine, manufacturing, agrifood, mobility) essential for the wider EU economy and their digital transformation. The table below provides an overview of application and sectoral targeting of the different Work Programmes, including under JUs.

Table 12 Application & sectoral targeting identified in the Digital Europe Work Programmes

SO	TOPIC	SECTORIAL / APPLICATION FOCUS
SO1 – HPC	*Supercomputer*	Strategic application including climate change, personalised medicine
	Quantum computing	Only mention on industrial application sectors relevant for Europe (application use cases)
	National Competence Centres	Only mention of industrial sectors and domains (in particular SMEs)
	HPC applications	Use cases targeting AI, big data, machine learning, cybersecurity, conflict simulations, social sciences, challenges in transport and logistics, construction
SO2 – CLOUD, DATA AND AI	*Cloud to Edge Infrastructure and Services*	Semiconductors; Aeronautics and Security Industry
	Data spaces	Green Deal Data Spaces, Smart Communities, Mobility, Manufacturing, Agriculture; Energy Data Space, Data Space for Tourism, Language Data Space, Data Space for Manufacturing, Health Data Space, Cultural Heritage Data space, public procurement and financial data spaces, Skills data space.
	Support for Data for EU	The European Single Access Point (ESAP) for EU capital markets – targeting financial sector

	TEFs	Health, Manufacturing, Agri-Food, Smart Cities and Communities; Coordination of AI sectorial TEF
SO3 – CYBERSECURITY	*Secure quantum communication*	Critical sectors; Traditional communication networks, and open to service operators and cybersecurity business
SO4 – ADVANCED DIGITAL SKILLS	*Specialised education programmes in key capacity areas*	Data, Internet of Things (IoT), AI, Blockchain, cybersecurity, HPC, quantum; Non-ICT education fields (e.g. AI applications for agriculture or law etc.)
	Short term training courses in key capacity areas	HPC, Cybersecurity, AI and other emerging technologies and wider industry sectors
	Reinforcing Skills in semiconductors	Semiconductors industry
	Cybersecurity Skills Academy	Cyber-forensics, cyber ranges, malware analysis and AI for cybersecurity, etc.
	Digital Skills and Jobs Platform	All sectors that have a need for basic and advanced digital skills. Key professions handling sensitive data, such as health and care professionals
	Promoting European innovation in education	EdTech sector
SO5 – ADOPTION & BEST USE OF KEY DIGITAL TECHNOLOGIES	*EBSI and Regulatory Sandbox*	Blockchain ecosystem and public sector (education, social security)
	Deployment of Public Services	AI applications in law enforcement domain, as well as the digital transformation of justice, health and consumer protection; eWallet use cases on eGov, banking & payment, insurance, telecom, health, transportation, education
	EDIH	Broad application sectors & industry – main industrial sectors targeted, additional focus on promoting digital technologies supporting or enabling the industry decarbonization, energy efficiency and climate adaptation.
	Digital Product Passport	Textile, electrical and electronic equipment, tyres and construction material
SO6 – SEMICONDUCTORS	*Pilot lines & Design platform*	Electronic component & system industry, but also cross-sectional technologies and application areas: Mobility, Energy, Digital Industry, Health & Well Being, Agrifood and Natural Resources, Digital Society
FINANCIAL INSTRUMENTS		AI, Chips

Source: Technopolis Group 2024, based on WPs 2021-2022 & 2023-2024 (incl. Joint Undertaking)

Alignment of the programme to address the needs of stakeholders (REL.02.2/02.3)

In terms of pattern of participation among main stakeholder groups as presented in the effectiveness chapter, the strong role of the industry sector through private-for-profit organisations (PRC) is visible across all SOs, with about 32% of participants overall in the programme a majority of which are SMEs (slightly more than 50%) and large enterprises (about 48%). This reflects the capacity of programme to attract the relevant stakeholder groups aligned with its strategic orientation to accelerate the uptake of key digital technologies. Higher education (HES) and Research Organisations (REC) represent important stakeholder groups in capacity building especially related to infrastructures such as HPC, Cloud, data & AI as well as advanced digital skills where higher education organisation play a key role. The distribution of participation across stakeholder groups also highlights the participation of public organisations (PUB) in specific objectives, such as SO5 or SO3 where areas of public interest are strongly defined.

Stakeholders considered the programme very relevant in terms of focus and sectors to address the needs of their own organisation with **higher relevance reported among research organisations (71%) and SMEs (70%).** In contrast, large enterprises (63%) and public sector organisations (59%) expressed relatively lower levels of satisfaction, indicating some variation in perceived alignment with organisational priorities.

Table 13 Relevance of the programme for organisations across SOs (results on very relevant)

	HES	RTO	PRC-LE	PRC-SME	PUB	OTH	% Very relevant
SO1	62%	50%	0%	40%	100%	80%	**60%**
SO2	70%	85%	80%	80%	68%	66%	**75%**
SO3	57%	69%	55%	67%	48%	50%	**58%**
SO4	75%	55%	100%	67%	62%	55%	**68%**
SO5	61%	69%	60%	73%	61%	62%	**64%**
S06	67%	75%	100%	75%	100%		**77%**
% Very relevant	**67%**	**71%**	**63%**	**70%**	**59%**	**61%**	**66%**

Source: Technopolis Group 2024, Beneficiary survey (Q.33 How relevant, in terms of the focus of sectors and technologies, is the Digital Europe Programme for your own organisation?), only based on respondents declaring their affiliation to an SO (n=1044)

Close collaboration and frequent communication between EC services and implementing bodies has been beneficial in addressing the specific needs of the communities targeted by Digital Europe. In particular, the ongoing consultation and cooperation with key organisations, relevant communities have been highlighted as critical factors in ensuring that the calls are well-aligned with the needs of the targeted stakeholders. The involvement of key stakeholder groups in shaping the strategic priorities of Digital Europe is facilitated by engagement mechanisms, set up in the governance structure of the programme. The **Digital Europe Sherpa Group**, composed of representatives from different Commission services and executive agency, ensures alignment across Commission services. Meanwhile, **thematic expert groups** serve as advisory forums where stakeholders provide technical expertise and strategic recommendations. Additionally, **specific communities**, such as the European Alliance for Industrial Data, Edge and Cloud, the Digital Skills and Jobs Coalition, and the European Blockchain Partnership, contribute directly to the refinement of investment roadmaps.

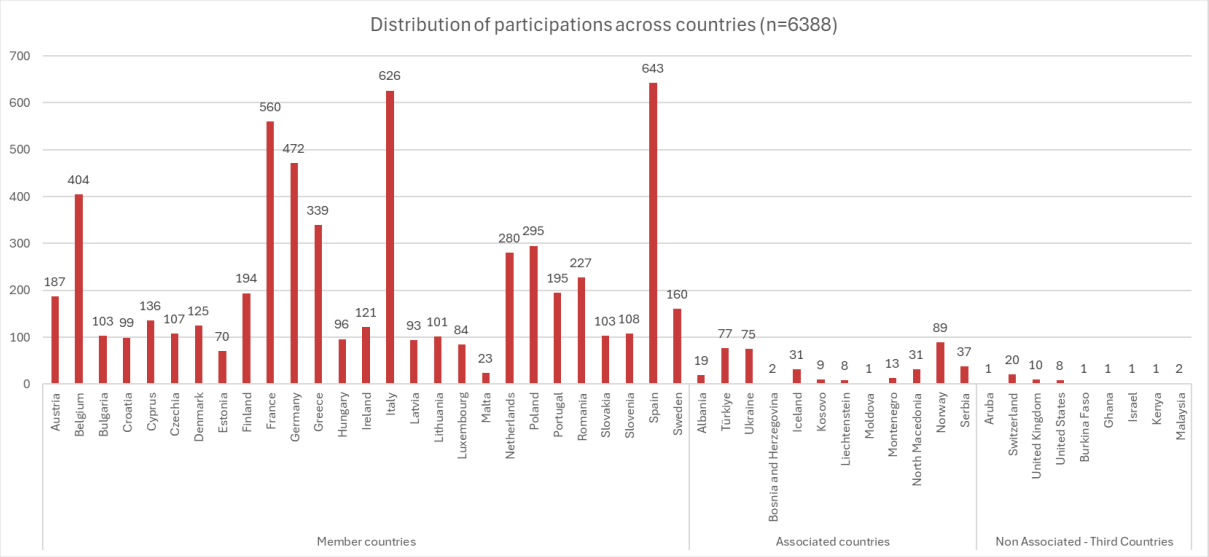
The stakeholders consulted highlighted the adequacy of the programme design with the needs of their community and the efforts to reach out to specific stakeholders communities. In this regard, stakeholders of SO2 highlighted the efforts to mobilise the community & extend the benefits of AI in specific sectors. A dedicated Working Group of EDIH collaborating on AI in the public sector, as well as SO5 funding for knowledge exchange on AI in the public sector through the Public Sector Tech Watch Observatory serve such purpose. As part of SO4, VET providers, which for WP 2021-2022 encountered difficulties in accessing consortia were encouraged to participate in 2023-24 WP notably in the delivery of specialised education programmes. As part of SO6 on semiconductors, interviewees highlighted the strong alignment of the calls on pilot lines and design platform with RTO needs, and in particular leaders of their specific sectors (e.g. advanced nodes, advanced packaging & heterogenous integration, FD-SOI). Pilot lines also have clear end-user targets to transfer knowledge know-how to Integrated Device Manufacturers (IDM) and equipment suppliers as well as smaller designer companies which would develop prototypes through the pilot lines.

Beyond its main stakeholder groups directly benefiting the programme, further efforts of alignment will be needed to ensure the exploitation of funded infrastructures. A key factor here lies in skills and workforce development. During a workshop on High-Performance Computing, participants highlighted significant challenges in scaling the talent pipeline to address the demands of advanced computing and AI. Participants strongly advocated for structured, industry-aligned programmes and emphasised the importance of inclusivity to foster diversity, particularly by increasing female participation in technical fields. As part of SO6, the design of the pilot lines calls didn't include the possibility to allocate funding to industry stakeholders which are typically involved in related industry-led initiatives, such as the IPCEI on micro-

electronics. The ECS SRIA 2023 highlights the need from this perspective to link the Chips design platform and pilot lines to the research roadmap, and more specifically ensure the appropriate involvement of industrial stakeholders in advisory bodies of these two instruments[136].

Participation pattern of Member States and public authorities in the programme (REL.02.4)

Figure 8 Number and distribution of participation across MS



Source: Technopolis Group 2025, reference date 31/12/2024

With regards to the **number and distribution of participations across participating countries**, within Member States, Spain and Italy stand out as the countries with the highest number of participations with 643 and 626 participations, respectively. They are followed by France and Germany with 560 and 472 participations, respectively. Regarding associated countries, Norway has the highest number of participations of this country group (89 participations), while for Non-Associated Third Countries, Switzerland, United Kingdom, and United States reported 20, 10, and 8 participations, respectively.

Four Member States received a significant part of the grant funding: Germany (EUR 237 million), followed by France (EUR 172 million), Italy (EUR 159 million) and Belgium (157 million). This is to be expected due to their strong participation in the programme and their involvement in large-scale infrastructure projects (e.g. pilot lines in IMEC for Belgium, HPC centres etc.). When weighted by population, Luxembourg has the highest Digital Europe funding per capita, followed by Cyprus, Malta and Estonia.

Table 14. Funding (EUR)/1000 citizens across Member States

Member States	Digital Europe Funding (EUR)	Population (N)	Digital Europe Funding / 1000 Citizens (EUR)
Austria	48.414.631	9.120.813	5.308
Belgium	157.275.860	11.738.763	13.398
Bulgaria	20.641.792	6.757.689	3.055

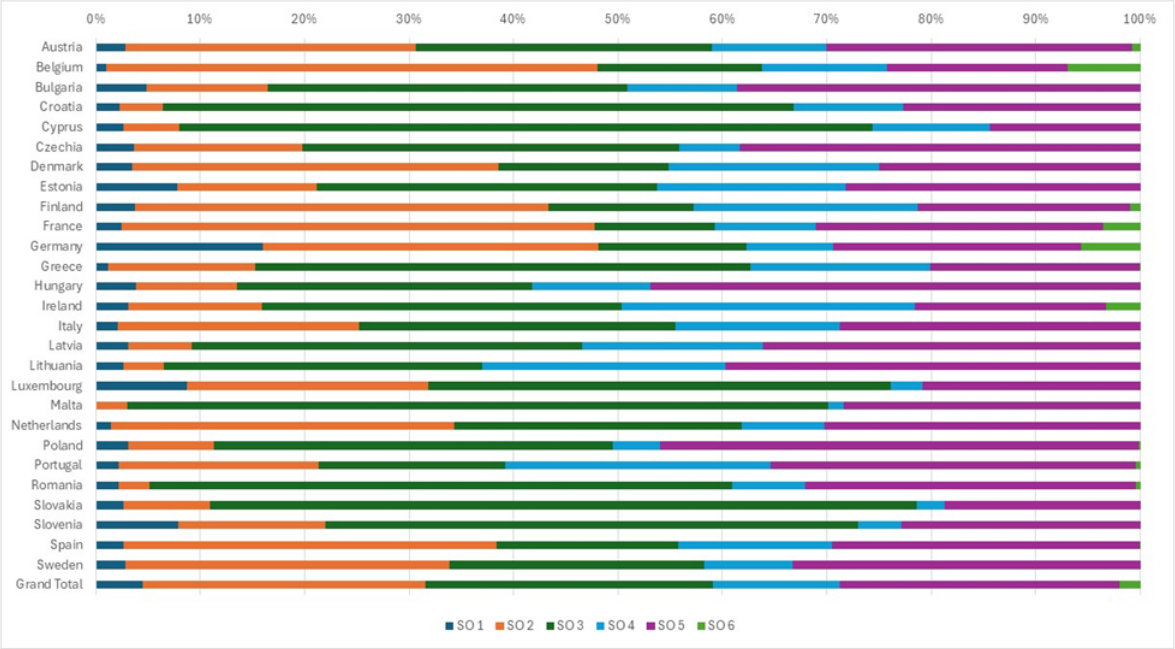
[136] Amendment to the SRIA 2023 – Linking the SRIA with the Chips for Europe Design

Croatia	29.242.234	3.875.325	7.546
Cyprus	36.306.783	1.358.282	26.730
Czechia	34.224.654	10.735.859	3.188
Denmark	39.944.679	5.977.412	6.683
Estonia	15.229.833	1.360.546	11.194
Finland	48.793.868	5.617.310	8.686
France	171.776.509	66.548.530	2.581
Germany	236.695.163	84.552.242	2.799
Greece	85.839.185	10.047.817	8.543
Hungary	26.879.917	9.676.135	2.778
Ireland	52.689.827	5.255.017	10.027
Italy	159.485.733	59.342.867	2.688
Latvia	16.149.910	1.871.871	8.628
Lithuania	18.948.684	2.859.110	6.627
Luxembourg	27.606.316	673.036	41.018
Malta	11.484.226	539.607	21.283
Netherlands	78.769.089	18.228.742	4.321
Poland	58.762.979	38.539.201	1.525
Portugal	37.861.802	10.425.292	3.632
Romania	48.458.828	19.015.088	2.548
Slovakia	37.495.834	5.506.760	6.809
Slovenia	22.106.419	2.118.697	10.434
Spain	118.984.844	47.910.526	2.483
Sweden	47.683.238	10.606.990	4.495

Source: Technopolis Group 2025, based on data provided by the client (reference date 31/12/2024)

Below figure shows the participation of Member States across SOs. Overall, SO1 has the lowest number of beneficiaries' actions under this SO, mainly consisting of infrastructure deployments with high-investment needs and a limited number of direct beneficiaries but with large numbers of expected users across the whole Europe. The participation in EDIHs and in SO5 is relatively stable and significant across Member States, while more variations can be observed in the participation in SOs 2-4.

Figure 9 Pattern of country participation in the SOs



Source: Technopolis Group 2025, reference date 31/12/2025.

Member States play a role in shaping the programme's direction while maintaining flexibility to focus their participation on areas they consider most strategic and where they can channel co-funding to maximise impact. The governance framework of the programme ensures a structured involvement of MS through formalised consultation mechanisms. The **Digital Europe Programme Committee**, composed of representatives from Member States and Associated Countries, is a key body that provides feedback on draft strategic orientations and work programmes before their adoption. MS also participate in **structured interactions** with the European Commission through policy support groups, workshops, and consultations, offering critical input on sectoral needs and technical solutions. Beyond advisory roles, MS are actively **engaged in specific implementing bodies,** such as the EuroHPC and the ECCC or Chips JU where they contribute to defining strategic priorities and co-invest in key digital capacities.

Measures to ensure broad participation of relevant stakeholders (REL.03.1)

The programme demonstrates a high degree of alignment with stakeholder needs, which has been conducive in ensuring participation of relevant stakeholder groups and communities. As highlighted, the Digital Europe integrated **structured mechanisms in its programming** which allowed to balance strategic priorities with inclusive participation. This includes strategic programming mechanisms, consultation processes and use of advisory bodies to ensure engagement with stakeholder communities & Member States. A key aspect to ensure participation of relevant stakeholders has also been the **feedback to policy mechanisms** introduced in the programme, which ensures the implementation of the Digital Europe **remains adaptive and responsive to operational realities and stakeholder needs**. In this regard, the governance framework ensures feedback loop between implementing bodies and EC services at both strategic (Sherpa Group) & implementation level (DEIG).

Ensuring wider participation in the Digital Europe requires the strategic use of funding instruments that align with the needs of different stakeholder groups. While the programme's co-funding model is designed to foster shared investment and commitment, the effective use of **tailored funding mechanisms and flexible implementation rules** can further enhance accessibility and participation. The targeted use of SME Support Actions, which offer a 75% co-funding rate, already addresses some barriers to entry for smaller enterprises, but additional efforts could ensure that these instruments are better understood and accessible to eligible actors. Moreover, ensuring alignment between Digital Europe funding instruments and industry priorities is essential to maximise participation from private sector actors. Instruments that support pre-commercial development and pilot projects help align co-investment strategies with industry needs, facilitating greater private sector engagement. Expanding the use of funding structures that allow for a mix of grants and co-investment mechanisms could also improve participation rates, particularly in areas requiring substantial private sector involvement. Flexibility in funding rules, including the possibility of **covering preparatory activities or enabling complementary financing** through better coordination with other EU and national instruments, would further support stakeholder participation.

How did the EU intervention make a difference and to whom?

This section reports on the evaluation criterion of EU added value of Digital Europe compared to what would have been achieved at Member State or regional level (EAV.01) and the extent to which the partnerships and other multicounty projects (incl. EDICs, EDIHs, JUs, IPCEI, etc.) promoted cooperation among Member States to reach the objectives of Digital Europe (EAV.02). The analysis builds on findings from the public consultation, survey of beneficiaries and applicants, a survey of end users, case studies and interviews with beneficiaries, implementing bodies and EU level stakeholders.

EAV.01 Benefits beyond national/local initiatives

EU added value is an intrinsic element of the Programme as its actions aim to improve digital competitiveness and reinforce strategic autonomy across the European Union. Digital Europe has demonstrated **strong EU added value** by supporting complex large-scale deployments that Member States could not bring about on their own, ensuring cooperation across MS to tackle cross-border challenges (e.g. cybersecurity, a fragmented interoperability landscape) and by offering comprehensive services across the EU through its networks.

The EU-added value of the activities funded under the Digital Europe is most prominent in the area of **financial additionality,** addressing gaps in national funding by pooling and leveraging resources at a scale that, while not beyond the affordability of most Member States in absolute terms, many are not readily available or prioritised at the national level, particularly for cross-border initiatives and large-scale projects. This is particularly pertinent with regards to the investments that were made to promote HPC capacity, the deployment of a quantum network, and the co-investment in EDIHs. By creating networked NCCs, EDIHs, TEFs, HPC and quantum infrastructure, investments are centralised, scaled up for the EU to compete with global leaders. Beneficiaries also mention the possibility to reach larger scale and impact with their Digital Europe funded solutions. The public consultation also supports this, with respondents indicating most added value of Digital Europe through financing projects which otherwise could not be supported at national or regional level (43% rate this benefits as having high or very high EU added value). The applicant survey also shows that a large number of participants (65.5%) to a large or very large extent believe that Digital Europe provides financial means at a scale that is not provided by national and regional schemes.

The case study on Technology Infrastructures makes a clear case for the dual-funding approach – combining EU and national contributions – as an effective way of pooling resources, enabling large-scale investments in strategic technologies and digital ecosystems that benefit all Member States. Investments such as in EuroHPC supercomputers and Chips Pilot Lines represent significant financial commitments that individual Member States would unlikely undertake independently. This collaborative approach facilitates the acquisition of critical infrastructure across Europe, fostering innovation, enhancing the region's technological and industrial competitiveness, and reducing reliance on foreign testing infrastructures. In the context of SO1, for instance, interviewees noted that by working together, Europe has achieved pre-exascale and exascale systems much faster than individual Member States could have done independently. The dual-funding approach, combining EU and national contributions, adds a strong European dimension to infrastructures hosted in Member States while ensuring they retain ownership over identifying infrastructure needs acting as “problem owners”. This allows Member States to adapt infrastructures to their ecosystems and provide services tailored to the specific demands of their industries, particularly benefiting SMEs and start-ups. At the same time, this model promotes broader access to European collaborations, enabling researchers and stakeholders across Europe to access these infrastructures, fostering innovation and cross-border collaboration

Behavioural additionality of Digital Europe is taking shape but is expected to increase as the programme’s activities are being implemented. Taking the example of the EDIHs, there is some exchange of information and lessons learned ongoing between member states, but collaboration is still mostly regional, and at times with neighbouring countries. Similarly, in the field of cybersecurity, the joint approach and policies are considered a first step towards more EU-level coordination, but stakeholders also ask for further standardisation. In the field of interoperability, behavioural additionality has been in focus from the start, and interviewees praise the added value of dealing with cross-border issues in a coordinated manner, harmonising and ensuring that solutions can be re-used by MS. The public consultation also supports this, with respondents listing enhanced international cooperation as the second highest added value of Digital Europe (35% rates this as high or very high). According to the case study on technology infrastructures, an example of behavioural additionality already present, is that of developing EU-level strategies in strategic sectors that ensure participation of major players while influencing smaller countries to prioritise the same objectives.

The case study on synergies presents evidence that there is a transmission mechanism of knowledge, funding or outputs going from Digital Europe to national or regional programmes and vice versa. In multiple cases, projects make use of knowledge prepared under national and/or regional programmes. Three project managers in the mini-survey on synergies indicate that national or regional projects were followed-up by Digital Europe projects. The HaDEA analysis shows eight instances of synergies with national or regional funds or the RRF[137].

[137] This number is not representative, given that this is based on a subset of projects that were selected for the synergy analysis. More information on the methodology used can be found in the Synopsis report.

The case study also mentions that Digital Europe provides clear EU added value in the context of digital skills and the mobility of students and staff. The programme enables the ability to involve a wider range of expertise, as opposed to internal expertise available at the level of an organisation. This is beneficial for the students that will participate in new master's programmes that are being supported by Digital Europe. This holds true for the European Master Artificial Intelligence for Connected Industries (AI4CI) (through established Erasmus+ exchange agreements or national co-funding) and GreenChips-EDU (through extensive staff and student exchange programmes), which brings together European key players in microelectronics education and innovation, as well.

As the projects have been setting up the services and infrastructure and only some of them are fully operational at the moment, there is still a limited number of end users benefitting from these infrastructures and services. For this reason, there is limited evidence for **output additionality**. Beneficiaries are focusing on setting up their own activities and slowly building the first networks. As activities are still developing, exchange of services and solutions) is taking place to some degree. Respondents to the end user survey[138] moderately agree that the services they received are unique in terms of their scope/quality in the EU (64%) or in their country (73%) compared to similar international, national or regional initiatives. 19% and 25% strongly agrees that the facilities are unique. Similarly, most end users moderately agree that services are more affordable (74%) or that services are more accessible (67%) than alternative options. When looking at types of end users, EDIH users mirror these numbers, while participants and students in Digital Europe funded skills trainings and HPC end users were (much) more positive. TEF users are less positive than the aggregate results (however, the sample is very small). Several beneficiaries and end users mention that more support (e.g. networking initiatives) from implementing bodies is needed to improve the connections and cooperation among Member States and that communication and awareness raising could still be improved.

The case study on synergies shows EU-added value of the activities aimed at synergies as well as the implementation of projects that (will) have (potential) synergies with other national and regional programmes. The pan-European nature of the programme, its strategic approach to digital deployment across the EU to promote its competitiveness and the extent to which Digital Europe as well as the evidence that knowledge developed by other programmes from different levels of the R&I system are taken up in the Digital Europe Programme, creates EU-added value. This way, Digital Europe also offers a unique opportunity for projects and organisations to exploit the benefits of working together across countries.

One project manager indicated that Digital Europe can be seen as a catalyst for the take up of the results or outputs of a project. Since it is a European programme, the entry point to the market is different and more positive, as opposed to without Digital Europe.

EAV.02 Cooperation among Member States

[138] The end user survey focused on end users of four work strands: High Performance Computing, TEFs, Advanced Digital Skills and EDIHs. For more information about the methodology used, see the Synopsis report.

Cooperation is currently mostly focused on exchanges of information and experiences or is limited to neighbouring regions or countries. The evaluation of Digital Europe by the European Economic and Social Committee[139] also states that the general communication and information on the Digital Europe (both at European level and in the respective counties) as well as structured exchanges with social partners can still be improved.

Beneficiaries of the programme are positive, and while some beneficiaries have mentioned that they are not ready for wider cooperation yet, 63.7% of the respondents to the beneficiary survey state that Digital Europe improves access to and cooperation with partners from other countries across the EU and beyond to a large or very large extent. Also 62% affirm that Digital Europe supports the creation of European ecosystems for digital technologies. Both statements also score highly in the applicant survey (65.5% and 63.8% respectively). Finally, the case study on Technology infrastructures (TIs), reveals that TIs are conceived and structured as interconnected networks, enabling the establishment of pan-European collaborations. The case study shows the potential for significant cooperation effects in the future, for example when the integration of Quantum Computing and AI across HPC systems requires common solutions.

Digital Europe provides frameworks for coordination and investment through multi-country projects. Some of the MCPs, large-scale projects facilitating the achievement of the general objectives and digital targets of the Digital Decade Policy Programme, are supported by European partnerships: e.g. the EuroHPC Joint Undertaking (JU) supports the implementation of MCP initiatives related to supercomputing and quantum computing. Similarly, the Chips JU will support MCPs to reinforce the EU's strategic autonomy in electronic components and systems to support future needs of vertical industries. This approach allows to create portfolio of multi-country projects, including IPCEI, Technology Infrastructures, such as EDIHs, and the relevant different European Partnerships. According to the public consultation, the funding of interconnected activities and the implementation of multi-country projects are considered to contribute to the creation of large, cross-border digital ecosystems in the context of Digital Europe.

The *EU Digital Identity Wallet* is a good example of cross-border cooperation and pooling of resources. The EU Digital Identity Wallet aims to offers a universal, trustworthy and secure way for citizens to identify themselves when accessing public and private services, digital documents and have control over how their data is handled by both private and public organisations. This implementation of the EU Digital Identity Wallet requires cross-border interoperability and collaboration to ensure smooth implementation. Digital Europe enables pooling of resources for this. For example, the EU Digital Identity Wallet (EWC) Consortium is a collective of stakeholders from across the EU, each contributing their unique strengths to driving the development and implementation of the EU Digital Identity Wallet.

NCCs and EDIHs have cross-border collaboration as one of their primary aims. NCC survey respondents deem cross-border collaboration to be critical for cybersecurity efforts. The **NCCs** are, however, still being set up. Participants in the focus group on SO3 see a lot of potential in these facilities but mention that there is still a lack of networking and picking up on good

[139] EESC (2024) Evaluation of the Digital Europe Programme. Reference: INT/1054-EESC-2024-00492-00-00-AC-TRA.

examples of other countries taking place. The NCC survey confirms that current challenges to cross-border collaboration are a lack of communication channels, funding constraints and regulatory differences in different countries. More exchange of information and establishing efficient communication channels between teams in different locations would be beneficial. Similarly, a large number of **EDIHs** funded under Digital Europe are in their implementation phase, with initial outputs starting to be delivered[140]. While those EDIHs that were interviewed value the potential for collaboration with EDIHs from other countries, current exchanges with other EDIHs are relatively limited and when they exist, mostly take place within the same country or with neighbouring regions. The different maturity stages of the EDIHs also play a role here. Interviewees are critical about the efficiency and relevance of The Digital Transformation Accelerator, which has thus far not been very effective in promoting cross-border cooperation (which is also dependent on national legislation). The focus group held during the EDIH annual summit in 2024 recommends adopting a unified communication approach at both national and EU levels and to foster future collaboration with other AI-focused initiatives to improve effectiveness of EDIHs.

The **EDICs** are by definition focused on cross-border cooperation, as three MS must submit an application to set up an EDIC. The EDICs also have a clear aim to coordinate funding, promote common standards and interoperability. Similarly, when it comes to cooperations, **Joint Undertakings** play a significant role as network builders. They adopt a long-term structural approach to bring stakeholders together across the value chains, sectors and countries, going beyond what would be possible at the level of Member States. JUs also provide a single legal and financial instrument to coordinate and pool resources from public and private actors in a specific field of technology or application at the Union level which represents a conducive element to shape entire ecosystems and value chains. For example, in the EuroHPC JU the main coordination for all aspects related to HPC is centred around the JU, starting from basic science to procurement, application, competences, market and value chain. Similarly, other JUs with tripartite models provide a platform for policy coordination between the EU, national and regional levels, by involving the Member States and the European Commission together with the private stakeholders in jointly shaping the strategies and visions in the key areas of R&I investments and deployment. This enables these partnerships to foster synergies between the EU, national and regional research programmes, and leverage deployment and national R&I funding in line with the Horizon Europe priorities.

What are the conclusions and lessons learned?

This section presents the conclusions and recommendations of this evaluation on the extent to which Digital Europe is relevant, efficient, effective, coherent and delivers EU Added Value. These conclusions and recommendations will be validated during a policy workshop with a wide range of stakeholders in June/July 2025.

This interim evaluation of Digital Europe's activities concludes that the programme is fit for purpose.

[140] The total target of 150 EDIHs has been funded through the Digital Europe Programme and there is now at least one EDIH in all EU Member States as well as in seven associated countries. In December 2024, over 50 thousand end users had been reached through its services, with over 15 thousand having received concrete services.

Conclusions

Effectiveness: At this interim stage, Digital Europe is making good progress against all its objectives. Most outputs are on track, and some have already been achieved. The first results in terms of reaching end-users are promising, with approximately 55,100 companies and 25,800 public organisations having engaged with the programme at some level. While the first phase of Digital Europe emphasised the creation of new infrastructure and networks, early feedback from beneficiaries and end-users suggests that the intended impacts – in terms of technology deployment, productivity gains and competitiveness – should build strongly in the next phase.

In terms of expected wider impacts, stakeholders are positive regarding Digital Europe's contribution to the digital transformation but also point out that the programme's scale is insufficient to deliver significant change at the EU macro-level.

Digital Europe has unlocked substantial co-funding from beneficiaries, further leveraged by other funders (EU programmes, Member States etc.) with as much as €5.9bn of co-funding and leverage combined, primarily from other public sources.

Digital Europe is reaching a diverse range of stakeholders. There is a relatively high presence of research organisations and higher education institutes among beneficiaries, while the participation of SMEs and public organisations is more evident among end users. There are exceptions with a strong engagement among ICT consultancies for example. The programme's novelty and complexity has reduced awareness amongst wider stakeholders, albeit the primary responsibility for engaging end users lies with the supported projects, whether that is AI factories delivering world class tools to researchers and business users or National Security Operations Centres that work with critical infrastructures on threat analysis.

Efficiency and Cost-Effectiveness: Digital Europe is a new and more ambitious programme compared to other programmes such as CEF, with a broader scope and enhanced objectives. It is implemented through a mix of management modes, leveraging the existing competences, infrastructures and stakeholder networks of various DGs, Executive Agencies JUs and the ECCC. While this diverse implementation approach has introduced some management challenges, including some coordination inefficiencies, inconsistencies, and learning curves, it has also been key to the programme's progress. Relying solely on DG CNECT's in-house teams and its primary executive agency, HaDEA, would have significantly limited its ability to achieve the scale and impact it has reached so far.

Digital Europe has used a mix of different funding instruments and co-financing rates. There has been a significant learning curve for setting up these processes, however, the funding strategy has been broadly right for this first phase of the programme, using simple grants in most instances, procurement for major capital investments and contribution agreements where delivery has been delegated to established and trusted entities. Relatively limited use has been made of financial instruments in this first phase; however, the use of loans and investment funds could become more relevant as Digital Europe moves into its implementation phase and expand its work with the private sector.

Digital Europe has seen a relatively high success rate for applicants, due to the programme's novelty and its relatively targeted calls. The EC and implementing bodies have been able to set up a process that is generally able to meet time-to-grant deadlines. Applicants currently face relatively high bidding costs, compared with the scale of the financial support available, and there is an argument for further simplification of calls – and project implementation –

through the increased use of simplified cost options for grants and streamlined reporting requirements in case of co-funding.

Digital Europe has been implemented relatively efficiently from the EC and implementing bodies side with a 4.9% overhead rate.

It was not possible at this stage to fully calculate the cost-effectiveness of the programme, with its early focus on investments in infrastructure and the limited engagement with end-users so far. The JRC Rhomolo model shows an anticipated multiplier of 2.24-5.01.

Coherence: Digital Europe is embedded within a clear policy framework guided by EU priorities and the Digital Decade Policy Programme[141]. It supports the implementation of key regulations for Europe's digital transformation, such as the European Skills Agenda and the Digital Education Action Plan (2021–2027), ensuring their application across Member States. In terms of internal coherence, the programme's design, structured around SOs, delivered a coherent portfolio of projects with well-sequenced activities across work programmes, establishing synergies across work streams and within SOs, and leveraging shared capacities beyond the specific technologies employed. It directly supports the setting-up of EDICs and their implementation but also MCPs such as IPCEIs (e.g. call on the support to the implementation of MCPs, cloud-IPCEI exploitation office).

Digital Europe has demonstrated a high level of synergy with the Framework Programmes for Research & Innovation (both H2020 & Horizon Europe) through the uptake and deployment of innovative digital technologies and solutions developed under Horizon.

Digital Europe aligns with the national and regional priorities of member states, while also actively contributing to shaping and refocusing national funding priorities around common European objectives. This mutual influence strengthens the strategic relevance of the programme. However, its co-funding model has faced challenges, particularly due to divergent national funding rules as well as differing levels of programme management and financing capacity across member states.

Relevance: The evaluation confirms the strong and continuing relevance of the Digital Europe Programme in its effort to address a series of well-documented and profoundly limiting challenges to the digital transition. Despite improvements on some fronts, such as the gradual digital transformation of all businesses, persistent pan-European challenges remain**.** The programme's six strategic objectives remain fully relevant to Europe's digital transformation and its global competitiveness.

Its work programmes anticipated the areas where the world has seen the most rapid and consequential advances, around AI, cybersecurity and cloud, as well as supporting developments in areas where the EU has a global competitive edge (e.g. Quantum, photonics). Its programming also ensured a focus on addressing digital security interest.

Digital Europe has remained alert to fast-paced developments. Its built-in flexibility in addressing emerging needs is demonstrated through its timely responses to various major

[141] The Digital Decade Framework. Available here.

developments (e.g., the launch of generative AI), and even a wholly new Specific Objective (SO6) focused on Europe's semiconductor manufacturing capabilities.

The programme shows a strong alignment with stakeholder needs, facilitated by the collaboration and frequent communication of EC services and implementing bodies with stakeholders. In this regard, the co-funding rates, are mentioned by most stakeholders as beneficial in generating mutual commitment and focus on delivering solutions.

EU added value: The programme delivers substantial EU added value by pooling resources from multiple Member States (MS) and enabling investments at a scale that surpass national capabilities. Key examples include investments in high-performance computing (HPC), quantum networks, and European Digital Innovation Hubs (EDIHs). These efforts scale up critical infrastructure, allowing Europe to better compete globally while addressing shared challenges like climate change, disinformation, and public sector transformation.

The dual-funding model—combining EU and national contributions—has been effective overall, notwithstanding certain implementation challenges. Large-scale initiatives like EuroHPC supercomputers and Chips Pilot Lines illustrate the benefits of this approach, enabling MS to co-invest in projects they would not undertake independently. This model supports strategic technologies and ecosystems, fosters innovation, and enhances industrial competitiveness while reducing reliance on foreign testing infrastructures. Moreover, it empowers MS to tailor infrastructure investments to their ecosystems, providing services adapted to local industries, particularly SMEs and start-ups.

The programme promotes cooperation among MS by fostering pan-European digital ecosystems and advancing digital transformation. Multi-country initiatives such as European Digital Infrastructure Consortiums (EDICs), EDIHs, and Joint Undertakings (JUs) exemplify this effort. The programme's impact is evident in successful initiatives like the EU Digital Identity Wallet, which showcases effective cross-border cooperation to create interoperable solutions.

Digital Europe's effectiveness is contingent on Member States' capacity to co-invest and scale projects. In countries and regions with less mature digital ecosystem -often those receiving cohesion funding- limited access to national co-funding mechanisms can constrain their ability to fully capitalise on Digital Europe funding to its fullest potential. This may slow digital deployment and restrict access to innovations such as AI testing facilities or cybersecurity tools. Strengthening synergies with cohesion policy instruments is therefore essential to ensure these regions are not left behind. Making these synergies work in practice is critical to bridging the digital divide and ensuring a more inclusive digital transformation across the EU.

Recommendations

The recommendations are split between the short-term (next 2-3 years and the conclusion of the programme), and the period after that (new MFF).

Recommendations for the short-term

Recommendation 1: Scale Up Infrastructure Exploitation

Having successfully progressed beyond the initial phase of establishing and launching key hard and soft infrastructures, it is now essential to focus on scaling up, optimising integration,

and ensuring the long-term sustainability of these investments. To achieve this, the following actions are recommended:

- **Scale Up Infrastructure Exploitation:** Transition from the establishment phase to scaling up infrastructure capacity, prioritising the effective utilisation and integration of the resources already developed. Address entry barriers particularly for SMEs and newcomers facing cash-flow risk under long lump-sum milestones—by structuring shorter, time-boxed milestones and re-using data from proposal to onboarding to reduce start-up delays.
- **Develop Access Incentives for SMEs and Public Organisations:** Introduce targeted incentives to enable Companies, in particular SMEs, and Public Organisations to access and fully benefit from the infrastructure while contributing to its broader impact. This could include simplified access mechanisms, tailored easily accessible funding opportunities (e.g. vouchers[142]), and support frameworks for capacity building. Access incentives should be pan-European, therefore also creating incentives for those who invested in soft and hard infrastructures.

Recommendation 2: Enhance Synergies and integrate a sustainability perspective

- **Strengthen Programme Processes and Synergies:** Streamline programming processes to better coordinate and align across different initiatives and funding programmes —particularly cohesion policy instruments. Emphasise cross-programme synergies to minimise duplication, maximise resource use, and ensure coherence between investments in hard and soft infrastructure. This is especially important to support Member States and regions with less developed digital ecosystems, many of which are also recipients of cohesion funding. Effective coordination can help unlock national co-investment and ensure wider access to key infrastructures (e.g., AI testing facilities, cybersecurity tools), helping to reduce the digital divide. Clearly articulate the distinct missions and impacts of HE (research) and Digital Europe (deployment). Develop joint calls or phased mechanisms that integrate both streams and simplify participation. More broadly, align complementary initiatives—such as digital skills, infrastructure, and interoperability—so that human and technical capacities evolve together. Scale up and refocus skills programmes to prioritise targeted training for stakeholders and operators of critical infrastructures, rather than broad citizen-focused initiatives.
- Align with MS to integrate Digital Europe in national strategies and secure MS support for large, high-visibility “big ticket” initiatives. Define priority subjects similar to Smart Specialisation Strategies (S3). Use Digital Decade reports and national roadmaps to identify participation opportunities. Ensure high-level inter-ministerial coordination to avoid fragmentation. Further synchronise Digital Europe call calendars with national/regional budgeting cycles and publish up-front the responsible ministry/authority and national co-funding eligibility rules (eligible costs, match rates).
- **Ensure Long-Term Sustainability:** Incorporate measures to guarantee the sustainability of infrastructure, including robust financial planning, capacity utilisation strategies, and frameworks for ongoing maintenance. This will require continuous evaluation and adaptability to changing market and technological landscapes. In addition, review how sustainability is ensured for soft infrastructures (networks,

[142] E.g. through alignment with ERDF funding.

interoperability, standards etc.), and how IP that emanates from Digital Europe investments is managed, including the IP that will be with the EC after the end of procurement contracts.

Recommendation 3: Simplify Reporting, Enhance Flexibility, and Clarify Governance

The current reporting and coordination processes for projects funded under EU programmes face challenges related to complexity, inflexibility, and a lack of clarity in governance. These issues, which is not a Digital Europe only issue, stem from overlapping requirements from EU institutions, Member States, and co-funding arrangements. To address these issues and improve efficiency, transparency, and user experience, **the following actions are recommended**:

- **Simplify Reporting Requirements and Foster Interoperability** Streamline reporting processes by creating an interoperable solution that allows MS and the EU to coordinate and accept each other's reports. By reducing duplicative reporting requirements, beneficiaries can focus on project implementation rather than administrative burdens. This harmonisation would enhance coordination between EU institutions and MS, simplifying processes for users. Use interoperable EU–national IT systems and common templates to eliminate duplicate reporting between EU and national layers.)
- **Improve Monitoring and Data Collection on Beneficiaries** Establish better monitoring mechanisms within DG CNECT to ensure comprehensive data on financial instruments, end users, and MS-level co-funding. Improved visibility into who is co-funding and how resources are allocated will enhance accountability and provide valuable insights for strategic planning and stimulating synergies. Track OCA processing times, reporting duplication, and portal performance as operational KPIs.
- **Introduce Greater Flexibility in Grants**

  Review where it is possible to allow for easier and faster management of grants, e.g. through the increased use of lump sum grants, and more flexibility for partnership changes (e.g. allowing for sub-contractors, faster amendments), as well as facilitating cascade models of funding. Create agile structures that allow SMEs to exit or adjust roles without destabilising consortia. Use shorter tasks, milestones, hybrid models (lump sum + unit cost), and vouchers to lower risks and barriers for SMEs.
- **Incorporate Flexibility in Procuring Early-Stage Solutions** Design procurement processes that accommodate the uncertainties of early-stage projects, where exact needs and partnerships may evolve. Allow flexibility to adjust goals, partners, and methodologies as the project progresses, ensuring adaptability without compromising accountability.

Recommendations for the medium term

Recommendation 4 Develop and restructure Digital Europe around a clear functional logic and narrative

Digital Europe is currently structured around a mix of technological and functional strategic objectives, making it hard to convey its purpose and positioning. However, Digital Europe is clearly investing into important hard infrastructures (e.g. HPC, TEFs, Pilot Lines, Databases, digital Tools), 'soft infrastructures' (networks, **interoperability,** standards etc.) and capabilities

(e.g. skills, attitudes, access to information, ethics etc.). By more clearly articulating these functional roles, positioning it clearly next to the research and innovation functions of HE[143]

Clearly define the specific functions and roles of each infrastructure component (hard and soft), highlighting their distinct purpose beyond research and innovation (e.g., deployment and market-driven applications). Based on these functions, design bespoke instruments to address the unique needs and objectives of each infrastructure type, ensuring alignment with the programme's strategic goals. Clarify HE vs Digital Europe boundaries in guidance/call texts to reduce confusion for participants, especially for academia navigating research vs deployment routes.)

Recommendation 5: Strengthen Coherence and Enhance Deployment Trajectories Through Innovative Instruments and Cross-Border Collaboration

The external coherence of Digital Europe has been commendable, particularly in its alignment with Horizon Europe and the successful transition of research-focused communities into deployment. However, challenges persist in establishing effective mechanisms for developing deployment trajectories and addressing procurement issues. Current schemes do not fully support the **creation of deployment pathways**, particularly in the context of developing new technologies and navigating state aid complexities. To address these gaps and enhance coherence with other programmes, the following actions are recommended:

- **Develop New Instruments to Support Deployment Trajectories** Establish instruments designed to support the deployment of new technologies without falling foul of state aid. These instruments should allow for the co-development of innovative solutions with Member States (MS) while avoiding direct procurement issues. Such mechanisms would complement capabilities developed under Horizon Europe, enhancing the transition from research to deployment. Provide early State-aid routing support (de minimis/GBER/notification) via decision trees.)
- **Introduce Cross-Border Access Vouchers** Create a voucher scheme to enable SMEs and other entities to access recognised infrastructures across Member States. For example, a Bulgarian SME could utilise a voucher to access an AI factory in another country, overcoming potential limitations posed by national-level restrictions. This approach would facilitate the sharing of advanced infrastructure while reducing disparities in access across Member States.
- **Utilise ERDF Funds to Support Deployment** Explore opportunities to repurpose unallocated European Regional Development Fund (ERDF) resources to support deployment objectives. Under new ERDF rules, non-engaged funds could be transferred to digital programmes, earmarked specifically for deployment-focused activities. Although involving DG REGIO may introduce complexity, the strategic alignment and potential for ERDF to play a key role in digital transformation could incentivise their participation. Coordinate timelines and templates with ERDF processes to reduce administrative friction.

Recommendation 6: Prioritise Strategic Focus and EU Added Value in Investments

To effectively lead the digital transformation within a limited financial envelope, a more strategic allocation of financial resources is necessary. Focus investments on areas where

[143] Where HE covers innovation that is 'new to the market', with Digital Europe the deployment covering 'new to the firm' type of innovation. There is a clear overlap zone in the high TRL, see also recommendation 5.

the EU can deliver the greatest impact by either **scaling up initiatives to achieve critical mass or concentrating resources on targeted high-value priorities**. Avoid spreading resources thinly on small-scale projects, such as narrowly focused programmes or areas where transformation is already progressing independently. Clearly define the ambition of the Digital Europe programme, which may differ per technology area and per function. In some technology areas, Digital Europe could act primarily as a tool to ensure the efficient capacity building and exploitation of infrastructures already available in some MS but not in others, whereas in other Digital Europe also covers the ambition to develop and sustain world-leading digital infrastructures.

Recommendation 7: Improve Data Collection and Impact Assessment of Digital Europe's Instruments

To enhance Digital Europe's ability to measure its impact and optimise resource allocation, it is essential to improve data collection on end users and establish mandatory evaluations of key programme instruments using structured business and financial data.

Key Actions include:

- Ensure that data on the businesses and public entities benefiting from Digital Europe's infrastructures and services (e.g., EDIHs, AI Factories, cybersecurity centres) includes business identifiers (e.g., VAT numbers, national company registers, legal entity identifiers) to enable better tracking of outcomes over time.
- Establish protocols for **linking programme participation with key business performance** indicators (e.g., size, turnover, employment, productivity growth) while ensuring compliance with GDPR and data protection standards.
- Require periodic evaluations of specific instruments such as European Digital Innovation Hubs (EDIHs), cybersecurity initiatives, and AI factories. Ensure that evaluations use business-level data (e.g., financial performance, technology adoption rates) to measure long-term economic impacts rather than relying solely on qualitative feedback.
- Establish harmonised reporting requirements across Member States to improve comparability and streamline data collection.
- Enhance DG CNECT's monitoring systems to consolidate and analyse data across different programme delivery mechanisms.

Annexes

Annex I. Description of Digital Europe's Specific Objectives

Under **SO1** Digital Europe pursues the deployment, coordination, and operation at EU level of an integrated, demand-oriented, and application-driven world-class supercomputing and data infrastructure, a ready-to-use operational technology to build an EU HPC ecosystem, and infrastructure integrating quantum computing technologies and computing science research. Additionally, it encourages the development within the EU of the hardware and software necessary for such deployment.

SO2 is focused on building core AI capacities and knowledge in the EU, including quality data resources and algorithms libraries, and make them accessible to businesses (especially SMEs and start-ups), civil society, not-for-profit organisations, research institutions, universities, and public administrations. Additionally, it is aimed at reinforcing and networking AI testing and experimentation facilities in Member States and developing commercial applications and production systems that facilitate the development of innovative business models and shorten the required time from innovation to industrial production, thus, fostering the uptake of AI-based solutions in areas of public interest. Across this specific objective the principle of privacy and security by design, and data protection is present.

SO3 supports the building-up and procurement of advanced cybersecurity equipment, tools, and data infrastructures in order to achieve a high common level of cybersecurity at the European level. It acknowledges the need to comply with data protection legislation and fundamental rights and the building-up and best use of European knowledge, capacity, and skills in this regard. It aims to ensure a wide deployment of state-of-the-art cybersecurity solutions across the European economy, while improving the resilience against cyberattacks and increasing risk-awareness.

To expand Europe's talent pool, bridge the digital divide, enhance digital competencies, address skills mismatches, and promote specialisation in digital technologies and applications, **SO4** focuses on supporting the design and delivery of high-quality training. This includes long-term and short-term courses, on-the-job training, and work placements, specifically targeting students and the workforce, with a strong emphasis on SMEs and the public sector. All this while taking into account the gender balance and focusing on skills for high performance and cloud computing, big data analytics, robotics, AI as well as semiconductors and cybersecurity. The European Semiconductors Skills Academy brings together higher education institutions and industry partners to increase student enrolment and ensure chip design and microelectronics are embedded in university curricula, fostering a highly skilled talent pipeline.

SO5 aims to support the public sector and sectors of public interest (e.g., healthcare, education, judiciary, law enforcement, consumer protection, customs, transport, mobility, energy, environment, culture, and creativity) in deploying and integrating advanced digital technologies. It focuses on the development, operation, and maintenance of trans-European interoperable digital service infrastructures, ensuring their effective uptake in public services. Interoperability is a key enabler, particularly in the development of Common European Data Spaces, which aim to harness data for sectoral growth and enhanced citizen benefits across fields such as health, cultural heritage, and tourism. This objective also promotes the adoption of open-source and interoperability solutions, enabling seamless collaboration between public administrations, businesses, and citizens. Increased interoperability in digital public services is expected to generate significant cost savings, while in digital health, it is essential for harmonising data from multiple sources, ensuring common standards, and streamlining system-wide processes. The objective includes continuous monitoring of digital trends,

fostering trusted data-sharing ecosystems, and strengthening the European Digital Innovation Hubs (EDIHs) to accelerate digital transformation. Finally, it is also crucial to increase confidence in Digital Transformation, protecting and empowering children online through the Safer Internet Centres and the BIK platform.

With the adoption of the Chips Act in September 2023, **SO6** aims to strengthen Europe's leadership in semiconductor technologies, a key pillar of the digital economy. Semiconductors power everyday smart devices, critical applications in transport and healthcare, and essential infrastructures in energy, mobility, and communications. They are also fundamental to emerging technologies such as AI, low-power computing, 5G/6G, IoT, and edge computing.

Under Chips for Europe, Digital Europe supports capacity-building activities managed by the Chips JU, including the development of a Design Platform to enhance Europe's chip design capacity and the implementation of pilot lines. A network of competence centres provides expertise, training, and access to infrastructure for SMEs, start-ups, and industry stakeholders.

Digital Europe is designed to support a wide range of **target groups**. Specifically, the types of actors that can make use of the programme are: (1) Member States, (2) public administrations; (3) businesses and industry, particularly SMEs; (4) research and academic institutions; (5) non-profit organisations; (6) users and consumers; and (7) cities and regions.

Digital Europe funds are allocated in the form of grants or procurements and through Contribution Agreements as well as financial support through equity and quasi-equity by combining funding with the InvestEU guarantee, such as the Investment Platform for Strategic Digital Technologies or the Chips Fund. Different types of grants exist with different participation and financing conditions (including simple grants, SME support actions, grants for procurement, grants for procuring advanced capacities, grants for financial support, lump sum grants, or framework partnership or specific grant agreements); in some cases, co-financing is required from applicants while in others the financing is covered entirely by the European Commission[144].

[144] Work Programme Digital Europe 2023 – 2024.

Annex II: Methodology and Analytical models used by the contractor

The evaluation follows the Better Regulations Guidelines (2023) and measures the effectiveness, efficiency, coherence, relevance and EU added value of the programme.

The study assesses the programme at a holistic level, identifying key differences between specific objectives (SOs) and instrument types, where relevant, without delivering a detailed evaluation for each SO. While conclusions and recommendations are formulated at the SO level, SO-specific assessments of areas such as efficiency, cost analysis, and EC cost structures could not be performed due to their inherent complexity. Thus, a programme-wide perspective has been provided which addresses nuances between specific objectives.

The assessment of **effectiveness** considers not only formal KPIs but also broader current and expected benefits for beneficiaries, end-users, and the wider economy. Contributions to horizontal priorities, such as stakeholder assessments and alignment with EC policy flags, further enrich the analysis. By integrating a cost-benefit approach, the evaluation explores both direct costs and qualitative benefits. However, the interim stage of the programme and limited reach of end-users necessitate reliance on future projections. Additionally, enabling factors like policy mix, the creation of digital ecosystems, programme awareness, and measures to safeguard EU interests are assessed, though uneven implementation across Specific Objectives (SOs) constrains the depth of the analysis.

In terms of **efficiency**, the evaluation highlights key processes such as the time-to-grant for selections, retention rates, and stakeholder satisfaction with management practices. It also emphasises the implementation of simplification measures, especially for SMEs, and evaluates communication activities. Additionally, the analysis was enhanced through extensive manual reconstruction efforts by the EC and the contractors, providing a more detailed understanding of procurements, financial instruments, and contribution agreements despite initial data gaps.

Addressing **relevance**, the evaluation considers how the programme's design has evolved to meet the needs of the EU digital ecosystem while addressing past and current challenges. A combination of backward-looking assessments and forward-looking foresight exercises provides insights into the alignment of programme objectives with technological, political, and socio-economic needs. Through stakeholder consultations, surveys, expert focus groups, and desk-based analyses, the study captures key dynamics, although its reliance on stakeholder input limits the granularity of the analysis beyond programme/SO level.

The programme's **coherence** is assessed by examining internal and external synergies. Internal coherence explores alignment within and between SOs and management modes through desk-based reviews and portfolio analyses, while external coherence investigates integration with EU policies, other funding programmes, and national initiatives. Stakeholder consultations, case studies, and mapping exercises reveal actionable insights and highlight successful synergies, particularly with Horizon Europe. While certain challenges stem from implementation timelines and the non-linearity of innovation processes, the evaluation uncovers valuable opportunities to enhance coherence across funding streams.

The assessment of **EU added value** explores how the programme complements national and regional efforts, fostering cooperation among Member States to promote the digital transition. The analysis distinguishes between financial additionality, behavioural additionality, and

output additionality, examining resource pooling, stakeholder behaviour changes, and tangible outcomes. Although financial additionality is assessed using a proxy for leverage and lacks granularity at the Member State level, the findings emphasise the unique contributions of EU interventions and their overarching impact.

Finally, the evaluation adopts a holistic lens, capturing differences between SOs and instrument types without delving into detailed SO-specific assessments. Conclusions and recommendations are structured at the SO level, but the absence of quantified indicators limits the granularity of efficiency and cost analyses. This overarching approach enables the identification of cross-cutting themes and interconnections across the programme, offering strategic insights while addressing the inherent complexity of the evaluation.

Methodological Approach

The evaluation findings summarised in this report build upon a broad mix of qualitative and quantitative data collection and analysis methods, listed in Table 15 below. The coloured cells indicate the relevance of a method for the evaluation questions in the criteria categories (darker shadings stand for a higher degree of relevance).

Table 15 Methods used to address the questions under the evaluation criteria

	Qualitative methods				**Quantitative methods**				
Topics for investigation	Desk Research	Interviews	Focus Groups	Case studies	Secondary data analysis	Composition & portfolio	CBA	OPC	Survey
State of Play									
Effectiveness									
Attainment of objectives									
Intended effect & benefits									
Enabling factors & barriers									
Efficiency									

Efficiency in implementation									
Cost-effectiveness & simplification									
Coherence									
Internal coherence									
External coherence									
Relevance									
Alignment with emerging needs,									
Alignment with Technological developments, political & socio-economic needs									
Alignment with stakeholder needs									
EU added value									
Added value compared to national & regional support									

Added value to promote digital transformation									

What has been done

For this evaluation the contractor has performed a variety of activities and data collection tools. These includes the following:

- exploit existing programme and relevant contextual data
- technical workshop, a process of data gathering and validation was set up following the submission of the inception report. This entailed a survey questionnaire to operational units in charge of the workstrands, to assess and aggregate topic specific monitoring data.

We collected, collated, analysed, and used four major types of secondary data **directly related to the programme**:

- **Programme data**, which predominantly came from the programmes' financial management systems (eGrant). This data was instrumental for better understanding of the portfolios of supported projects under both programmes, and informed a number of evaluation tasks, such as sampling approaches for primary data collection, final approach to the in-depth evaluations etc.
- **Contextual data** which set the evaluation into a relevant policy context and provided additional information on both policy environment and on economic sectors targeted by the programme. The context was important to better calibrate the evaluation findings. Contextual data included contextual indicators providing detailed information on the wider context and trends related to the higher policy objectives set in the 6 SOs of the programme. In addition to existing contextual indicators, other contextual data stemming from the DESI monitoring, the Digital Decade, but also the European Monitoring of Industrial Ecosystem (EMI, DG GROW), allowed to complement existing information and provide sufficient granular data on the status quo of the different technological areas covered by the different SOs.
- **Core performance indicators and additional indicators** measured whether the programme is delivering on the expected results as outline in the regulation, with a set of 14 KPIs and 10 additional indicators. These served as the basis to assess the progress of the programme set against the targets.
- **Topic level indicators** which measure detailed progress towards the Digital Europe Programme objectives at the level of each workstrands, captured the specificities of the activities currently ongoing.

The interim evaluation of the Digital Europe has also largely exploited **other studies** that have been conducted or are currently being conducted and focused on part of the Digital Europe intervention. Studies related to **specific instruments or management modes** were considered in order to complement topic level/workstrands' investigations:

- **Joint Undertaking evaluations & ECCC**: EuroHPC and KDT JU evaluations were concluded in April 2024 as part of the interim evaluation of the Framework Programme focusing on the Digital & Industrial Transition and should complement the investigation within SO1 & SO6 (where relevant). Similarly, the planned ECCC evaluation falls under the scope of the resilient Europe interim evaluation.
- **Studies on specific instruments**: the finalised Fit for Future Opinion on Digital Europe[145], the planned evaluation of EDIH, the ongoing EESC evaluation report on the Digital Europe Programme, but also the mid-term evaluation of financial instruments has allowed to complement instrument level analysis. Other recent studies include DG RTD landscape analysis on Technology Infrastructure which focused on Pilot lines recently funded under SO6, but also EDIHs and Testing and Experimentation Facilities (TEF) as Technology Infrastructures.

The contractor undertook an in-depth analysis of **complementarities, synergies and potential overlaps** between the Digital Europe Programme and other EU funded programmes & initiatives

In the absence of ex-ante flagging of topics (indicating potential synergies identified in the calls) and ex-post project flagging (indicating potential use of synergies during the project), the contractor relied on:

- The analysis of **cross-participation between Digital Europe Programme participants & other programmes.** While cross-participation of organisations does not ensure synergies, it provides a useful proxy of the potential knowledge flow between major funding programmes. It also allows to identify potential stakeholder groups responsible for bridging programmes, hence more able to deploy solutions developed elsewhere. In some cases, it also gives an indication on the adequacy of the targeting of funded actions which address specific stakeholder groups. Among the key limitation, the cross-participation analysis relies on data at organisation level (PIC number) which might encompass different departments or units.
- The **existing mapping of synergies or potential synergies** carried out under specific studies (e.g. Framework Programme/Digital Europe) often pointed out potential synergies stemming from projects such as the Quantum Flagship/EuroQCI, has been considered. Similarly, examples we have looked at infrastructures funded under Joint Undertaking (EuroHPC/Chips JU), but also at overall instrument landscape level (e.g. EDIHs, TEFs as part of the Technology Infrastructure Study or for EDICs as port of the digital decade monitoring).
- **Stakeholder consultations**, during interviews (including with implementing bodies) to identify good practices and processes set up during the first period of implementation of Digital Europe, but also through the Public Consultation and targeted survey, to understand the specific use of other programmes to complement the Digital Europe (including cumulative/sequential funding etc.). The study team put a strong emphasis on further identifying examples of synergies and relevant processes put in place to

[145] Opinion adopted in November 2023. See here>> a3708108-68ec-4993-8817-1f228853ca88_en (europa.eu)

ensure complementarities between actions. A survey was conducted with beneficiaries in order to validate identified synergies.

In addition, the contractor consulted a wide range of stakeholders. The aim was to allow the study team to seize the specificities of stakeholder communities addressed and targeted by the programme while allowing for a broader ecosystem, not directly involved in the programme to contribute and provide their views. In this regard, and as described in the table below, four main groups of stakeholders have been targeted by the consultation throughout the study: implementing bodies, beneficiaries, end users and wider stakeholder community active in the digital field.

Table 16 Overview of stakeholder categories consulted during the evaluation

Stakeholder category	Interviews	Surveys	Public Consultation	Focus Groups	Monitoring data
Implementing bodies	27			X	X
Wider EU stakeholders	14		XX	X	
Beneficiaries	51	XX	X	X	XX
End-users	8	XX	X		
Applicants		X			
NCC		X			

The consultation activities conducted included:

- **Public Stakeholder Consultation**. An online survey ran for 12 weeks on the European Commission's website, gathered the views of a broad spectrum of stakeholders including EU Social partners who are interested in the evaluation and development of Digital Europe.
- **Targeted consultation of specific stakeholders**. Here the contractor employed three methods – targeted surveys, interviews and focus group discussions. First, targeted stakeholders were consulted via specific survey questionnaires to the beneficiaries of Digital Europe funding, including applicants, end users and the National Coordination Centres. Second, we conducted about 100 interviews with different groups of programme stakeholders, including Digital Europe implementing bodies, EU level stakeholders, a sub-set of beneficiaries and end users. Third, we prepared six focus group discussions to consult stakeholders aligned to specific objectives of the programme. The seventh focus group for the Annual Safer Internet Forum, originally requested in the Terms of Reference, was converted into stakeholder interviews at the client's request. These targeted consultation gathered opinions and

collected information on the process related to implementation of the programme at EU and national levels.

Findings from the consultation activities are reported in the Synopsis report (see Annex V).

The main elements of the stakeholder consultation strategy aligned with the evaluation questions and cover the six mandatory criteria (state of play, effectiveness, efficiency, relevance, coherence, and EU added value).

In accordance with the Better Regulation Guidelines and Better regulation toolbox, the contractor proceeded with the consultation for evaluating the Digital Europe Programme in three phases:

- **Phase 1:** Planed the stakeholder consultation and establishing the consultation strategy (identifying consultation objectives; mapping stakeholders; and creating consultation questionnaires that are linked to the specific evaluation questions and indicators (Open Public Consultation and survey questionnaires, interview questionnaires and focus group plan);
- **Phase 2:** Conducted consultation work (announcing the launch of the Public stakeholder consultation and the targeted surveys; running their execution, running the interview programme and organising the focus groups);
- **Phase 3:** Informed policy making (analysed the data collected during both the online public and targeted consultations; provided an analytical synopsis of the consultation results; triangulated the data with other sources; linked the data collected to specific indicators of evaluation questions).

To support all stakeholder consultation activities, privacy statements were drafted by the client to disseminate alongside all invitations to contribute and participate in the evaluation.

Limitations

While the interim evaluation of Digital Europe provides valuable insights into its implementation and progress, several methodological limitations must be acknowledged. These constraints primarily relate to the early stage of the programme, data availability, and challenges in measuring impact on end users.

- **Too Early to Measure Economic and Digital Outcomes**: As an interim evaluation, this assessment is conducted midway through the programme's lifecycle, meaning that many expected economic and digital transformation impacts are not yet fully observable. The effects of investments in HPC, AI, cybersecurity, digital skills, and interoperability take time to materialise, and long-term productivity, innovation, and competitiveness gains will only become clearer in subsequent years. There are significant limitations in terms of the ability to assess the full cost-effectiveness of a relatively new programme, which has for now primarily focused on investments in infrastructure, with expected use and deployment and related benefits being expected in the years ahead. Furthermore, while costs are relatively easily monetised, some benefits are hard to quantify or monetise.
- **No Micro-Level Data on End Users**: The evaluation relies primarily on aggregated programme-level data, stakeholder consultations, and secondary sources, but granular micro-data on end users (e.g., SMEs, researchers, public administrations, and citizens benefiting from Digital Europe-supported infrastructures and services) is

lacking. Without detailed end-user data, it is difficult to assess the practical uptake, usability, and effectiveness of Digital Europe-funded initiatives at the individual and organisational level.

- **No Control Group:** Unlike controlled experiments, where an intervention group is compared to a non-participating control group, Digital Europe does not have a structured framework to isolate its impact from other external factors. Many of the areas of intervention—such as AI, cloud, and digital skills development—are also supported by national initiatives, Horizon Europe, and private sector investments. This makes it challenging to attribute observed changes specifically to DEP interventions rather than the broader digital policy ecosystem.
- **Limited Data on Procurement Processes**: Digital Europe relies on joint procurement mechanisms (e.g., for HPC, cybersecurity, and AI testing facilities). However, the availability of detailed data on procurement outcomes, cost-effectiveness, and supplier participation remains limited at this stage. This constrains the ability to evaluate whether procurement processes have been efficient, competitive, and aligned with EU strategic priorities.
- **Limited Information on Contribution Agreements and Financial instruments**: Several funded initiatives operate through Contribution Agreements with EU bodies, Joint Undertakings, and national entities (e.g., Destination Earth) and through financial instruments. However, no detailed information has been provided on which economic actors have received funding, making it difficult to assess the reach out, sector and distribution among member states.

Annex III. Evaluation matrix

#EVQ	Evaluation questions	Topics for investigation	Focus of the analysis	Indicators	Tools
EFFECTIVENESS					
Attainment of the objectives					
EFFECT.01.1	What has been the progress towards achieving the expected outcomes, results and impacts, of each specific objective? Have there been any unexpected and unintended outcomes or results?	Attainment of objectives Main outcomes & (expected) results	• Main outcomes & Expected results and impacts of each specific objectives • Progress towards the objectives, in terms of outputs, outcomes, results • Unexpected outcomes or results of the programme funding activities	• Output indicators from Performance and Evaluation Framework for each of five specific objectives; • Result indicators from Performance and Evaluation Framework for each of five specific objectives; • Impact indicators from Performance and Evaluation Framework for each of five specific objectives • Additional supporting indicators and contextual indicators from Performance and	• Desk study: programme documentation and data • Secondary data analysis • In-depth interviews: Strategic level, EU implementation actors, beneficiary level • Survey: beneficiaries and NCPs and national coordination centres • Public Consultation

				Evaluation Framework • Share of stakeholders who agree that the objectives have been achieved / been being achieved; • Share of stakeholders who agree that expected outputs, outcome/results, and impacts have been observed for specific objectives; • Qualitative evidence on outputs, outcomes/results and impacts which can be observed which were not expected;	
EFFECT.01.2	In case intermediate targets have not been met or the expected progress has been delayed, what were the causes? Will it be possible to achieve the objectives on time? Were there any mitigating measures taken?	Attainment of objectives Underlying factors for delays Progress outlook	• Important differences and delays compared to target set • Mitigation measures and processes in place & lessons learnt	• Output, result and impact indicators from Performance and Evaluation Framework for each of five specific objectives• Share of stakeholders (EU and implementing level) who agree on the causes for observed delays• Share of	• Desk research: programme documentation and monitoring data.• Secondary data analysis • Interviews: Strategic level, EU implementing actors, beneficiaries.

				beneficiaries who agree on the causes for observed delays• Qualitative evidence of mitigating measures being implemented	
EFFECT.01.3	To what extent does the Programme attract the adequate target groups?	Attainment of the objectives Adequate targeting of the programme	• Programme design responding to stakeholder needs	• Secondary analysis of programme documentation on the distribution of use of Digital Europe amongst different target groups • Qualitative evidence of barriers to participating in Digital Europe for specific target groups (Member States, sectors, types of organisations) • Share of stakeholders (EU strategic and implementing level) who feel that target groups are sufficiently reached, • Share of stakeholders (EU strategic and implementing level) who feel that more action is	• Secondary data analysis • Survey EU implementing level, beneficiaries • Interviews EU strategic level • Desk research: programme documentation and reporting

				needed to include specific groups in Digital Europe	
Intended effect and benefits					
EFFECT.02.1	Have any concrete benefits of Digital Europe for public and private organisation and citizens already materialised?	Intended (and unintended) effects Benefits for public & private organisation & citizens	• Drivers for participation of beneficiaries and expected benefits • Type of (expected) benefits identified for end-users (public & private organisations, citizens) Unexpected benefits	• Programme documentation describing activities and outputs along the specific areas which are used directly by: • citizens, • public organisations, • and private organisations • Stakeholder perspectives: beneficiary and user level) on concrete benefits generated by Digital Europe activities for:• citizens, • public organisations,• and private organisations• Stakeholder perspectives: representatives of public organisations, private organisations, and citizens	• Desk research: programme documentation• Secondary data analysis• Public Consultation• Surveys: NCP & national coordination centres• In-depth interviews: EU implementation actors, beneficiary level• Case studies
EFFECT.02.2	Could concrete benefits for users of HPC facilities, Testing and Experimentation facilities, Data Spaces, cloud to edge marketplaces, activities to increase cybersecurity, advanced digital skills training				

	initiatives, the European Digital Innovation Hubs, digital solutions, and services in the public and private sectors) already be identified?				
EFFECT.03	To what extent has Digital Europe already contributed to accelerating the digital transformation, increasing the digital competitiveness of Europe, or reinforcing strategic autonomy?	Intended effect Results and impacts on digital transformation, competitiveness & strategic autonomy	• Intended results and impact of the programme on digitalisation, competitiveness, and strategic autonomy	• Impact and contextual indicators from Performance and Evaluation Framework for each of five specific objectives • Share of stakeholder perspectives at EU level who see Digital Europe contribution along these dimensions • Share of stakeholder perspectives: beneficiaries, users, and wider society who see Digital Europe contribution along these dimensions	• Desk research: programme documentation; broader internationally comparative policy literature and documentation. • Interviews: EU stakeholders, EU implementing actors • Survey: NCPs, national contact centres • Case studies • Focus groups • Public Consultation
EFFECT.04.01	How do Digital Europe actions contribute to	Intended effect Contribution to	• Contribution to climate actions and Sustainable	Programme documentation and	• Desk research: programme

	horizontal priorities, in particular to climate action and environmental sustainability and gender?	horizontal priorities	Development Goals• Contribution Gender equality	strategies for Digital Europe• EU programmes, strategies and documentation which contribute to gender priorities• EU programmes and strategies Data on indicators from Performance and Evaluation Framework for each of five specific objectives,• Data on Digital Europe actions relevant to horizontal priorities (via Digital Europe Performance data),• Stakeholder perspectives (strategic, EU implementing) on how Digital Europe contributes to EU 1) sustainability and 2) gender priorities	documentation, other policy documentation• Secondary data analysis• Interviews: EU strategic level• Case studies• Focus groups

EFFECT.04.02	Are there any, and if yes which, spill-over effect of actions funded under Digital Europe? (Please identify, describe and quantify (if possible)	Intended effect Intended spillover effect of actions funded under Digital Europe	• Contribution to ecosystem creation and support • Contribution to market creation • Leverage effect of Digital Europe • Positive and negative externalities of the programme	• Programme documentation and reporting • Policy, research, or academic documentation • Qualitative information demonstrating spill-over effects from Digital Europe	• Desk research • Interviews: EU strategic level, EU implementing actors, beneficiaries • Focus groups • Case studies
Enabling factors & barriers					
EFFECT.05.01	Have there been any positive or negative external (outside of the implementation of the Programme of the Commission and its implementing bodies) factors that have influenced the progress towards achieving the objectives of Digital Europe? How have these factors impacted the Programme?	Enabling factors and barriers	• Internal and external enabling factors and barriers to the attainment of the objectives • Programme design and policy mix allowing for the deployment of digital technologies	• Programme documentation citing external factors as a reason for delayed implementation of Digital Europe supported activities • Share of stakeholder perspectives (EU, implementing and beneficiary levels) who feel external factors have affected implementation and progress of Digital Europe	• Desk research: programme documentation, other policy documentation • Interviews EU strategic level, EU implementing actors • Surveys: NCPs, national contact centres. • Focus groups • Public Consultation

EFFECT.05.02	What is the awareness in the public and private sectors and among citizens of the Programme, the solutions and services developed under Digital Europe? What is the level of awareness in the public of the synergies and complementarities among Digital Europe and other EU funded programmes with similar objectives?	Enabling factors and barriers• Effectiveness of programme communication and dissemination measures	• Awareness of the programme, solutions and services developed among public, private organisations and citizens• Awareness of the beneficiaries of the synergies and complementarities of the programme with other EU funding programme	• Share of stakeholders (beneficiaries and users) who are aware of Digital Europe• Share of stakeholders (beneficiaries and users) who are aware of the solutions generated via Digital Europe• Share of the wider society who are aware of Digital Europe • Share of wider economy participants who are aware of Digital Europe	• Interviews EU implementing actors• Public Consultation• Surveys NCPs and national contact centres• Interviews: EU strategic level, EU implementing actors, beneficiaries• Focus groups
EFFECT.05.03	To what extent are the activities and implementation arrangement suited to protect the EU's security interest and help reinforce the EU's strategic autonomy?	Enabling factors and barriers • Effectiveness of measures and arrangements to safeguard EU' security interest and reinforce strategic autonomy	• Adequacy of measures put in place to safeguard EU's interest (Art. 12) • International participation • Programme design allowing to reinforce EU's strategic autonomy	• Share of stakeholders (EU implementing and beneficiary levels) who consider current implementation modes as sufficient to protect EU security interests • Share of stakeholders (EU implementing and beneficiary levels) who consider current implementation modes as sufficient to protect EU	• Desk research • Survey NCPs and national contact centres, beneficiaries • Interviews: EU strategic level, EU implementing actors, beneficiaries • Focus groups • Case studies

				strategic autonomy • Policy, research, or academic reporting on Europe's digital strategic autonomy across the areas of: HPC, AI, CS, digital skills, deployment in economy and society, and chips. • Policy, research, or academic reporting on Europe's security interest across the areas of: HPC, AI, CS, digital skills, deployment in economy and society, and chips.	
EFFECT.05.04	What are the drivers for participation in the programme? What are the barriers to participation? In case some target groups/ sectors are not reached, what factors are limiting their access and what actions could be taken to remedy this?	Enabling factors and barriers• Drivers and barriers to participation	• Programme design responding to stakeholder needs & addressing failures• Enabling factors & barriers to participation, additional measures needed	• Secondary analysis of programme documentation on the distribution of use of Digital Europe amongst different target groups• Qualitative evidence of barriers to participating in Digital Europe for specific target groups (Member States, sectors, types of	• Secondary data analysis • Survey EU implementing level, beneficiaries• Interviews EU strategic level• Focus groups (selections of EU or national implementing organisations?)• Desk research: programme

				organisations)• Share of stakeholders (EU strategic and implementing level) who feel that target groups are sufficiently reached,• Share of stakeholders (EU strategic and implementing level) who feel that more action is needed to include specific groups in Digital Europe	documentation and reporting
EFFICIENCY					
Efficiency in implementation					
EFFIC.01	In which way do the different management modes of the Programme allow for an efficient implementation (i.e., direct and indirect management by different implementing bodies) and an efficient achievement of the Programme's objectives? How efficient	Efficiency in implementation	Efficiency in implementation across management modes		

	is the implementation of the Programme?				
EFFIC.01.1	How efficient is the design of calls for proposals and calls for tender or joint procurement?	Clarity & completeness of the calls design	• Adequacy of processes to design for calls of proposals and calls for tenders or joint procurement	• Satisfaction of applicants with the frequency, clarity & completeness of the information provided in the calls for proposals and tenders or joint procurement• Satisfaction of applicants with search function and publications of calls• Satisfaction of applicants with clarity of rules for eligibility, timeline & administrative & technical requirements of calls for proposals and tenders or joint procurements• Proportion of eligible/non eligible applications across the programme, the main work strands & calls• Average frequency of	• Secondary data analysis• Desk research: programme documentation, work programmes, guidelines for applicants & calls specifications • Public Consultation• Interviews with EU strategic level, EU implementing actors, beneficiaries• Surveys: NCPs, national contact centres, beneficiaries

				calls• Proportion of low-quality applications (clarity of calls)	

EFFIC.01.2	How efficient is the application process? (19) How efficient is the management of calls? (20)	Application & selection processes Programme design	• Application processes and time to inform & grant • Funding distribution and success rates over objectives, strands of activities and action types	• Satisfaction of applicants and participants with application & selection processes, including tools and resources• Mapping of the application & selection processes• Average Time-to-Inform across strands of work/calls• Average Time-to-Grant/Contract across strands of work/calls (time- elapsed between call deadline & contract)• Satisfaction of applicants with feedback from evaluator, appeal procedures • Case of complaints for maladministration to ombudsman• Level of budget appropriation of the programme • Funding distribution over specific objectives, main strands of work, stakeholder types, geographical areas & Member States•	• Programme monitoring data• Review of programme documentation, work programmes, guidelines for applicants & calls specifications, review of complaints to EU ombudsman• Public Consultation• Interviews with EU strategic level, EU implementing actors, beneficiaries• Surveys: NCPs, national contact centres, beneficiaries• Secondary data analysis• Interviews with EU strategic level, EU implementing actors, beneficiaries• Surveys: NCPs, national contact centres, beneficiaries

				Funding distribution over implementation modes (action types, funding modalities), stakeholder types, geographical areas & Member States• Funding distribution over the Commission policy priorities and cross-cutting issues (policy flags)• Average funding per project, actions/measures, stakeholder types• Success rate of high-quality proposal vs funded proposal	

EFFIC.01.3	How efficient are the implementation modes (grants, procurement, contribution agreements) to reach the objectives?	management of calls, projects, monitoring & reporting	• Responsiveness to flexibility needs in implementation processes • Satisfaction with project management, monitoring & reporting processes and proportionality of requirements • Satisfaction with tools and support provided	• Average time-to-pay across strand of work• Satisfaction of programme participants and beneficiaries with project management, monitoring & reporting processes, including support provided by Commission services, tools and resources• Frequency and severity of fraud detected and corrected• Opinion of managing bodies on the effect of specific implementation modes• Opinion of Commission and managing bodies on the level of transparency of specific delegated management modes such as contribution agreements or FSTP funding	• Secondary data analysis• Desk research: review of programme documentation, work programmes, guidelines for applicants & calls specifications • Public Consultation• Interviews with EU strategic level, EU implementing actors, beneficiaries• Surveys: NCPs, national contact centres, beneficiaries• Focus groups

EFFIC.01.4	How have the various communication activities contributed to increasing the visibility of the Programme at EU level and supporting potential applicants? How have National Contact Points been supporting the participation in the Programme?	Information & communication flow	• Contribution to communication activities to the programme visibility and uptake • Support of EU implementing actors to programme participation	• Mapping of communication and information channels of the programme available at EU level • Mapping of communication activities and support actions organised by National Contact Points • Satisfaction of applicants and participants with the level of information provided about the programme • Opinion of participants on the support and information received by National Contact Points • Identified factors to facilitate and improve information and communication flow	• Secondary data analysis • Desk research: review of programme documentation, work programmes, guidelines for applicants & calls specifications • Public Consultation • Interviews with EU strategic level, EU implementing actors, beneficiaries • Surveys: NCPs, national contact centres, beneficiaries • Focus groups
Cost-effectiveness & simplifications					

EFFIC.02	To what extent has the programme been cost-effective for the different stakeholders involved and implementing bodies? How can the programme be further simplified? (new umbrella question)	Cost-effectiveness	Cost-effectiveness of the programmes for EC, implementing bodies, applicants and participants	See below	See below

EFFIC.02.1	What is the extent of the administrative and financial burden on the Commission (including costs for eGrants and other IT tools, procurement-related costs, costs of external experts, costs related to contribution agreements, reporting requirements) and its implementing bodies (HaDEA, EuroHPC, ECCC and (future) ChipsJU)? Has any unnecessary administrative burden for the Commission been identified?	Cost-effectiveness of Digital Europe for the EC and implementing bodies	• Administrative and operational cost for EC and implementing bodies • Measures to reduce unnecessary burden	• Identified factors that facilitate and hinder programme implementation • Administrative vs. operational budget of the EC and implementing bodies and comparison with other EU programmes (Horizon Europe, KDT JU, SNS JU) • Share of administrative budget in the total programme budget • Share of administrative budget in total agency budget • Ratio of actual administration budget to actual operational budget of the programme • Operational and administrative budget per FTE • cost of external experts and evaluators • Opinion of commission officials and implementing	• Desk research: mapping existing information on other programme costs • CBA • Interviews with EU strategic level, EU implementing actors, • Desk research: mapping existing information on other programme costs

				bodies on potential measures for the reduction of administrative burden	
EFFIC.02.2	Were the administrative costs and level of financial investment for the Commission justified	Proportionality of costs	• Proportionality of administrative costs and financial investment versus programme benefits • Direct	• Mapping of benefits/changes achieved (or expected too) vs costs• Opinion of	• Desk research: mapping existing information on other programme costs• CBA•

	given the changes/effects which have been achieved?		leverage effect of the programme	commission officials and implementing bodies on the adequacy of the level of financial investment compared to the changes/effects achieved• Direct leverage effect of project including in-kind contribution to operational objectives of	Interviews with EU strategic level, EU implementing actors, • Desk research: mapping existing information on other programme costs
EFFIC.02.3	What is the extent of the administrative costs and financial burden on the different stakeholders involved in the implementation? What are the costs of applying to the Programme and of participating in the Programme (including reporting requirements)? Are these costs proportionate to the associated benefits?	Cost-effectiveness of Digital Europe for applicants and beneficiaries	• Cost for applicants and beneficiaries • Proportionality of costs of application and implementation versus programme benefits	• Mapping of administrative requirements (incl. security screening, financial reporting etc.) • Satisfaction of applicants and participants with the simplification measures (e.g. lump sum funding) • Application writing costs (resources spent/time) for applicants & participants • Direct costs for administration & project management of participants and beneficiaries (FTEs)	• Secondary data analysis • Desk research: mapping existing information on other programme costs • CBA • Interviews with EU strategic level, EU implementing actors, beneficiaries • Surveys: NCPs, national contact centres, beneficiaries

				• Opinion of participants regarding the proportionality of costs of project management, monitoring & reporting compared to programme benefits • Opinion of stakeholders on simplification measures related to application process, project management, monitoring & reporting	
EFFIC.02.4	Have any inefficiencies in the overall implementation of the Programme been identified? How could the programme's management be further simplified? How could costs and burdens be reduced?	Measures for cost and burden reduction	• Potential measures to decrease management and application costs and burdens	• Mapping of benefits/changes achieved (or expected too) vs costs and burdens• Opinion of commission officials and implementing bodies on the adequacy of the level of financial investment compared to the changes/effects achieved• Mapping of benefits/changes	• Desk research: mapping existing information on other programme costs• CBA• Interviews with EU strategic level, EU implementing actors

				achieved (or expected too) vs costs and burdens	
RELEVANCE					
Alignment of objectives with technological, political & socio-economic needs					
REL.01.1	How well do the original objectives of the Programme correspond to the past current and emerging needs (21) within the EU? Is the Programme future-proof?	Alignment of Digital Europe with current and emerging needs	• Alignment with failures and needs • Flexibility in the design of the programme	• Policy, research, or academic report and documentation which describe past, current and future needs in Europe across 9evolving needs): HPC, AI, CS, digital skills, interoperability and uptake, and chips • Share of beneficiaries who feel that Digital Europe supports their current and future needs • Share of stakeholders (EU implementing level) who feel that the Digital Europe Programme support current and future needs in the EU	• Desk research • Secondary data analysis of monitoring data • Interviews: EU implementing actors, beneficiaries • Surveys: NCPs, National Contact Centres, beneficiaries • Focus groups • Public Consultation

REL.01.2	To what extent has Digital Europe adapted to recent technological developments that have occurred during the implementation of the programme?	Alignment of Digital Europe with technology development	• Trends in Technological development • Flexibility of Digital Europe versus technology developments occurring during the implementation of the programme	• Stakeholder agreement (EU strategic level, EU implementing level) on the most important technological developments have been affecting Digital Europe Programme implementation • Policy, research, or academic reports and documentation on key technological developments • Share of beneficiaries who feel Digital Europe has adapted well to key technological challenges	• Desk research • Secondary data analysis of monitoring data • Interviews: EU implementing actors, beneficiaries • Surveys: NCPs, National Contact Centres, beneficiaries • Focus groups
REL.01.3	To what extent has the Programme responded to relevant political, economic, and societal developments?	Alignment of Digital Europe with political, socio-economic developments and challenges	Trends in political, socio-economic challenges	• Policy, research, or academic reports and documentation on key political, economic, and societal developments• Programme documentation, data and reports describing how Digital Europe and	• Desk research• Secondary data analysis of monitoring data• Interviews: EU implementing actors, beneficiaries• Surveys: NCPs, National Contact Centres, • Focus groups

				supported projects reacted to relevant developments• Share of beneficiaries and users who feel Digital Europe adapted well to relevant challenges.• Share of stakeholders (EU strategic and EU implementing actors) who feel the Digital Europe Programme adapted well to relevant challenges.	
Alignment with stakeholder needs					
REL.02.1	Which sectors or areas (based on NACE codes) are benefitting from Digital Europe? Should other sectors/areas also be addressed?	Alignment with stakeholder needs	• Alignment of Digital Europe with sector specific needs • Demand articulation & cross-sectorality of the Programme	• Quantitative data on which sectors make most use of Digital Europe • Share of stakeholders (EU strategic level, EU implementing level) who feel that other sectors can make more use of Digital Europe. • Share of stakeholders who feel other sectors should be more actively	• Secondary data analysis programme data • Interviews EU strategic level, EU implementing actors • Focus groups

				addressed to use Digital Europe.	
REL.02.2	What are the main stakeholder groups benefiting from Digital Europe? Should other stakeholder groups also be addressed?		• Stakeholder profile of beneficiaries and applicants • Appropriate stakeholder groups involved in Digital Europe	• Quantitative data on which stakeholder groups make most use of Digital Europe • Share of stakeholders (EU strategic level, EU implementing level) who feel that other stakeholders can make more use of Digital Europe. • Share of stakeholders who feel other stakeholder groups should be more actively addressed to use Digital Europe.	• Secondary data analysis programme data • Interviews EU strategic level, EU implementing actors, beneficiaries • Focus groups
REL.02.3	How does Digital Europe address the needs of its main stakeholders?		• Adequacy of the targeting of the programme in view of objectives• Adequacy of Digital Europe Programme activities & tools in view of stakeholder groups needs		
REL.02.4	What is the level of participation in the Programme (What is the level of participation of Member States and public authorities in the		• Participation patterns and budget absorption across EU27	• Quantitative and qualitative data on the participation of Member States and their budget share when using Digital Europe	• Secondary data analysis of programme data

	Programme? What is the budget consumption and level of subscription to calls?)				
REL.03.1	What could be improved to ensure wide participation of relevant stakeholders?	Measures to ensure broad stakeholder participation	hindering factors and barriers to participation	• Programme documentation, data, and reports providing insight on the use and the reasons for not using Digital Europe • Share of stakeholder perspectives (EU strategic level, EU implementing level) who agree on main reasons for main stakeholders not using Digital Europe • Share of beneficiaries who agree on the main obstacles preventing stakeholders from using Digital Europe • Stakeholder perspectives on how identified obstacles could be remedied to improve participation	• Desk research programme documentation and reports. • Surveys: NCPs, national contact centres, beneficiaries • Interviews: EU implementing actors, beneficiaries • Survey national implementing level • Focus groups

COHERENCE					
Internal coherence					
COH.01	To what extent are Digital Europe topics complementary or overlapping and what synergies have been created within the Programme? Is there any potential for further complementarity within the Programme?	Internal coherence in & between Digital Europe parts	• Complementarities & synergies in & between programme parts• Measures and mechanisms to foster complementarities & avoid duplications	• Mapping of objectives and assessment of the policy mix in relation with the programme intervention logic• Identified good practices to foster synergies• Identified gaps, overlaps and duplication & processes to address them• Mapping of the processes for strategic programming allowing for the identification of complementarities across topics• Opinion of participants & stakeholders on synergies created within the Programme	• Secondary data analysis• Desk research: programme strategy, calls and monitoring reports• Public Consultation• Interviews EU strategic level, EU implementing actors

COH.02	To what extent are the actions implemented under direct and indirect management complementary and have created synergies?	Internal coherence in & between Digital Europe parts under direct & indirect management modes	"• Complementarities & synergies in & between programme parts under different management modes • Measures and mechanisms to foster complementarities & avoid duplications "	• Mapping of synergies between different work strands under specific management modes • Identified processes to ensure the identification of complementarities and the creation of synergies across different management modes • Identified gaps, overlaps or duplication across activities funded under different management modes • Assessment of the division of labour between different management modes • Mapping of the portfolio of Multi-Country Projects • Identified processes to foster a coherent portfolio of multi-country projects	• Secondary data analysis • Desk research: programme strategy, calls and monitoring reports • Public Consultation • Interviews EU strategic level, EU implementing actors
External coherence					

COH.03	To what extent is Digital Europe coherent with wider EU policies and priorities?	External coherence with wider EU policies & priorities	External coherence - alignment with EU policy priorities	• Mapping of objectives assessment of the intervention logic against main EU priorities • Identified synergies & overlaps between policy framework (Research & Innovation, Single Market, Cohesion policy, Digital decade) • Views of participants and programme beneficiaries on the alignment of the programme with EU policy priorities	• Secondary data analysis• Desk research: programme strategy, calls and monitoring reports• Public Consultation• Interviews EU strategic level, EU implementing actors• Case studies

COH.04	To what extent is Digital Europe coherent with actions funded under EU Programmes listed in Annex III of the Digital Europe Regulation, the Recovery and the Resilience Facility, the Digital Decade Policy Programme objectives, and targets (22) and other EU Programmes with similar objectives? Have synergies materialised? In which areas should synergies be fostered?	External coherence with actions funded under other EU programmes	Alignment with other EU programmes and funded actions	• Mapping of EU funding programmes and initiatives with similar objectives and their foreseen links with Digital Europe and their sequencing, downstream and upstream potential synergies• Share of project identified throughout the programme monitoring as synergetic with other EU programmes • Identified processes to ensure the identification of complementarities and the creation of synergies across different programmes• Identified rules and instruments facilitating the creation of synergies (funding rules & co-funding rates, rules of participation, identification of promising results, joint programming activities)	• Secondary data analysis • Desk research: programme strategy, calls and monitoring reports • Public Consultation • Interviews EU strategic level, EU implementing actors • Surveys NCPs, national contact centres • Case studies

				• Assessment of the division of labour between different EU programmes • Mapping of the portfolio of Multi-Country Projects • Identified synergies with other EU programmes through MCPs • Opinion of stakeholders on synergies between specific work strands and other EU programmes (Horizon, Space Programme, CEF etc.) • Opinion of participants & stakeholders on synergies created with other EU Programmes	

COH.05.1	To what extent is Digital Europe coherent with other national or regional initiatives with similar objectives? To what extent have synergies been achieved?	External coherence with national & regional initiatives	Alignment with national or regional initiatives with similar objectivesPotential synergies achieved with MS & regional initiatives	• Identification of main regional and national funding programmes and initiatives with similar objectives and their foreseen links downstream and upstream potential links • Identified processes to ensure the identification of complementarities and the creation of synergies at different level • Identified rules and instruments facilitating the creation of synergies (cumulative funding, synergy grants etc.) • Assessment of the division of labour and sequencing with regional and national programmes • Identified synergies with other national and regional programmes through MCPs• Opinion of	• Secondary data analysis • Desk research: programme strategy, calls and monitoring reports • Public Consultation • Interviews EU strategic level, EU implementing actors • Surveys NCPs, national contact centres • Case studies
COH.05.2	What could be done to improve the coherence with other related national or regional initiatives to better contribute to EU digital policy objectives?	Measures to improve coherence with related national & regional initiatives	Measures to improve coherence with other related national or regional initiatives contributing to EU digital policy objectives		

				stakeholders on synergies between specific work strands and regional and national programmes and policy • Opinion of participants & stakeholders on synergies at regional and national level	
EU ADDED VALUE					
EAV.01	Which benefits were achieved so far that go beyond what Member States could achieve on their own? Which concrete benefits does Digital Europe offer that go beyond the benefits of other existing national or regional initiatives with similar objectives? (23)	EU added value compared to national and regional support	• Public & private contribution for EU priorities mobilised (expected leverage effect) • Additionality of the FP compared to national and regional support (input, output, and behavioural additionality)	• Policy documentation and reports describing national or regional initiatives regarding digital technologies • Stakeholders (EU implementation level) indicate that comparable national or regional instruments exist and provide evidence on the concrete benefits these initiatives yield.• Perspectives of beneficiaries and users	• Desk research: national level policy documentation on comparable initiatives• Secondary data analysis• Surveys NCPs, national contact centres, beneficiaries• Interviews EU implementing actors, beneficiaries• Case studies

				indicating that the Digital Europe Programme has helped to achieve more concrete benefits than comparable national or regional initiatives	
EAV.02	To what extent does Digital Europe promote cooperation among Member States to achieve its objectives?	Added value to promote the digital transition	•Policy directionality • Creation and support to digital ecosystems • mechanisms and actions promoting cooperation among MS	• Policy documentation on the Digital Europe Programme and the cooperation mechanisms it facilitates • Secondary analysis of programme data on size and nationalities in project consortia • Share of stakeholders (EU strategic and EU implementing level) who confirm that the Digital Europe Programme cooperation mechanisms contribute to achieving programme objectives • Share of beneficiaries who indicate that the Digital Europe Programme has promoted	• Desk research: national level policy documentation on comparable initiatives • Secondary data analysis • Surveys NCPs, national contact centres, beneficiaries • Interviews EU implementing actors, beneficiaries • Case studies

				more cooperation between Member States than if they had not used it.	

Annex IV. Overview of benefits and costs

Methodology

In order to arrive at a systematic overview of costs and benefits, the the Better Regulation Toolbox #18 was followed to identify the main costs and benefits from a programme's logic (looking at different objectives and expected impacts), and from a stakeholder perspective. The identified benefits and costs were structured in line with BR Tool #56, taking into account the Digital Europe-specific programme logic, with benefits falling into three levels (beneficiaries, end-users and wider benefits), and costs in two (EC and applicants/beneficiaries). For each type of benefit and costs, relevant monetized, quantitative and qualitative evidence was gathered. Due to the character of the programme, the relatively recent start of the activities (in engagement with end-users still being somewhat limited) and the interim character of the evaluation, monetized indicators were only available for a select number of benefit categories. In contrast, as expected, costs were relatively straightforward to monetise. As such, as direct like-for-like comparison between costs and benefits is challenging, in particular due to the fact that Digital Europe has to a large degree for now consisted of investments in infrastructures (soft and hard) whose benefits will emerge later on when end-users start to engage in larger numbers. As such, it is important to bear into account also the qualitative evidence, which has been incorporated along the quantitative evidence into a final judgement by the evaluator. The table below provides the main overview, with subsequent sections providing more detail regarding specific calculations.

Cost Table

Costs (see Table below) were calculated by a number of different sources.

Funding Costs: all calculated as actual until December 2024 (grants until Dec 2, 2024), based on EC monitoring of budget commitments.

Staff Costs: all implementation units provided the total number of person years over 4 years, the entire period in scope) engaged to work on the Digital Europe preparation and implementation, by staff category. These staff costs were multiplied by the total staff cost per staff category in order to arrive at a total.

Expenses: Provided directly in EUR

Funding costs participants: Based on project data.

Applicants: Staff cost & Expenses for preparing the application: Based on the beneficiary survey combined with grant data. In the beneficiary survey, all participants were asked how many person months the preparation of their proposal took, as well as any additional expenses (e.g. travel, consultancy cost). Staff time was converted to total cost in EUR by multiplying with an assumed average staff rate of 125% of the EU average wage (31.8 EUR per hour * 1.25 = 39.75 EUR per day, with 22 days making 6998 EUR per month). Ranges were obtained by taking both the lowest in the range responded to the highest for each answer. Separate estimates were made for coordinators and partners. The total cost was achieved by multiplying by the total number of applicants so far, for respectively partners and coordinators[146]. See for more detail later in this annex under 'administrative cost analysis'.

[146] Note that we did not include any application costs for procurement, financial instruments or contribution agreements. For procurements, application costs are included (on average, through market forces) in the total price/cost for an offer. For

Table 17 Overview of costs

Category	Type	Total Cost	Share
Funding Costs	Total spent on Grants (EC)	€ 1.752.927.507	55,30%
	Contributation Agreement	€ 382.716.200	12,07%
	Financial Instrument	€ 91.693.750	2,89%
	Procurement	€ 720.796.561	22,74%
	Programme Support Actions	€ 67.922.943	2,14%
			0,00%
	Total	*€ 3.016.056.962*	*95,14%*
Administrative Costs - Expenses	Experts	€ 741.800	0,02%
	Studies	€ 2.017.783	0,06%
	IT Tools	€ 28.477.522	0,90%
	Communications	€ 9.487.508	0,30%
	Meeting/Committee Representations	€ 1.009.849	0,03%
	Total	*€ 41.734.462*	1,32%
Administrative Costs- Staff Costs - Preparation	Policy strategy formulation Policy/programme strategy preparation costs	€ 17.003.230	0,54%
	Programme implementation preparation costs: Designing application procedures for funding calls (including assessment criteria and processes); establishing DEP website etc.	€ 1.337.328	0,04%
	Total	*€ 18.340.558*	0,58%
Administrative Costs - Staff Costs - Implementation	Implementation of direct funding calls (Grants & Procurements): design of calls, communication of calls, application assessment, contracting, management of implementing bodies	€ 54.757.625	1,73%
	Implementation management: Performance management, Compliance, Audit and Control, Monitoring and Reporting, agency supervision	€ 33.473.070	1,06%
	Programme management overheads: programme-level monitoring & management, IT-costs, IT developers, general communication costs etc	€ 1.626.000	0,05%
	Costs associated with Articles 12.5 and 12.6 (LE of associated countries under SO1, 2, 3 & 6) and other restrictions	€ 2.667.333	0,08%
	Costs associated with association agreements	€ 1.375.633	0,04%
	Total	€ 93.899.661	2,96%
Total EC	Total EC Cost	€ 3.170.031.642	100,00%
	Total Overhead %	4,857%	
Co-Funding Costs: Beneficiaries	Total co-funding costs for grants	€ 1.413.458.579	
Administrative Cost of Application & Participation: Accessing and using the DEP	Staff Costs for preparing an application/proposal	€ 414.593.813	21%
	Expenditure for preparing an application/proposal	€ 105.082.878	5%
Total Beneficiaries / Applicants	*Total Beneficiary Costs*	*€ 1.933.135.270*	39%
Grand Total	*Grand Total Costs*	€ 4.949.192.232	100%

financial instruments and contribution agreements, 'application costs' are included as staff preparation time through the EC/implementing bodies costs.

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	Expenditure for preparing an application/proposal	€ 105.082.878	5%
Total Beneficiaries / Applicants	*Total Beneficiary Costs*	*€ 1.933.135.270*	39%
Grand Total	*Grand Total Costs*	€ 4.949.192.232	100%

Benefits

The benefits are presented in table below. Information regarding the calculation method is provided in the calculation notes table.

Table 18 Overview of benefits

Stakeholder and Benefit type	Benefit	Type of Benefit	Qualitative overall judgement	Key Quantitative KPIs	Calculation Notes
programme beneficiaries					
Beneficiaries: Leverage of Funding	Co-funding unlocked from other funders	Economic	(++)	(++) EUR 1.41billion direct leverage; EUR 2.3-7.0 billion total leverage from DEP funding on grants (including direct leverage)	See Leverage Analysis
Beneficiaries:	Stronger networks	Economic	(+-++)	Access to new industry partners (36.7% of beneficiaries), new academic partners (28.2%)	Beneficiary survey data
	New products/services	Economic	(+-++)	Products/services already developed (38.6%), or expected (38.0%)	Beneficiary survey data
Stakeholder and Benefit type	**Activities**	**Type of Benefit**	**Qualitative overall judgment**	**Key Quantitative KPIs**	**Calculation Notes**
End-users					
Firms: total perceived value of services	Willingness to pay	Economic	(+-++)	115mEUR - 222m EUR	8.0k-15.3k value per organisation (EDIH mini-survey); 14289 EDIH firms supported so far; Digital Skills: 6.5k-14.4k per SME; 219 SMEs supported so far; 2.7k-3.7k per Large Company; 157 large companies supported
Firms: Increased Productivity	Higher productivity	Economic	(++)	est. 10.5k- 11.1k firms indicating medium or high impact	47.9% (EDIH end-user), 55.6% (beneficiary assessment); 19910 firms supported so far
	Lower costs	Economic	(++)	est. 7.8k-9.6k firms indicating medium or high impact	39.1% (EDIH mini survey); 48.1% (beneficiary assessment);

					19910 firms supported so far
	Number of employees trained in the organisation (by gender)	Economic	(+)	20713 individuals trained	From Performance Indicators
	Increased quality of work	Societal/Economic	(++)	est. 9.8k-11.4k firms indicating medium or high impact	49.7% (EDIH end-user); 57.0% (beneficiary) 19910 firms supported so far
Firms: Better Market Position	Increased exports for affected products/services	Economic	(+)	est. 4.1k-4.5k firms indicating medium or high impact	20.71% (EDIH end-user mini-survey), 22.7% (beneficiary assessment); 19910 firms supported so far
	Faster scale-up of startups	Economic	(+)	Est. 5.3k - 6.6k firms indicating medium or high impact	26.6% (EDIH end-user mini-survey); 32.9% (beneficiary assessment)
	Wider Service Offering	Economic	(++)	Est. 7.8k firms indicating medium or high firms	39.1% of firms responding to EDIH end-user mini-survey; 19910 firms supported so far.
	Avoided costs of cybersecurity damages	Economic	(+)	Est. 3.0k-6.9k firms indicating medium-high impact	15.0% of firms responding to EDIH end-user mini-survey; 34.4% of beneficiaries
Governments/public organisations: perceived value of Digital Europe	Willingness to pay	Economic	(+)	6.4mEUR - 13.3m EUR	3.96k - 8.21k value per organisation (EDIH-mini survey) 1621 public organisations supported
Governments/public organisations: better and safer public service delivery	Better public services	Economic/Societal	(+)	37.7% of beneficiaries indicated a medium or high impact	
	Lower cost of service	Economic/Societal	(+)	28.6% of beneficiaries indicated a medium or high impact	
Stakeholder and Benefit type	**Activities**	**Type of Benefit**	**Qualitative overall judgment**	**Key Quantitative KPIs**	**Calculation Notes**
Wider society and economy					

Wider economic benefits	Increased innovation and productivity growth rates	Economic	(++)	56.8% (EDIH end-user mini-survey) 52.4% (beneficiary assessment); 12-22bn EUR cumulated GDP impact by 2030 (Rhomolo)	
	Increased labour productivity and wages	Economic/Societal	(+)	20.71% (EDIH end-user mini-survey); 26.9% (Beneficiary assessment)	
	Reduced reliance on international suppliers / higher strategic autonomy	Economic	(0/+)	16% (EDIH end-user mini-survey), 41.7% (Beneficiary Assessment); 0.010-0.025% increase in exports by 2030 (Rhomolo)	
	Increased resilience of strategic EU sectors	Economic	(+)	35.5% (EDIH end-user mini-survey); 43.4% (Beneficiary Assessment)	
Wider environmental benefits	Faster Green Transition	Environmental	(+)	30.8% (EDIH end-user mini-survey); 36.5% (Beneficiary Assessment)	

Leverage analysis

The co-funding and leverage ratios for Digital Europe projects are based on grant data and the beneficiary survey. The grant data provides information on direct co-funding ratios within the total project cost envelope. The beneficiary survey data (see Table 19) offers insights into leveraged funding beyond the originally identified project costs (indirect leverage). This funding includes both internal as well as external investment to increase the scope, scale or duration of the project activities, and are a measure of perceived effectiveness and investment sustainability. This indirect leverage, based on the survey data is calculated per SO, is then extrapolated to the total portfolio using the grant data per SO (see Table 20).

Please note that leveraged funding (including direct leverage co-funding or indirect leverage) does not directly translate to insight on the ultimate source of the funding. For instance, SMEs or public authorities providing direct co-funding to Digital Europe may have been able to source some of that funding through national co-funding schemes.

Note that we excluded the limited responses received for SO6 (which has only recently launched) from this calculation. When respondents indicated uncertainty or found it too early to provide data, we assumed 0 leverage/co-funding for that specific category, as we are aiming to measure the currently known co-funding, and it is highly unlikely that task leaders are unaware of substantial co-funding for their organisation for a specific project.

To address potential double counting of external leverage and an organisation's own co-funding to the project, we report two leverage calculations: one including full double counting and one without it, presenting the final result as the ranges between them. We also reviewed the sensitivity to outliers. A distribution analysis reveals that there are no clear statistical outliers for each of the categories. We do note that the top three values for MS/Regional funding account for a large share (~16%) of the total, but from the desk research it is

understood that some projects indeed have substantial local co-funding. We therefore elect to not remove outliers from the analysis.

Table 19 Aggregated responses from the beneficiary survey, per SO, on co-funding

Row Label	Count of National/Regional/Local Public Funding:	Average of Int. Add. Leverage (min)	of Int. Add. Leverage (max)	Average of MS/Regional/Local (max)	Average of MS/Regional/Local (min)	Average of Int Pub Leverage (min)	Average of Int Pub Leverage (max)	Average of Private Leverage (min)	Average of Private Leverage (max)	Average of EU Leverage (min)	Average of EU Leverage (max)
SO1	45	9,91	16,78	€ 450.000,00	€ 175.000,13	€ 11.111,13	€ 24.444,44	€ 4.444,49	€ 26.666,67	€ 68.888,89	€ 144.444,44
SO2	189	14,06	23,25	€ 703.816,79	€ 296.183,30	€ 2.645,51	€ 14.285,71	€ 22.222,30	€ 66.137,57	€ 94.179,93	€ 249.735,45
SO3	222	13,08	21,33	€ 605.161,29	€ 257.419,41	€ 450,46	€ 3.153,15	€ 1.801,83	€ 12.162,16	€ 50.450,46	€ 120.270,27
SO4	213	11,06	18,73	€ 559.440,56	€ 211.188,92	€ 23.474,20	€ 60.563,38	€ 35.680,80	€ 89.671,36	€ 57.746,50	€ 129.107,98
SO5	362	12,36	20,40	€ 503.891,05	€ 201.556,56	€ 11.049,74	€ 29.005,52	€ 12.154,76	€ 46.685,08	€ 72.375,73	€ 183.701,66
Grand Total	**1031**	**12,45**	**20,62**	**€ 570.891,36**	**€ 231.615,70**	**€ 9.796,33**	**€ 27.061,11**	**€ 16.294,92**	**€ 50.824,44**	**€ 68.477,23**	**€ 169.156,16**

Table 20 Calculations to extrapolate total co-funding/leverage

SO	EU Contribution (Av)	Direct : Av Participant Co-funding	Indirect: Additional (follow-up) leverage	Indirect: MS/Local/ Regional Leverage	Indirect: Other EU Funding Leverage	Indirect: Int. Pub. Leverage	Private Leverage	Total Leverage
SO 1	€ 504.155	€ 285.412	€ 67.277	€ 312.500	€ 106.667	€ 17.778	€ 15.556	€ 805.189
SO 2	€ 362.976	€ 294.577	€ 67.727	€ 500.000	€ 171.958	€ 8.466	€ 44.180	€ 1.086.907
SO 3	€ 492.295	€ 367.967	€ 84.688	€ 431.290	€ 85.360	€ 1.802	€ 6.982	€ 978.089
SO 4	€ 267.306	€ 197.056	€ 39.820	€ 385.315	€ 93.427	€ 42.019	€ 62.676	€ 820.312
SO 5	€ 153.637	€ 140.800	€ 25.168	€ 352.724	€ 128.039	€ 20.028	€ 29.420	€ 696.177
Average	€ 274.710	€ 221.511	€ 45.427	€ 401.254	€ 118.817	€ 18.429	€ 33.560	€ 838.996

SO	Leverage Factor 1	Total leverage (excluding double-counting	Total leverage (excluding double-counting	Number of Participations	Total	Total (excluding double counting)
SO 1	160%	€ 519.777	103%	160	€ 128.830.251	€ 83.164.286
SO 2	299%	€ 792.330	218%	1.274	€ 1.384.719.116	€ 1.009.428.318
SO 3	199%	€ 610.122	124%	977	€ 955.593.306	€ 596.089.673
SO 4	307%	€ 623.257	233%	791	€ 648.867.142	€ 492.995.971
SO 5	453%	€ 555.378	361%	3.159	€ 2.199.224.604	€ 1.754.438.070
Average	305%	€ 617.486	225%	6361	€ 5.336.855.371	€ 3.927.827.002

Administrative costs analysis

In order to estimate the administrative costs both during the application phase and the project implementation (the latter not added to the CBA as it overlaps with funding costs but is included for efficiency analysis), we rely on data from the beneficiary survey. This data is then projected across the entire portfolio using grant data. We start with the reported average person-months spent on proposals and project administration as presented in the beneficiary survey, which had a high coverage of all beneficiaries. These efforts are monetized based on an assumed average daily cost of 125% of the minimum wage (https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Wages_and_labour_costs) translating to 6,998 EUR per month. This estimate was chosen as it is assumed that staff working on Digital Europe proposals are typically more skilled and paid higher wages than the EU average. We then multiply these costs by the total number of applicants, separately for coordinators and other partners, after which we present a total aggregate.

From a point of sensitivity, we observe linear sensitivity to the labour rate assumption. Moreover, we note sensitivity to outliers in the data. When removing the three highest values for each type of indicator, we note a particular sensitivity in application expenses (cash),

whereas the other values stay within a 5% range of the original estimate. We recognise that some proposals might have incurred very large application expenses due to the size of some of the grants, though there is a risk of overreporting. We therefore present the original values for all estimates, except for application expenses. For these, we present the middle value between the value without and including outliers. The adjusted value for application expenses is therefore EUR 12.9k for Coordinators and 31.3k for other Participants.

Table 21 Background Data

Cost per month	6996	Total AdminPartners	5839
Total number of applicants	9758	Total Admin Coordinators	549
Total number of coordinators	1137	Total	6388

Table 22 Analysis of Cost for Applicants (Partners)

	Average of ApplicationCostPMLow	Average of ApplicationCostPMHigh	Average of AdminCostMin	Average of AdminCostMax	Average of ApplExpenses
Person Months	1,86	2,50	2,71	3,52	9732,77
Monetised	€ 13.036,72	€ 17.506,90	€ 18.957,41	€ 24.619,10	€ 9.732,77
Estimated total	€ 127.212.362	€ 170.832.316	€ 113.687.606	€ 147.640.735	€ 94.972.376

Table 23 Analysis of Cost per Applicants (Coordinators)

	Average of ApplicationCostPMLow	Average of ApplicationCostPMHigh	Average of AdminCostMin	Average of AdminCostMax	Average of ApplExpenses
Person Months	3,12	3,85	9,49	10,42	49837,05
Monetised	€ 21.825,68	€ 26.925,39	€ 66.407,83	€ 72.905,50	49837,04938
Estimated total	€ 237.790.772	€ 293.352.176	€ 35.063.332	€ 38.494.102	€ 542.974.653

Table 24 Totals Summed across coordinators and applicants (without outliers)

Total ApplicLow	€	365.003.134
Total Applic High	€	464.184.492
Average Application cost total	€	414.593.813
Total Apll Expenses	€	637.947.029
Total Appl Expenses (adjusted for outliers)	€	105.082.878
Total Admin Low	€	147.150.231
Total AdminHigh	€	183.776.034

Willingness to Pay Analysis

In order to calculate the value delivered for end-users, a willingness to pay analysis was carried out based on the end-user survey data, in particular for EDIH and Digital Skills. For HPC, the number of users so far supported under Digital Europe is too low (and as such the value cannot be attributed to Digital Europe but rather to predecessor programmes), for TEFs the number of responses was too low to generate reliable estimates. The number of users comes from the end-user data provided by the EC. The results are presented in the table below. Note that these represent the total value perceived, subtracted by any payments made to receive the survey, thus representing the surplus/additional value generated by Digital Europe.

Table 9 below shows the extrapolation of the total willingness to pay based on the end-user surveys for EDIHs and the digital skills training. In line with the sensitivity analysis principles (see below), the range of benefit per user is based on the average of survey responses, where the low estimate correspond to the situation where all responses are on the lower end of the answer ranges presented in the questionnaire, whereas the higher range responds to the higher range. The average is the midpoint between these two. These are multiplied with the total number of users (per Jan 1, 2025) in order to arrive at the total estimates (again for the three different estimates) in order to arrive at portfolio-level figures.

Table 25 Willingness to pay analysis

EDIH Added Value	Total Users	Minimum Range	Average Range	Maximum Range	Lower Total	Average Total	Higher Total
Public Organisations	1621	€ 3.960	€ 6.085	€ 8.210	€ 6.419.290	€ 9.863.461	€ 13.307.632
SMEs	14289	€ 7.972	€ 11.638	€ 15.304	€ 113.913.600	€ 166.292.703	€ 218.671.806
Total	15910				€ 120.332.890	€ 176.156.164	€ 231.979.437
Total Contribution/Total Cost	322.902.157	619.699.238					
Digital Skills Training Added Value		**Minimum Range**	**Average Range**	**Maximum Range**	**Lower Total**	**Average Total**	**Higher Total**
Individuals	20713	€ 656	€ 836	€ 1.015	€ 13.596.790	€ 17.311.537	€ 21.026.284
SMEs	219	€ 6.464	€ 10.422	€ 14.380	€ 1.415.689	€ 2.282.501	€ 3.149.314
Large Companies	157	€ 2.675	€ 3.212	€ 3.749	€ 419.975	€ 504.315	€ 588.656
Academic Institutes	329	€ 1.342	€ 1.684	€ 2.026	€ 441.587	€ 554.019	€ 666.450
Total	21418				€ 15.874.041	€ 20.652.373	€ 25.430.704
Total Contribution/Cost	273.787.470	€ 421.056.311					

Robustness and Sensitivity Approach

In order to ensure the robustness of the estimates produced in the cost-benefit analysis, we implemented the following approaches:

1. **Reported Data Ranges**: When data is collected in **ranges** (in particular in the surveys), we report the aggregate upper and lower bounds, as well of the middle of the range.
2. **Scenario Testing for Key Assumptions**: For key **assumptions**, such as the level of spillover in the Rhomolo-analysis, the study team/JRC worked with multiple **scenarios** to test the sensitivity of outcomes to various parameters. These ranges are transparently reported in the report.
3. **Addressing Survey Overreporting Risks:** For areas where there was a risk of **misinterpretation** or **overreporting** by the survey respondents (in particular in the leverage analysis), we reported both the aggregated direct results and a conversative estimate that accounts for maximal overreporting. This provides a comprehensive total result range.

Annex V. Stakeholders consultation - Synopsis report

Introduction

This document summarises and analyses the key findings from all consultation activities carried out for the interim evaluation of the Digital Europe programme (hereafter referred to as Digital Europe).

Overview and method of stakeholder consultation strategy

The consultation strategy encompasses numerous activities targeting stakeholders, applicants and beneficiaries of Digital Europe, as well as end users of infrastructures, tools, and services funded by Digital Europe.

The following consultation activities took place:

- **Public Consultation** on the Commission's 'Have your Say' Portal, alongside the simultaneous publication of the Call for Evidence.
- **Targeted stakeholder surveys** with beneficiaries, applicants, end users and stakeholders of the cybersecurity National Coordination Centres (NCCs).
- **Interviews** with implementing bodies of the programme, beneficiaries, end users and other stakeholders.
- **Focus groups and workshops**
- A policy **event** with stakeholders to validate and concretise the findings of the evaluation.

Triangulation was performed across all consultation activities to ensure consistency and relevance of the findings from stakeholder views.

Call for Evidence and Public Consultation

The Commission published a Call for Evidence from 27 June to 20 September 2024 on the 'Have your say' portal to gather citizens' and stakeholders' views on the scope and planned methodology of the interim evaluation. A public consultation was launched simultaneously[147]. A total of 103 online contributions and 35 position papers were submitted in response to the Call for Evidence, and 790 questionnaires were received in response to the public consultation. A report summarising the findings of this public consultation is available on the 'Have your Say' portal (Digital Europe programme – interim evaluation).

Through the analysis, a campaign by the Free Software Foundation Europe was identified promoting the use of free and open-source software. Manual review of these individual answers revealed that several messages were either duplicated or very similar, repeatedly emphasising funding challenges and community support.

[147] This survey included 11 identification questions, 64 closed questions with branching sub-questions, and 17 open-text sections.

Targeted Stakeholder Surveys

All surveys were launched on the EU Survey portal[148].

Survey	Date	Responses
Beneficiary Survey	July 12 – Sept.13, 24	1 159
Applicant Survey	July 12 – Sept.13, 24	58
NCC Survey	July 30 – Sept. 30, 24	78
End User Survey[149]	Oct. 10, 24 – Jan. 10, 25	431
Synergy Survey	Nov. 13- Dec. 4, 24	30

Interviews

A total of 102 interviews were conducted, categorised as follows:

- Beneficiaries: 52 interviews,
- Implementing Bodies: 28 interviews
- EU Level Stakeholders: 14 interviews
- End Users: 6 interviews
- Other: 1 interview

The interviews included the following categories of stakeholders:

Types of organisation	Number of Interviews
public bodies	40
research organisations	23
private businesses	14 (13 SMEs and 1 large enterprise)
higher education institutions	10
non-governmental organisations (NGOs)	8
intergovernmental organisations	3
non-profit organisations	2
international financial institution	1
other	1

Focus groups

In November 2024, six focus groups were conducted, each focusing on one of the six objectives of the Digital Europe programme. Participants were identified through desk research, stakeholder mapping, scoping interviews, surveys, and expert recommendations. In total, **49** participants contributed to these focus groups.

[148] EUSurvey - Welcome

[149] The survey covered four services (Advanced Digital Skills, Testing and Experimentation Facilities, European Digital Innovation Hubs, and High-Performance Computing).

Workshops

The Commission gathered input on the programme's performance through several workshops with overall more than 100 participants:

- A workshop at the conference on the future of digital investments in the EU organised in the context of the Danish presidency of the Council of the European Union[150],
- a stakeholder workshops on the implementation of the programme at the 'From Research to Reality – digital solutions for European challenges' event[151] in the context of the Belgian presidency and
- a workshop with representatives of the European Digital Innovation Hubs (EDIHs) at the EDIH summit[152].

Policy workshop

On 11 September 2025, a final online policy workshop was held to concretise the recommendations of this evaluation. The workshop focused on three recommendations where input from beneficiaries and Member States representatives was beneficial:

1.) vertical alignment between the Digital Europe programme with Member States with regards to co-funding mechanisms,
2.) clarification of state aid rules,
3.) simplification measures at both the application and project management phases.

Participants included Member States' representatives as well as beneficiaries, representatives of network organisations and National Contact Points. In total, 60 participants contributed to the policy workshop.

To analyse the feedback numerous **quantitative and qualitative methods** were applied. The data was, for instance, synthesised and analysed with the findings coded and categorised using the text analysis software NVivo and the analysis of individual responses was conducted using RamGPT, an AI proprietary tool developed by Ramboll. Profiling of respondents, including geographic distribution and stakeholder types, as well as analysis of closed questions, was completed through descriptive statistics.

Participating stakeholder groups

This section provides an overview of the stakeholder groups involved in the various consultation activities[153]. **Error! Reference source not found.** and **Error! Reference source no t found.** below illustrate the distribution of responses by country of origin.

The majority of respondents (96%) came from **EU countries**. The most represented country was Germany (15%), followed by Spain (12%) and Italy (10%). Among non-EU countries, Norway had the highest representation (24%), followed by United Kingdom (10%) and the United States (9%). Both Liechtenstein and Turkey participated with 8% of participants each.

[150] Conference | The Future of Digital Investments in the EU, final report to be expected in October 2025
[151] From Research to Reality – digital solutions for European challenges | Shaping Europe's digital future
[152] EDIH Network Summit 2024 | European Digital Innovation Hubs Network
[153] Participant data was not collected at the workshops organised by the Commission as participants could move freely among different sessions.

Figure 10. Distribution of responses by country of origin (EU) (n=2640)[154]

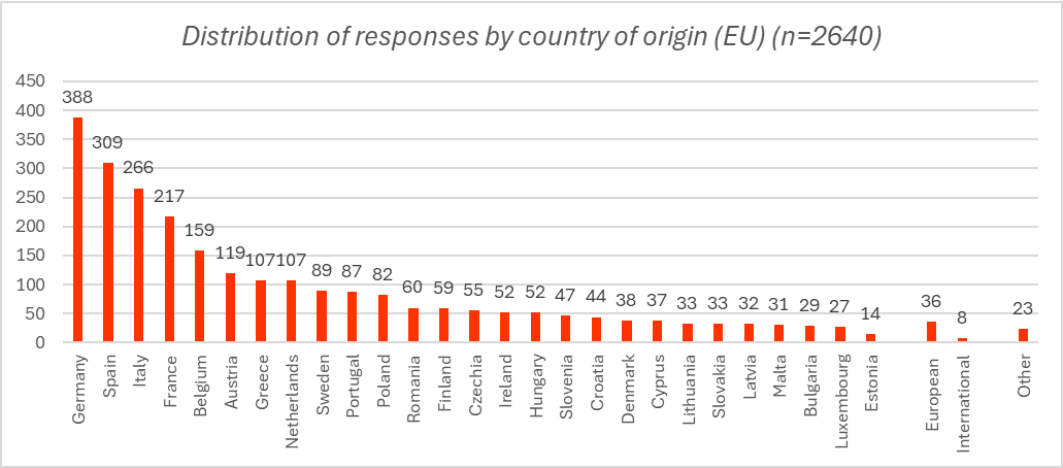
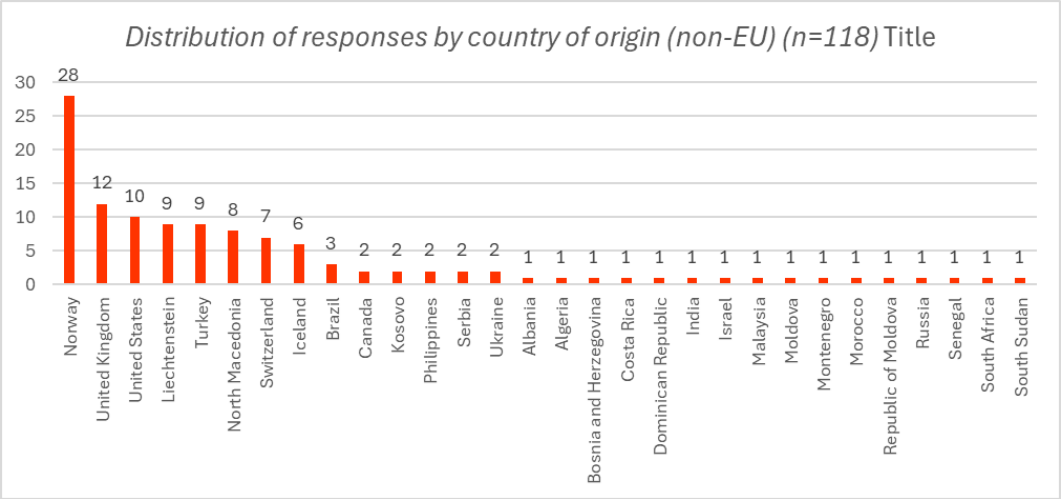


Figure 11. Distribution of responses by country of origin (non-EU) (n=118)[155]



The stakeholder groups involved in the consultation included private businesses (both SMEs and large enterprises), academic or research institutions, public bodies[156], civil society organisations, non-governmental organisations (NGOs), and intergovernmental organisations. Additionally, in the context of the NCC survey, participants included other stakeholder categories, such as industry players in cybersecurity.

The most represented stakeholder categories were **academic or research institutions** (26%), followed **by EU citizens** (22%), and private businesses (**SMEs)** (19%)[157].

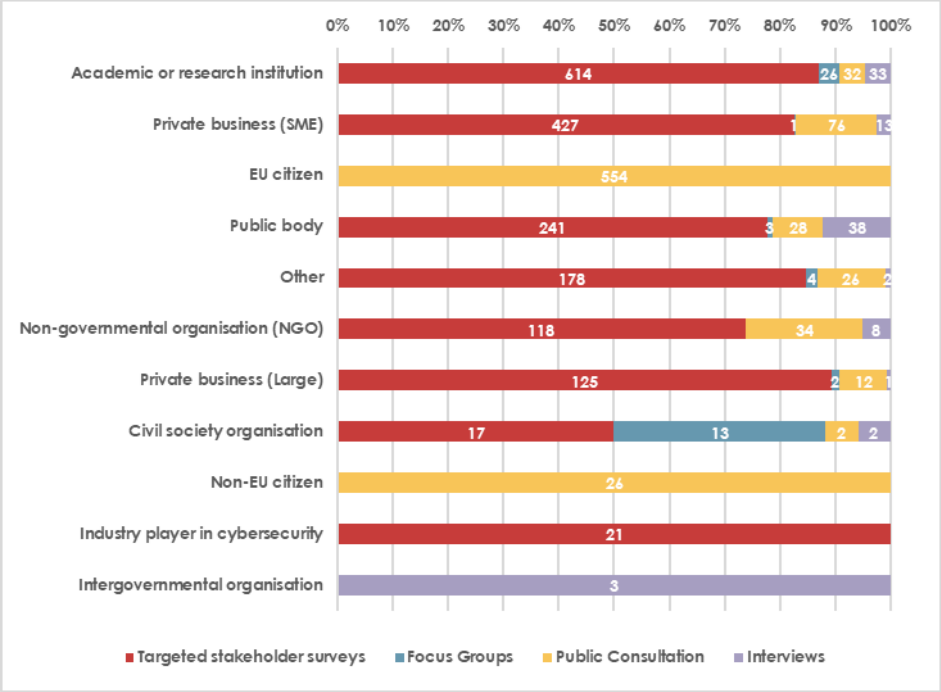
[154] Includes data from surveys and policy workshop. The 22 participants who selected the option 'Other' are specific to the end-user survey, where further specification of their geographical origin was not possible. Additionally, the label 'EU/international' refers to stakeholders operating across multiple Member States or within European/international institutions and agencies.

[155] Includes data from surveys and policy workshop

[156] Excluding research organisations and education establishments.

[157] In the Public Consultation, EU citizens were the largest group of respondents. Therefore, the distribution of the responses was mainly driven by the perspectives of EU citizens, rather than by those of businesses and other groups of stakeholders.

Figure 12. Distribution of responses per type of respondent (n=2680[158])



Main findings of the consultations

Effectiveness

The public consultation showed that Digital Europe has already been effective in boosting the **EU's global competitiveness** and in digitally transforming public organisations. In the future, Digital Europe is expected to contribute even more to enhancing the EU's global competitiveness and driving the digital transformation of EU governments and public organisations. Initial results show **increases in the EU's competitiveness on a global scale** and **digitally transforming EU governments and public organisations.** On the other hand, **inadequate knowledge** of the programme and a lack of resources to prepare proposals hindered participation.

- 61% of respondents in the **public consultation** (mostly research institutions, companies and NGOs) were aware of the programme but lacked detailed knowledge of its objectives and priorities. Meanwhile, 26% had in-depth knowledge (mostly EU citizens and companies), and 14% were not very familiar with the programme or its objectives.
- **Beneficiaries** particularly valued the programme's dual focus on SMEs and the public sector, however, highlight several challenges, such as coordination between partners and Member States, clarity on implementation modalities, and the 50% funding rate. These issues particularly affect publicly funded organisations (higher education and research organisations) and SMEs without access to additional co-funding at national

[158] The total is higher than the total of participants per country of origin (including both EU and non-EU countries) because the questionnaire for Advanced Digital Skills (as part of the end user survey) was open to a broader group of participants, including individuals who are not currently employed. Respondents had the opportunity in an earlier question to specify whether they were individuals not currently employed (e.g. full-time students, individuals between jobs), company managers/owners whose employees benefited from the training. Not all respondents were directly affiliated with organisations or institutions.

levels.

Furthermore, beneficiaries have noted significant advantages in areas such as networking, organisational development, and market positioning. For instance, 53% gained access to new academic partners, 58% enhanced their institutional reputation, 53% strengthened strategic partnerships at the EU and international levels, 44% expanded their workforce, and 35% launched innovative products or services.

Respondent who selected the option 'other' mentioned benefits such as building a **large network**, **increased competitiveness** and **increased awareness of current capabilities**.

- Interviewees noted that universities and research organisations struggle to **co-finance the 50% co-funding rate,** as not all Member States have established co-funding mechanisms in place. Companies are also sometimes hesitant to co-finance Digital Europe projects due to uncertainties regarding market readiness and the potential long-term value of the supported technologies.
- **EU-level stakeholders** saw the programme as an important enabler of cross-border ecosystem development and highlighted progress in the use of advanced digital infrastructure.
- **Implementing bodies** pointed to the successful rollout of initiatives such as the extensive EDIH network as evidence of the programme's effectiveness in laying a strong operational foundation.
- Stakeholders in the **policy workshop** reported difficulties securing national co-funding, due to unclarity regarding the identification of responsible authorities at national level, and duplicated burden to apply and report at EU and national levels. Beneficiaries in Member States with structured co-funding frameworks experienced smoother project starts, while fragmented or ad hoc arrangements in some Member States constrained accessibility.
- The analysis of the **position papers** highlights that the programme has significant potential for **driving the digital transformation** and fostering skills development. However, its effectiveness is hindered by **limited participation of SMEs**, due to complex funding structures (e.g. funding conditions vary between sub-programmes and often require a detailed review of work programmes and tender documents, with key information sometimes only available in English), administrative burden, and insufficient funding rates. Public bodies also face barriers, further limiting the programme's reach. Furthermore, **aligning Digital Europe with national co-funding mechanisms** could enhance efficiency, reducing delays and leading to better overall outcomes.
- An analysis of the online contributions to the **Call for Evidence** highlighted the programme's effectiveness in **fostering innovation** and **sectoral transformation**, particularly in areas such as agriculture, health, and manufacturing. While the programme's focus on **digital literacy** and **accessibility** has helped to bridge the digital divide, supporting free and **open-source solutions** could further promote technological autonomy[159].
- The **surveys for end-users** revealed several **benefits** for users of infrastructures, services, and IT tools funded by Digital Europe, including:

[159] Insight produced by a concerted campaign of stakeholders.

- **Strengthened Collaboration and Networking Opportunities** with 69% of respondents rating it as having at least a medium impact.
- **Improved Access to Technology Testing and Innovation Support** with 68% of respondents rating it as having at least a medium impact.
- Respondents who selected the option 'other', mentioned additional benefits, such as **improved research infrastructure**, **improved knowledge of new technologies**, and **increased awareness of how digital technologies can optimise day-to-day operations and give strong insights for future decisions**.

- When asked about how much end users would be willing to pay for the services provided by the programme, responses varied significantly. The most highly valued work strand was High-Performance Computing (HPC), with a maximum willingness to pay EUR 39 504, and a minimum of EUR 14 942, whereas the European Digital Innovation Hubs have a maximum value for SMEs of EUR 11 936 and a minimum value of EUR 7 972. Students benefiting from advanced digital skills trainings value these trainings between EUR 656 and EUR 1 015.

  Many **stakeholders consulted rated the ease of accessing the services and infrastructures positively**, with 87% considering them at least moderately easy to access. In contrast, 5% found the services difficult or very difficult to access. Access difficulties were attributed to **administrative barriers**, **registration challenges**, **unclear roles** in certain situations, as well as **difficulties in accessing and utilising HPC systems**, **technical failures**, **language barriers**, and **lack of experience**.

Different **drivers** and **bottlenecks** for the **implementation** of Digital Europe were identified during the **focus groups**, as summarised in the table below.

Table 1. Drivers and bottlenecks identified during the focus groups

Focus group	Drivers and bottlenecks	Participants
HPC	Need for **streamlined processes and flexible funding** due to lengthy timelines of EU programmes	Academic or research institutions
Cloud, Data, and AI	*The need for*: • **creating best-in-class products and platforms** to generate a 'fear of missing out' among companies. It is challenging for the industry to engage with Digital Europe without a specific market pull embedded in the programme as companies usually are risk averse. • **reinforcing capabilities and partnerships** between the public and private sectors. • reducing **consortium size** to two to three players with high execution power, as large consortiums comprising multiple partners do not	Academic or research institutions Civil Society Organisations

	necessarily lead to expected outcomes.	
Cybersecurity and Trust	*The need for:* • **enhanced coordination and strategic alignment** among Member States, industries, and institutions, particularly regarding talent retention, infrastructure development, and cross-border collaboration. • enhanced collaboration among companies and regions (among others with the help of the **European Cyber Security Organisation (ECSO))** • better **alignment between the European Defence Fund and Digital Europe.**	Private businesses (SMEs), Academic or research institutions, Civil Society Organisations
Advanced Digital Skills	*The need for:* • a **unified help desk** at the European level to centralise relevant information for easier use access. • **synergies** between the Erasmus+ Centres of Vocational Excellence (CoVE) and Digital Europe. • development of '**AI for Good'** initiatives to establish a positive EU brand around AI for education. • Digital transformation training for SMEs and long-term initiatives for skills development[160].	Academic or research institutions, Civil Society Organisations
Deployment and Best Use of Digital Capacities and Interoperability	*The need for*: • **coherence in legal frameworks and policy objectives.** • aligning actions with **long-term strategic objectives[161].**	Academic or research institutions, Civil Society Organisations, Public bodies
Semiconductors	*The need for*: • the **EU Semiconductor's Board** to align national and EU priorities. • **streamlined processes and lump-sum funding for SMEs**.	Academic or research institutions, Public bodies, Private businesses (large), Civil society organisations

[160] Participants from civil society organisations and academic or research institutions agreed on the role of the **ERASMUS+** programme, while the need for **training for SMEs** was suggested by academic and research institutions.

[161] Although participants were representatives of civil society organisations, public bodies, and academic or research institutions, these suggestions were provided mainly by civil society organisations.

	• **long-term and proactive planning.**	

During the focus group on HPC, representatives from a Joint Undertaking suggested the need for **more agility and increased funding for high-risk, high-gain projects**, including support for disruptive ideas through **cascade funding**. Additionally, they criticised traditional procurement practices that take 8-10 years, instead of adopting off-the-shelf solutions.

Efficiency

- Interviewees mentioned **delays in application processes**, attributed to negotiations with Member States, security restrictions, and due diligence requirements related to the mutual insurance mechanism.
- From the perspective of the Commission, interviewees noted that **procurement processes were lengthy** due to the need to source external expertise. The long selection and contractualisation process is particularly challenging for fast-moving technology areas, such as AI.
- Several stakeholders commented on the lack of instruments specifically focused on exploiting results, such as vouchers or Financial Support for Third Parties (FSTP) and criticised the relatively standardised co-funding approach. They instead advocate for a shareholder model, commonly used in research infrastructures, where multiple partners jointly invest in and govern an initiative, enabling long-term sustainability, shared ownership and more effective exploitation of outcomes beyond the typical project lifecycle.
- The beneficiary and applicant surveys revealed satisfaction with process-related aspects of grant and procurement management, but dissatisfaction with the conditions.

    - Among beneficiaries, 71% reported being satisfied or very satisfied with the **clarity of the scope and description of calls,** a sentiment echoed by 64% of applicants. Similarly, 66% of beneficiaries and 69% of applicants were satisfied with the **clarity of rules and eligibility criteria**. Satisfaction with the **clarity of application instructions** was slightly higher among applicants (69%), compared to beneficiaries (64%). **Timing and scheduling** were also approved by 59% of beneficiaries and 58% of applicants.

    - Dissatisfaction levels were generally aligned for both beneficiaries and applicants, with some exceptions. There was a notable discrepancy regarding the **clarity of feedback received and level of detail of the evaluation of the proposal,** with 9% dissatisfaction among beneficiaries versus 29% for applicants. Higher dissatisfaction rates were observed in the perceived adequacy of the **funding rate proposed in relation to the scope, objectives and requirements of the call of proposals** (29% for both beneficiaries and applicants), **proportionality between the costs and the volume of funding requested in the proposal** (23% for beneficiaries; 31% for applicants), and the **proportionality between the efforts and the chances of securing Digital Europe funding** (21% for beneficiaries; 41% for applicants).

    - Feedback on the support services provided by the **National Contact Points (NCPs) during the planning, application, and implementation phases** was mixed. **Assistance with finding partners through matchmaking events** was

generally underutilised by beneficiaries (27%), with only 21% being satisfied. Among applicants, 24% remained neutral, while 22% were dissatisfied or very dissatisfied. Notably, beneficiaries expressed higher dissatisfaction rates (dissatisfied/very dissatisfied) with **guidance on legal, financial, and implementation issues**, with 13% of beneficiaries and 24% of applicants reporting dissatisfaction. Both groups valued the NCPs' **explanations on the scope and modalities of Digital Europe actions**, with 47% of applicants and 34% of beneficiaries expressing satisfaction. However, high percentages of neutrality were observed across both groups, with more than 20% reporting neutrality in every aspect. The policy workshop participants observed inconsistent interpretations of rules and slow turnaround for clarifications, resulting in delays. NCPs have limited knowledge on legal and financial aspects and in turn cannot advice beneficiaries effectively.

  - Many beneficiaries emphasised the need for **flexibility in project implementation** to accommodate technological advances or market changes.

  - Applicants, on the other hand, expressed discontent with the lack of transparency in evaluation processes and the application of state aid rules, including the de minimis regulation, which created uncertainty. They also noted a lack of support for Seal of Excellence projects at the national level. Both beneficiaries and applicants shared concerns over high administrative burdens and emphasised the need for simplified procedures and greater funding flexibility.

- The workshop held at the conference on the future of digital investments in the EU[162] stressed the importance of **public procurements** and concluded that future investments in digital deployment need to be more unified merging current programmes and applying simplified rules. The event's conclusions echoed the importance of increased private investment highlighted in the Draghi report and emphasised the role of public funding in de-risking private investments.

- The workshop at the EDIH summit called for **a unified communication strategy** involving national players and the opportunity to share best practices across EDIHs.

- During the **policy workshop** participants stated that in case of national co-funding, duplicated reporting to the EU and national authorities, the additional State aid assessment and unclear points of contact at national level led to delays. This was also emphasised at the workshop at the EDIH summit.

- Specific **suggestions** from all stakeholders included the development of **ensured access** for **smaller organisations and underserved regions to fully benefit** from the programme's initiatives, **alignment with national co-funding mechanisms**, enhanced awareness raising at national levels (EDIH), increased **predictability** in call planning, faster implementation of **security restrictions**, more **flexibility** in project planning and implementation (e.g. faster amendments), reduced duplicated data entry in the portal, and a more user-friendly application portal.
- With regards to **cost-effectiveness**, procurement processes were described as

[162] Conference | The Future of Digital Investments in the EU, final report to be expected in October 2025

particularly resource-intensive, and establishing security restriction processes required a heavy learning curve for all parties involved.

- The beneficiary survey results indicated that application costs typically require between 1.86-2.5 person months, with approximately EUR 7.1k in additional expenses per proposal. Coordinators spend between 3.12 and 3.85 person months and incur EUR 31.3k in additional expenses.

Relevance

- In the public consultation, respondents widely agreed that Digital Europe is highly relevant for addressing current and future challenges, particularly in the areas of **cybersecurity** and **advanced digital skills**.
- Additionally, 77% of respondents believed that Digital Europe should cover additional areas in the future. Some of the most frequently mentioned aspects included: a concerted approach to a **free and open-source software**[163], the **promotion of digital skills and inclusion** and the **sustainability and green transition.**
- The analysis of the position papers highlighted that the programme aligns closely with Europe's strategic priorities, such as **improving digital skills**, supporting **SMEs**, promoting **digital sovereignty**, and driving the **green transition**. To increase its relevance, business associations suggested that the programme should become **more accessible** and **inclusive**. Stakeholders, mostly NGOs and associations, emphasised the need for more **accessible training** opportunities for underserved groups and smaller organisations. They also called for a stronger focus on **basic digital skills** alongside advanced skills, to bridge the digital divide. **Open-source initiatives**, which EU citizens and business associations see as promoting innovation and sovereignty, remain underrepresented**,** and the programme is urged to prioritise technologies 'made in the EU'.
- The review of online contributions in the public consultation[164] showed that efforts to integrate energy-efficient technologies, ethical AI practices, and digital accessibility in the programme address current and future societal challenges. Contributors furthermore suggested involving underrepresented groups in shaping digital policy to ensure diverse stakeholder needs across sectors and communities are better addressed.
- Across the six specific objectives (SOs) of Digital Europe, there is a broad recognition of the role of the programme in driving Europe's digital transformation and maintaining its global competitiveness, with all objectives being either mostly or very relevant both for current and future needs in both beneficiary and application surveys. Interviewed stakeholders support this view.
    - Both the beneficiary and applicant surveys highlight the relevance of **Cybersecurity and Trust (SO3)**, with 91% of applicants and 86% of beneficiaries rating it as mostly/very relevant for current needs. In terms of sectoral and technological relevance, 64% of beneficiaries found the programme very relevant, and 31% moderately relevant. Applicants showed an even stronger alignment, with 75% rating it as very relevant and 23% as moderately relevant.
- When considering technical priorities for the future, AI technologies were at the

[163] Insight produced by a concerted campaign of stakeholders.

[164] NB. although this section relates to the Call for Evidence, none of the responses specifically addressed the methodology of the Digital Europe. Stakeholders focused on providing general feedback on the programme through position papers and online contributions.

forefront both groups, with 80% of beneficiaries and 78% of applicants identifying AI as the top priority. Advanced connectivity, navigation and digital technologies were prioritised by 62% of beneficiaries and 66% of applicants, followed by robotics and autonomous systems, considered important by 45% of beneficiaries and 40% of applicants.

- **Interviewed stakeholders** recognise the importance of data and data infrastructures and find the programme's design relevant, though some stakeholders, such as SMEs, Edtech and VET providers, have not been as sufficiently engaged. They generally acknowledge the programme's flexibility and alignment with emerging trends, such as adapting to AI's growing prominence and introducing initiatives like the AI Factories. Stakeholders also acknowledge the importance of integrating quantum technologies into Digital Europe initiatives. However, they also highlight future complexities, such as adapting HPC infrastructures for AI use cases and addressing security, data management, and energy efficiency. Public bodies emphasise the programme's alignment with governance goals, interoperability needs, and broader political objectives. Research organisations see Digital Europe as relevant for advancing cutting-edge technologies like AI and quantum computing but identify gaps in the coordination, accessibility, and integration of digital infrastructure. NGOs and SMEs focus on Digital Europe's relevance to practical deployment, accessibility, and the establishment of clear standards. Interviewed stakeholders also expressed concerns that persisting skill gaps hinder the exploitation of HPC infrastructure for AI.
- Many **end-users** perceived the role of the **service funded by Digital Europe in addressing the needs** of the respondents or their organisation as at least somewhat effective (89%). Meanwhile, 6% found it not effective at all or considered it as not very effective. With regards to the main obstacles organisations that took part in the end-user survey currently are facing or expect to face, 88% of respondents highlighted the lack of **access to advanced computing resources and AI applications which can drive innovation and improve services in various sectors** as somewhat or highly relevant**. Lack of advanced digital skills and capabilities,** and **cybersecurity and trust in digital systems** follow closely, with 86% of respondents for each, identifying them as somewhat or highly relevant. When asked to specify, those who selected the option 'other' cited a **lack of skilled personnel**, **insufficient funding for code development**, the **need for clear and practical programmes**, the **digital impact in daily work routines,** and **reliance on open-source-minded consortia**[165].
- The workshop at the EDIH summit highlighted the need for more **flexibility of EDIHs to adapt to new technological challenges**, and a more holistic perspective on the different types of services offered. The workshop at the 'Research to Reality' event suggests aligning local, regional, and EU strategies for coherent digital governance.
- The focus groups highlighted key **future developments** and **recommendations**, as summarised in Table 2 below.

Table 2. Insights from the focus groups

Focus group	Future developments and recommendations	Stakeholder categories participating
HPC	*Need for:* - **a holistic approach** to sovereignty,	Academic or research

[165] Insight produced by a concerted campaign of stakeholders.

	encompassing the entire value chain rather than advancements in isolated technologies. Europe needs to develop integrated systems to reduce reliance on external suppliers - mechanisms to **scale education and training**, to increase the number of skilled professionals - **structured, industry-aligned programmes** that can deliver sustained expertise **- more inclusivity**, with calls to increase **female representation** **- investments in high-speed storage solutions**[166]	institutions
Cloud, data and AI	*Need for:* **- investments** in areas such as agentic AI for human labour augmentation, augmented reality, shared and synthetic data, interoperable data spaces, automated material design through experiment and computation - improvement of **EU competitiveness** through availability of regulatory sandboxing, access to testing and experimenting facilities, innovative public procurement and pre-commercial procurement **-** an **update** of the **GDPR** and **EU copyright regulation**	Academic or research institutions, Civil Society organisations
Cybersecurity and Trust	*Need for:* - a **highly skilled workforce** - **centralised identity solutions** through 'zero architecture' approaches - better alignment of **Digital Europe** with **Horizon Europe** **-** '**c**ertificates **of provenance**' for software libraries to improve software quality, including dependency on external libraries and the lack of understanding regarding their origin and usage **-** introducing **more flexible project scopes** to accelerate innovation[167]	Private businesses (SMEs) Academic or research institutions Civil Society organisations
Advanced Digital Skills	*Need to:* - include **training** promoting cross-domain competence but **- avoid excessive focus on multidisciplinary approaches**, which could dilute the unique	Academic or research institutions Civil Society Organisations

[166] As nearly all participants in the Focus Group on HPC were from academic or research institutions, insights primarily reflect the perspectives of these types of stakeholders.

[167] While the majority of insights came from academic or research institutions and civil society organisations without substantial differences in terms of perspectives, the need for **more flexibility and efficiency in project management** was suggested by private businesses specifically.

	characteristics of individual disciplines[168] **- broaden participation** (e.g. women), through dedicated measures and KPIs **- establish industry-education partnerships**	
Deployment and Best Use of Digital Capacities and Interoperability	*Need to:* **-** assess and address the **environmental impact** of advanced digital technologies - increase accessibility, citizen trust, and digital literacy **- raise awareness and foster a cultural shift** towards digital-first approaches **- accelerate innovation and foster collaboration between public and private** stakeholders, along with a balanced approach combining **top-down coordination with bottom-up** innovation[169]	Academic or research institutions Civil Society organisations Public bodies
Semiconductors	*Need for:* **- quantum computing as a long-term strategic priority** **- a highly skilled workforce** across diverse industries **- strengthening EU competencies in areas like advanced functionality, semiconductor-based photonics and new memory architectures** **- reducing fragmentation and focusing on market-driven research** **- ensuring the effective application of new technologies by addressing software quality and security**[170] - addressing **sustainability concerns** related to the growing demand for processing power and high-volume production.	Academic or research institutions Public bodies Private businesses (large) Civil society organisations

- During the HPC focus group, representatives from EuroHPC JU also provided insights. In terms of future developments and recommendations, a key theme was the need for a **robust software stack** in tandem with hardware advancements such as GPU-QPU integration. Additionally, there was a call for consistent **support for start-ups**, **better alignment of quantum initiatives**, and **pan-European collaboration** to maintain competitiveness in skills and innovation and reach critical mass. In terms of understanding current stakeholder needs, the representatives from EuroHPC JU advocated for a **holistic approach**, including training on energy efficiency, user

[168] The majority of insights came from academic or research institutions, and no substantial differences in perspectives across stakeholder categories were identified.

[169] Such balanced approach was suggested by public authorities, as well as the **challenges related to co-financing**, with some suggesting 100% financing from public funds.

[170] More specifically, private businesses suggested having a **long-term vision,** while academic or research organisations stressed that the Digital Europe should try to **diminish fragmentation.**

support and efficient software. Additionally, energy efficiency was suggested as a unique selling point promoting 'energy-efficient cycles'. A recommendation was to focus on **fewer, high-quality models** rather than high quantities.

Coherence

- Interviewed stakeholders highlighted the complementarities and synergies within Digital Europe's different Specific Objectives (SOs) and within work streams. Complementarities are evident in areas like AI, cybersecurity, HPC and skill development, with EDIHs playing a key role in connecting organisations to other services funded by Digital Europe, such as TEFs and data spaces. However, some stakeholders pointed out the lack of **systematic structural collaboration**.
- According to more than 50% of respondents in the public consultation, including EU citizens, companies and research institutions, Digital Europe is partially coherent with other national and regional funding instruments, with **Horizon Europe** being the most complementary. This view was also confirmed by interviewees.
- In the consultation, mostly EU citizens and small companies identified a **lack of alignment** with regional/local funding opportunities and international instruments, while 39% of respondents (e.g. academic institutes, businesses, and EU citizens) acknowledged at least partial coherence with international funding opportunities/instruments.
- The analysis of the **position papers** highlighted challenges related to **fragmented funding processes** and **inconsistent eligibility rules** across funding programmes. These issues hinder collaboration, complicate long-term planning, and make it especially difficult for resource-constrained stakeholders- such as SMEs and smaller research organisations- to understand the requirements for participation. Mostly small businesses and industry associations emphasised the need to **align timelines**. They noted that late changes to work programmes- such as shifting call deadlines or modifying priorities after planning had begun-—combined with insufficient coordination between EU and national funding structures have disrupted predictability and undermined effective planning.
- Other recommendations include the better integration with related initiatives, such as the Digital Education Action Plan and the use of tools, such as the Local and Regional Digital Maturity Assessment. Strengthening cross-sectoral **partnerships** and clearer coordination between EU and national funding structures can maximise synergies and increase the overall impact.
- The review of online contributions[171] highlighted **gaps** in the coherence of Digital Europe funding mechanisms with other **EU funding programmes**. Mismatched deadlines, different co-financing requirements, were reported mainly by some academic institutions and business associations, lead to **fragmentation**. Recommendations to harmonise funding conditions, simplify application procedures, and align objectives across EU programmes could improve the integration and effectiveness of the programme.
- When assessing the extent to which Digital Europe was perceived as complementary and synergistic with other instruments, 35% of beneficiaries indicated that Digital Europe is fully coherent with **other Digital Europe projects**. However, perceptions of

[171] N.B. although this section relates to the Call for Evidence, none of the responses specifically addressed the methodology of the Digital Europe. Stakeholders focused on providing general feedback on the programme through position papers and online contributions.

coherence were more mixed in relation to **regional** and **national funding opportunities aimed at building capacity and skills in key digital areas**, with respondents seeing the programme as only partially aligned (32% for regional and 36% for national funding). At the European level, Digital Europe was seen as fully coherent with **other EU funding instruments** by 34% of respondents. Alignment of Digital Europe with relevant EU regulations was generally positive, with 38% indicating full coherence, while coherence with **national regulation** was perceived differently, with 28% of respondents indicating partial coherence. A significant share of respondents (41%) reported that their Digital Europe-funded projects directly built upon activities previously supported by other European funding instruments, highlight strong potential for continuity and synergy across EU programmes.

- Participants in the policy workshop described coherence gaps when combining Digital Europe with national and regional co-funding. They reported fragmented national arrangements (from structured frameworks to ad hoc solutions), producing uneven beneficiary experiences across Member States and regions. Examples raised included combination of funding with the ERDF, which is challenging, misaligned calendars between Digital Europe calls and national budgeting cycles, and inconsistent rates, eligible cost rules, and templates. On the legal side, divergent State-aid interpretations (de minimis/GBER vs notification) created timeline variability and uncertainty.
- The synergy survey suggests that Digital Europe holds a strong position in fostering collaboration and integration with other programmes within **the R&I landscape**. Its projects often build on prior efforts funded by **Horizon 2020, Erasmus+, the Connecting Europe Facility (CEF)**, and various national or regional initiatives. Additionally, projects under Digital Europe **incorporate knowledge and results from other programmes**, such as analysis methods, metadata, data sources, and skills gap analyses, with higher or secondary education institutions and research organisations being primary users. Capacity-building programmes or (digital/research) infrastructures developed under other initiatives are similarly leveraged by Digital Europe projects, with public bodies and education or research organisations leading the way.
- Digital Europe project managers agreed that the programme is well-placed within the **knowledge network**, with 93% indicating they had collaborated with their current partners in previous projects- partnerships that now inform and strengthen ongoing initiatives. Many projects also operate within networks of similar efforts, sharing findings and best practices. Beneficiaries suggested that **organising more meetings to exchange results and experiences** could further enhance these synergies.

<u>EU added value</u>

The public consultation showed that Digital Europe has provided significant added value by financing projects, leveraging public funding for digital activities, and fostering international cooperation.

- Interviewed stakeholders confirmed that collaborative efforts across Europe have accelerated the development of pre-exascale and exascale HPC systems much faster than individual Member States could have done independently.
- Among the factors contributing to the development of **large cross-border digital ecosystems** under the programme, 19% of respondents- most of them EU citizens- indicated the importance of fostering cross-border partnerships and increasing overall funding. Additionally, 18% of respondents- mainly companies and research institutions) emphasised the value of funding interconnected activities, mutually reinforcing projects, and/or **multi-country projects (MCPs)**.

- Digital Europe has also played a crucial role in promoting the **EU's digital autonomy**, yet more targeted efforts are needed to increase participation, particularly among **smaller organisations**, and to streamline administrative procedures.
- Position papers highlighted significant added value by fostering **pan-European collaboration** in critical digital areas, such as AI, cybersecurity, HPC, and cloud computing. These investments enhance Europe's competitiveness, resilience and strategic autonomy, while supporting societal and economic goals. However, stakeholders (mostly business associations and NGOs) emphasise the need for Digital Europe to **reduce reliance on non-European technologies** to maximise its strategic benefits. Prioritising inclusivity, accessibility and the twin transitions can increase Digital Europe's impact and further consolidate its role as a key driver of Europe's digital future.
- Interviewed stakeholders from the EDIHs also pointed out the value in cross-border collaboration but highlight that the limited existing exchanges are mostly intra-country rather than across Member States.
- The review of online contributions[172] showed that the programme's contributions to **digital sovereignty, sustainability and cross-border** collaboration bring significant added value to the EU. Aligning **sustainability metrics and ethical practices** with digital innovation will further strengthen Digital Europe's role in creating a resilient and inclusive digital ecosystem.
- Among beneficiaries, 64% indicated that Digital Europe **improved access to and cooperation with partners from other countries in the EU and beyond** to a large or very large extent, compared to 66% of applicants. In addition, the **creation of a European ecosystem for digital technologies** was seen as bringing added value by 62% of beneficiaries and 64% of applicants. A total of 52% of beneficiaries indicated that Digital Europe delivered EU added value in terms of **Digital Europe's provision of financial means on a scale and consistency not available in national and regional schemes.** This perception was even more pronounced among applicants (66%).
- Conversely, the programme was not viewed as having **better funding conditions compared to national/regional instruments by both applicants and beneficiaries.**
- When asked whether there were other funding schemes or programmes at national or international level with **similar objectives** to Digital Europe, 65% of NCCs survey respondents said that there were no such programmes, while 35% confirmed the existence of other similar funding schemes. Those who recognised other funding opportunities mentioned initiatives such as the National Innovation Funds, Horizon Europe and the Cohesion Fund. National Cybersecurity Coordination Centres identified **standardisation of practices, enhanced cybersecurity capabilities** (22%), **improved cross-border collaboration** and **access to funding and resources** (both selected by 21-21%) as tangible benefits gained from EU interventions in cybersecurity (28%)[173]. A smaller portion (7%) identified other benefits, including **networking and new collaborations** and **more information about cases and solutions**.
- However, **lack of communication channels** (35%), **funding constraints** (29%), and **regulatory differences** (26%) were seen as significant challenges, with one respondent specifically noting that different legal and regulatory frameworks in different

[172] N.B. Although this section relates to the Call for Evidence, none of the responses specifically addressed the methodology of the Digital Europe. Stakeholders focused on providing general feedback on the programme through position papers and online contributions.

[173] The sum of benefits (33+31+31+41+11=147) exceeds the number of respondents because respondents had the option to select more than one answer.

countries can create complexity and make it difficult to identify appropriate points of contact. Among the challenges identified, some participants from the NCCs survey highlighted a **lack of human resources** and **difficulties in sharing information about incidents involving classified systems or items.**

- Furthermore, NCCs emphasised the need for increasing efforts to **educate the public about cybersecurity threats** and **best practices**, as well as creating **more job opportunities** in the public sector. They also suggested that NCCs should focus on **reaching out to CEOs** to raise awareness of the importance of cybersecurity and encourage a top-down approach, rather than relying solely on bottom-up initiatives. Additionally, there was a call to **make it easier for community members to access opportunities in cybersecurity**. More **focus should be placed on AI and its associated risks and threats**, while exploring ways to **increase efficiency** using AI.
- 86% of respondents to the NCCs survey rated **cross-border collaboration in cybersecurity efforts** as very important/important. To better support to cross-border cooperation, recommendations included the **exchange of information**, the **need for public authorities to initiate or improve cross-border communication with companies within the same sector** and **the establishment of efficient communication channels** among teams in different locations.
- The end-user survey revealed that around 65% of respondents at least moderately agree, that **the services are unique in terms of their scope/quality in their country compared to similar national/regional initiatives.** More positively, around 74% of respondents at least moderately agree that **the services are unique in terms of their scope/quality in the EU.** These figures drop to 22% and 24% respectively when we consider those who strongly agree that the facilities are unique.
- There is more widespread support for the notion that these services offer other types of added value, specifically relating to costs and ease of access. 319 respondents (74%) at least moderately agree that Digital Europe services are **more affordable for their organisation than alternative options, while** 296 (69%) at least moderately agree that they are **more accessible.** For those who selected the option 'other', the services **provide added value due to their ability to foster collaboration, innovation and business growth**. Respondents suggested that clearly communicating how these services compare with alternative options- alongside involving a broader range of participants- could further increase their perceived value.
- Main recommendations from the end-user survey included the need for **more public awareness activities** to ensure that people and SMEs are informed about available training and resources, as well as simplifying the **complexity of application, reporting, and access processes** to encourage wider participation. Programmes should cater to all skill levels, including beginners, and better address the specific needs of SMEs. Training should include **practical examples, hands-on sessions,** and **industry-specific applications**. **Continuous learning opportunities**, post-training resources, personalised plans, and supporting materials were also highlighted as essential for retention and practical implementation.
- **Harmonising HPC-use policies** and interfaces across EuroHPC sites would enhance usability, and more opportunities for cross-industry and cross-border collaboration, such as through EIT Manufacturing, should be created. Furthermore, respondents called for **long-term funding and collaboration frameworks** to sustain user communities, **improved technical support for HPC** streamlined infrastructure and offering **low-barrier access to testing environments and small-scale R&D projects. To remain competitive with commercial cloud services, HPC should reduce administrative burden**, **standardise documentation**, and **tailor initiatives** to the needs of specific industrial sectors. Finally, **tracking productivity, certifying participation and ensuring transparent use of funds were seen as essential to maximise impact**.

Conclusion

The consultation process for the interim evaluation of the Digital Europe programme engaged a wide range of stakeholders and provided a detailed assessment of the programme's progress. Stakeholders confirmed the programme's relevance in addressing Europe's digital priorities. Nevertheless, there remains scope for improvement in streamlining administrative processes and refining funding structures. While Digital Europe is fostering collaboration and delivering added value at EU level, improvements in coherence, accessibility, and support for smaller organisations could enhance its impact further.

Insights gathered through this process will inform the design of a future digital deployment programme, ensuring that future initiatives are more inclusive, efficient and aligned with evolving digital needs.

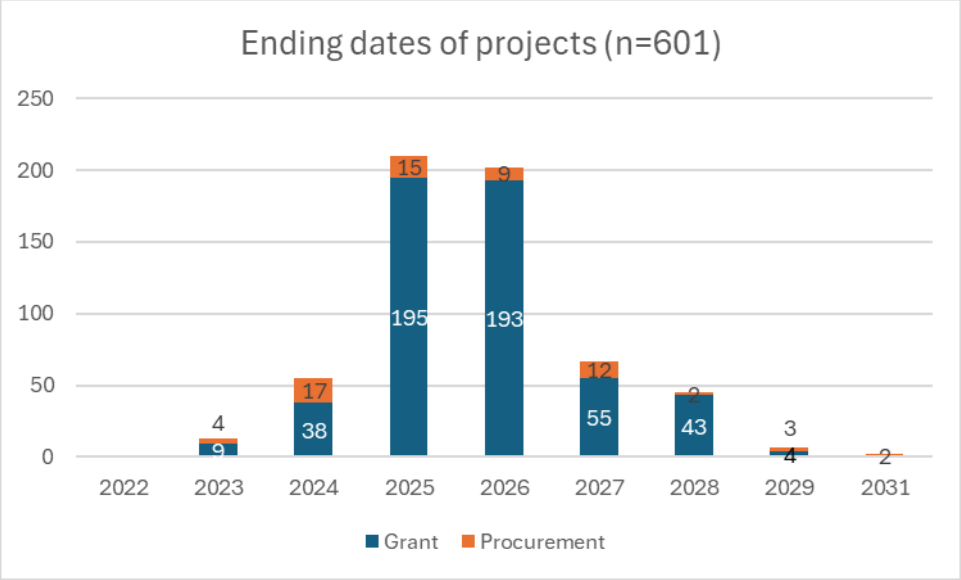
Annex VI. State of Play

This annex provides an overview of the implementation of Digital Europe activities. It includes grants, procurements, financial instruments, Contribution Agreements (CAs), and Programme Support Actions. The analysis is based on data on Digital Europe projects and proposals as of the cut-off date, 31 December 2024.

The activities are categorised by Specific Objectives (SO), with the European Digital Innovation Hubs (EDIHs) reported as a separate category. Programme Support Actions that do not fall under any SO, are presented as an additional category in the different analyses.

A total of 601 projects, have been funded through grants and procurements. In addition, other instruments (Contribution Agreements, Financial Instruments and programme support actions) were used. These projects account for total EU funding of EUR 3.02 bn, spanning from 2022 to 2025. Most projects are expected to conclude by 2025 and 2026, with reaming projects ending by 2031 at the latest.

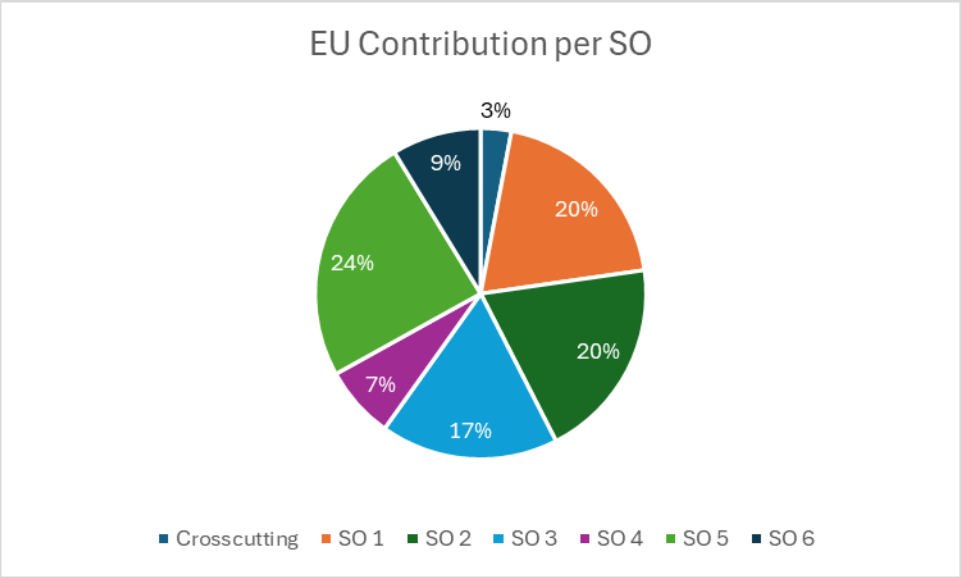
Figure 1: Ending dates of projects



Distribution across SOs

In terms of SOs, the main EU contribution – from both grants and other instruments (procurement, CA, financial instruments, and Programme Support Actions) – has been made to SO5 with a total EU funding of EUR 736.7 m. The lowest contributions were assigned to SO4 with EUR 214.9m. Four Programme Support Actions relevant for different specific objectives summed up to EUR 78.4 m. The total committed amount sums up to EUR 3.016b.

Figure 2: EU contributions per SO



The number of funded projects varies significantly from one SO to the other. SO5 has mainly due to the EDIHs the highest number of projects with 281 projects, followed by SO3 with 169. Next, there are 73 projects in SO2, and 51 projects in SO4. SO1 and SO6 present the lowest number of projects with 16 and 11 projects, respectively. In addition to the grants and procurements, in terms of other instrument types, 11 venture capitals were supported to help companies involved in digital activities to reduce their financial risk. There were 3 Contribution Agreements with the European Space Agency (ESA), the European Centre for Medium-Range Weather Forecasts (ECMWF), and the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) to implement Destination Earth. In addition there was a contribution agreement with ENISA to support cybersecurity incident and preparedness in key sectors and a contribution agreement with eu-LISA to support cross-border investigations and prosecutions in the EU by funding an IT platform that supports safe and quick exchanges of information.

Table 1: Distribution of projects and funding across the SOs

	Sum of EU Contribution by Instrument Type							Total Sum of EU Contribution (EUR)	Total Sum of # of Projects
SO	Contribution Agreement (EUR)	Financial Instrument (EUR)	Grant (EUR)	Procurement (EUR)	Programme Support Actions (EUR)	Number of Grants	Number of Procurements		
Cros-s Cutting		26.693.750			51.692.584,24			78.386.334,24	
SO 1	351.108.200		80.664.811,58	164.636.999,51	1.230.358,92	7	9	597.640.370,01	16
SO 2			462.430.902,33	135.702.296,33		56	17	598.133.198,66	73
SO 3	28.000.000		480.479.511,63	2.699.668	15.000.000	168	1	526.179.179,63	169
SO 4			211.171.428,64	3.717.090		50	1	214.888.518,64	51
SO 5	3.608.000		484.571.352,61	248.565.196,88		253	28	736.744.549,49	281

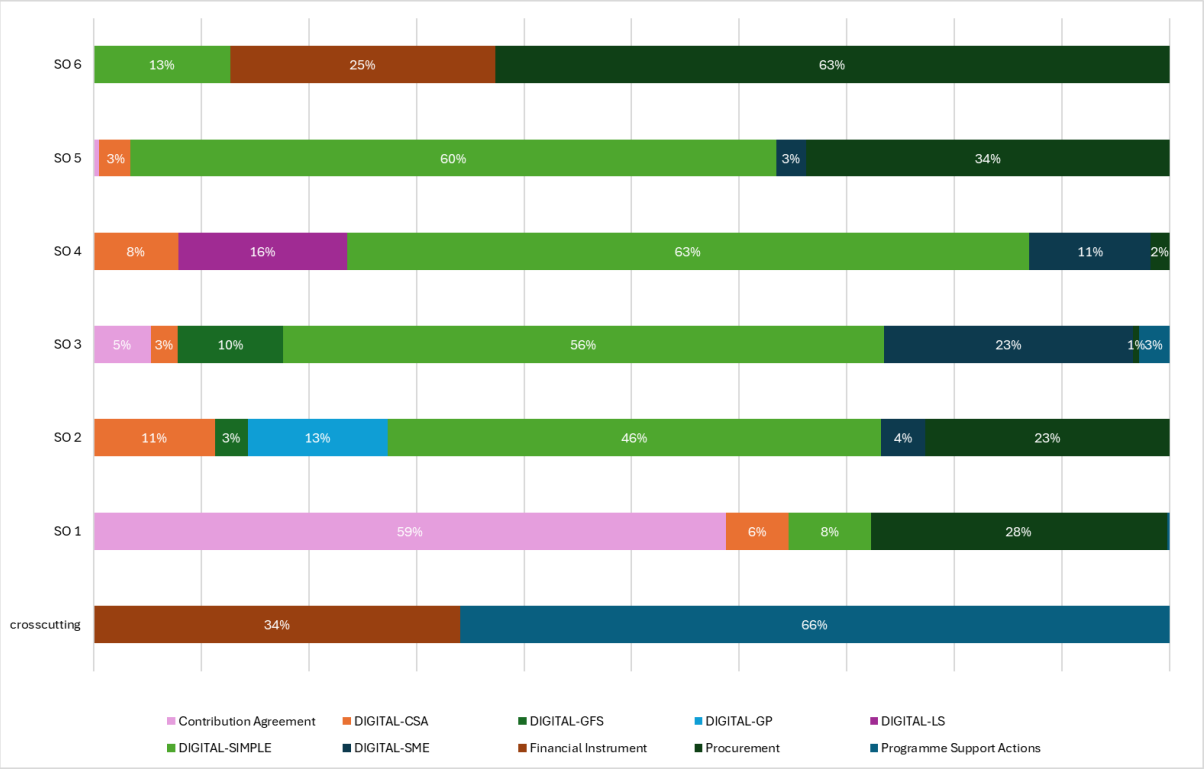
SO 6		65.000.000	33.609.500,70	165.475.310,50		3	8	264.084.811,20	11
Grand Total	382.716.200,00	91.693.750	1.752.927.507,49	720.796.561,22	67.922.943,16	537	64	3.016.056.961,87	601

Distribution across Types of Action

When looking at the funding distribution across types of action, Simple Grants (SIMPLE) represent the highest share of the total Digital Europe EU contribution with 41% (EUR 1 227 m) distributed across all SOs. It is followed by Procurement with a share of 24% (EUR 721 m) distributed across all the SOs. Meanwhile, Contribution Agreements (CAs) are distributed only in SO1, SO3 and SO5 with a share of 13% (EUR 383 m). DIGITAL-SME, DIGITAL-CSA and Financial Instruments have a share of 6% (EUR 191 m), 5% (EUR 154 m) and 3% (EUR 92 m) respectively. These are followed by DIGITAL GP (3%, EUR 78 m) DIGITAL-GFS (2%, EUR 69 m) and Programme Support Actions (2%, EUR 68 m). DIGITAL-LS had the least share of funds (1%, EUR 34 m), directed only to SO4, while DIGITAL-FPA was not used across any SO.

In terms of other instruments, 11 venture capitals were supported to help companies involved in digital activities to reduce their financial risk. There were 3 Contribution Agreements with the European Space Agency (ESA), the European Centre for Medium-Range Weather Forecasts (ECMWF), and the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) to implement Destination Earth. In addition, there was a contribution agreement with ENISA to support cybersecurity incident and preparedness in key sectors and a contribution agreement with eu-LISA to support cross-border investigations and prosecutions in the EU by funding an IT platform that support safe and quick exchanges of information.

Figure 3: Distribution of funding across types of actions over the SOs



Distribution across types of beneficiaries

In terms of stakeholders, there has been a total of 6 388 participants in Digital Europe grants. Higher or Secondary Education Organisations (HES) accounted for the highest number of participants174 with 1 331 participations (21% of the total number), followed by other organisations (1 226 participations, 19%). While SMEs (PRC_SME) account for 1 101 organisations (17%), private for-profit Large Enterprises research organisations (REC) accounted for 987 participants (15%). (PRC_LE) accounted for 13% (842 participations) of the total participations. Public Organisations (PUB) accounted for 12% (792 participants). Finally, A remaining share of 2% (109 participations) corresponds to PRC entities where information on whether they are SMEs or LE was not identified.

In terms of project coordination (excluding procurements), HES organisations (together with OTH organisations) accounted for the highest number of coordinated projects, with 121 projects (20%). PUB and REC follow with 119 and 106 coordinated projects (20% and 17%), respectively. Meanwhile, PRC-SME and PRC-LE accounted for 13 and 9% of the total projects (82 and 57 projects). The remaining 1% (4 projects) are PRCs where information on whether they are SMEs or LE was not identified.

In terms of funding distribution across the beneficiaries, HES were the highest receiver of EU funding with a share of 23% (EUR 397.0 m), closely followed by REC organisations with 22% (EUR 390.1 m). PRC_SME organisations had 17% (EUR 295.0 m), and PRC_LE and PUB had 11% (200.3 m) and 11% (184.4 m) respectively. OTH organisations have attracted 15% (269.0 m) of the funding. The remaining 1% (EUR 17.1 m) corresponds to the PRC entities where information on whether they are SMEs or LE was not identified.

Table 2: Distribution of funding across different types of organisations

Row Labels	Sum of EU Contribution (EUR)	Average of EU Contribution (EUR)	Sum of Participants
HES	397.041.308	€ 298.751,92	1.331
OTH	269.029.544	€ 219.975,10	1.226
PRC	17.131.142	€ 157.166,44	109
PRC_LE	200.262.396	€ 237.841,33	842
PRC_SME	294.987.367	€ 267.926,76	1.101
PUB	184.398.253	€ 233.120,42	792
REC	390.077.497	€ 395.616,12	987
Grand Total	1.752.927.507	274.710	6 388

*NA: ‘Type of Stakeholder’ information not available for ‘Other’ instruments.

Distribution of funding per type of beneficiary across the SOs

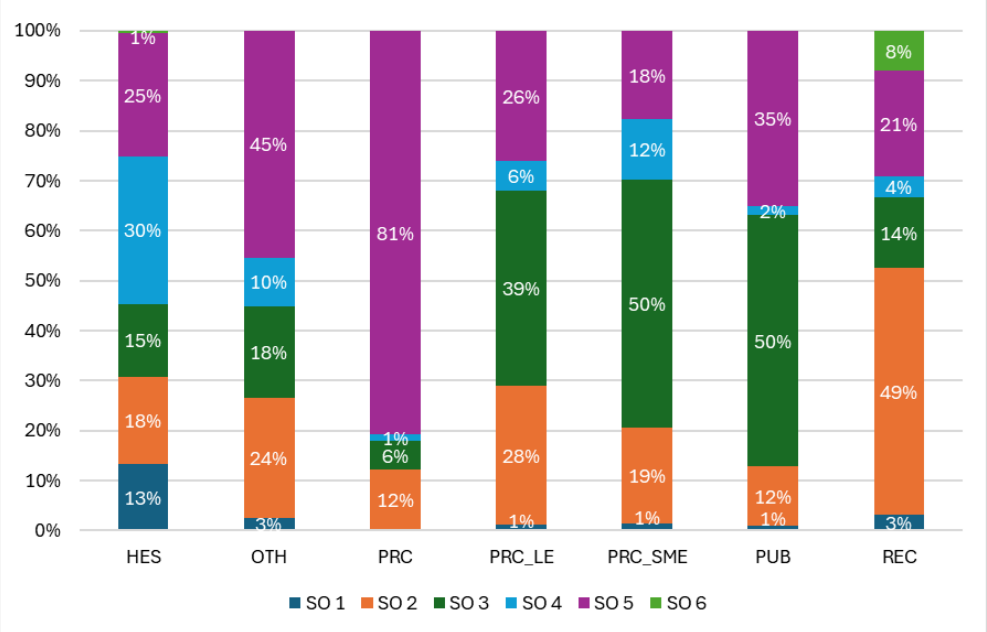
When looking at the distribution of funding per type of beneficiary across the SOs, it is noticeable that all beneficiary groups are participating and receiving EU funds in all SOs for grants. Differences are nevertheless wide. HES organisations received the highest amount of EU funding across all SOs than any other beneficiary group, with a significant share allocated to SO4 (31% of the total funding received by this stakeholder group). REC organisations received the highest amount of EU contribution in an individual SO – in SO2 with EUR 192.3 m (40% of the total funding allocated to the stakeholder group). PRC_SME received the highest contribution in SO3 (EUR 146.5 m or 50% of the total stakeholder group's allocation), while HES received the highest one in SO4 (EUR 117.4 m or 28% of the total stakeholder group's allocation). OTH received 22% of their share on SO5 (EUR 122.1 m). Finally, in SO6, funding was directed to HES and REC, being this last group, the one receiving the highest share (EUR 31.4 m).

Table 3: Distribution of funding across types of beneficiaries over the SOs (grants only)

Type of Stakeholder	SO 1	SO 2	SO 3	SO 4	SO 5	SO 6	Grand Total
HES	52.533.902	69.635.217	57.790.199	117.432.230	97.449.214	2.200.546	397.041.308
OTH	7.052.898	64.466.720	49.205.111	26.210.088	122.094.727	-	269.029.544
PRC		2.108.050	954.144	236.079	13.832.869	-	17.131.142
PRC_LE	2.430.700	55.402.380	78.432.365	11.815.219	52.181.732	-	200.262.396
PRC_SME	4.384.319	56.395.278	146.482.343	35.509.283	52.216.143	-	294.987.367
PUB	1.918.686	21.729.992	92.849.406	3.102.458	64.797.710	-	184.398.253
REC	12.344.306	192.693.265	54.765.944	16.866.071	81.998.957	31.408.955	390.077.497
Grand Total	80.664.812	462.430.902	480.479.512	211.171.429	484.571.353	33.609.501	1.752.927.507

PRC: PRC entities where information on whether they are SMEs or LE was not identified

Figure 4: Distribution of funding across types of beneficiaries over the SOs (grants only)



Evolution of share of funding per type of beneficiary over time

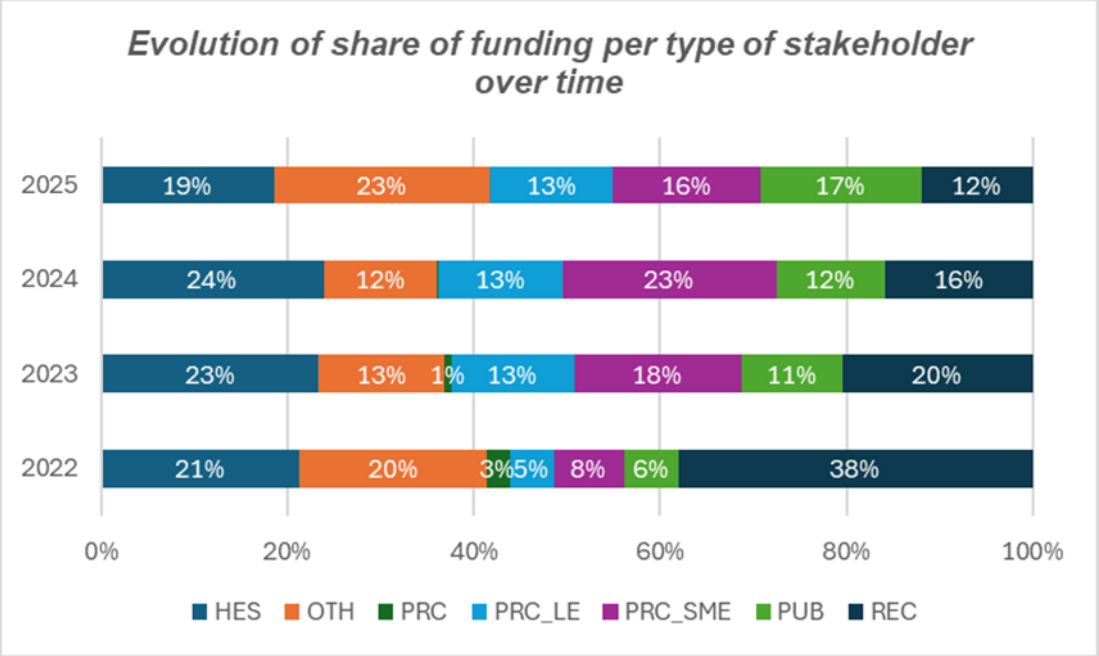
When looking at the evolution of EU funding per type of beneficiary over time, it is evident that at the starting stages of the programme, in 2022, REC received the most Digital Europe funding of that year, this share getting gradually smaller in the subsequent years, reaching 12% in 2025. PRC_SME started receiving funding in 2022 with a share of 8%, increasing up to 23% in 2024 and decreasing again to 16% in 2025. HES started receiving funding in 2022 with a share of 21% and remained around this percentage in the subsequent years. PUB funding started in 2022 with merely 6% of the funds allocated that year but rose steadily to 17% in 2025. The PRC entities for which information on whether they are SMEs or LE is not identified still represented 3% of the funding in 2022 but decreased to 0% from 2024 onwards.

Table 4. Share of EU funding across type of stakeholder over time

Type of Stakeholder	2022	2023	2024	2025	Grant total
HES	21%	23%	24%	19%	23%
OTH	20%	13%	12%	23%	15%
PRC	3%	1%	0%	0%	1%
PRC_LE	5%	13%	13%	13%	11%
PRC_SME	8%	18%	23%	16%	17%
PUB	6%	11%	12%	17%	11%
REC	38%	20%	16%	12%	22%
Grand Total	100%	100%	100%	100%	100%

PRC: PRC entities for which information on whether they are SMEs or LE is not identified.

Figure 5: Evolution of share of funding per type of stakeholder over time



Distribution across countries (grants)

Not surprisingly, Member States have participated by far the most in Digital Europe, receiving EUR 1 687.8 m of the total programme funding across 5 951 participating organisations. Associated Countries have a more prominent role than Non-Associated Third Countries, with an EU contribution of EUR 63.3 m across 392 participations, while the latter received and EU contribution of EUR 1.9 m across 45 participations.

Table 5: Distribution across country groups

	Grants	
Country Group	N	EU Contribution (EUR)
Associated Countries	392	63.260.406
Member States	5.951	1.687.752.837
Non-Associated-Third Countries	45	1.914.265
Grand Total	6.388	1.752.927.507

Distribution of funding across country groups over the SOs

When looking at the distribution of funding across participating countries per SO, overall Member States have a varied distribution over the SOs. SO3 is the one with the highest share of EU funding with 28%. Although individual Member States present also a varied distribution, some of them present a higher concentration of EU funding in specific SOs. Slovakia presents

the highest concentration of EU funding in a specific SO; 68% in SO3. It is followed by Malta, Cyprus, and Croatia which concentrate 60% or more of their funding also in SO3. Germany stands out in SO1 concentrating 16% of the total funding allocated to the country. Similarly, France and Belgium have over 45% of their funding in SO2.

Regarding, SO4, 25% of Portugal's Digital Europe funding and 28% of Ireland's funding is directed towards this SO, while regarding SO5, Hungary holds 47% of its total funding on this SO. SO6 funding has only been distribute to Belgium (7%), Germany (6%), France (4%), Ireland (3%), Austria (1%) and Finland (1%).

In terms of associated countries, 51% of their funding is directed to SO5, distributed mainly between Kosova, Liechtenstein (both 100%), Albania (90%) and Ukraine (80%). SO3 follows with 25% of the total associated countries' funding, specifically for Iceland (45%) and Norway (40%). 22% of Türkiye's funding is for SO4, while for SO1, the totality of the funding for Bosnia & Herzegovina is for this SO. Finally, the only two Non-Associated Third Countries receiving funding are Aruba and the United Kingdom with a 100% share directed to SO2.

Table 6. Funding distribution across participating countries over the SOS

Country Group / Country	SO 1	SO 2	SO 3	SO 4	SO 5	SO 6
Associated Countries	7%	5%	25%	11%	51%	0%
Albania	0%	10%	0%	0%	90%	0%
Bosnia and Herzegovina	100%	0%	0%	0%	0%	0%
Iceland	10%	1%	45%	6%	38%	0%
Kosova	0%	0%	0%	0%	100%	0%
Liechtenstein	0%	0%	0%	0%	100%	0%
Montenegro	35%	0%	0%	0%	65%	0%
North Macedonia	26%	0%	0%	0%	74%	0%
Norway	3%	8%	40%	10%	38%	0%
Serbia	24%	0%	0%	12%	64%	0%
Türkiye	8%	6%	0%	22%	64%	0%
Ukraine	0%	1%	0%	20%	79%	0%
Member States	5%	27%	28%	12%	27%	2%
Austria	3%	28%	28%	11%	29%	1%
Belgium	1%	47%	16%	12%	17%	7%
Bulgaria	5%	12%	34%	10%	39%	0%
Croatia	2%	4%	60%	10%	23%	0%
Cyprus	3%	5%	66%	11%	14%	0%

Czechia	4%	16%	36%	6%	38%	0%
Denmark	3%	35%	16%	20%	25%	0%
Estonia	8%	13%	33%	18%	28%	0%
Finland	4%	40%	14%	22%	20%	1%
France	3%	45%	12%	10%	27%	4%
Germany	16%	32%	14%	8%	24%	6%
Greece	1%	14%	47%	17%	20%	0%
Hungary	4%	10%	28%	11%	47%	0%
Ireland	3%	13%	34%	28%	18%	3%
Italy	2%	23%	30%	16%	29%	0%
Latvia	3%	6%	37%	17%	36%	0%
Lithuania	3%	4%	31%	23%	40%	0%
Luxembourg	9%	23%	44%	3%	21%	0%
Malta	0%	3%	67%	1%	28%	0%
Netherlands	1%	33%	28%	8%	30%	0%
Poland	3%	8%	38%	4%	46%	0%
Portugal	2%	19%	18%	25%	35%	0%
Romania	2%	3%	56%	7%	32%	0%
Slovakia	3%	8%	68%	3%	19%	0%
Slovenia	8%	14%	51%	4%	23%	0%
Spain	3%	36%	17%	15%	29%	0%
Sweden	3%	31%	24%	8%	33%	0%
Non-Associated-Third Countries	0%	100%	0%	0%	0%	0%
Aruba	0%	100%	0%	0%	0%	0%
United Kingdom	0%	100%	0%	0%	0%	0%
Grand Total	20%	20%	18%	8%	24%	9%

Table 7. Funding (EUR)/1000 citizens across Member States

Member States	Digital Europe Funding (EUR)	Population (N)	Digital Europe Funding / 1000 Citizens (EUR)

Austria	48.414.631	9.120.813	5.308
Belgium	157.275.860	11.738.763	13.398
Bulgaria	20.641.792	6.757.689	3.055
Croatia	29.242.234	3.875.325	7.546
Cyprus	36.306.783	1.358.282	26.730
Czechia	34.224.654	10.735.859	3.188
Denmark	39.944.679	5.977.412	6.683
Estonia	15.229.833	1.360.546	11.194
Finland	48.793.868	5.617.310	8.686
France	171.776.509	66.548.530	2.581
Germany	236.695.163	84.552.242	2.799
Greece	85.839.185	10.047.817	8.543
Hungary	26.879.917	9.676.135	2.778
Ireland	52.689.827	5.255.017	10.027
Italy	159.485.733	59.342.867	2.688
Latvia	16.149.910	1.871.871	8.628
Lithuania	18.948.684	2.859.110	6.627
Luxembourg	27.606.316	673.036	41.018
Malta	11.484.226	539.607	21.283
Netherlands	78.769.089	18.228.742	4.321
Poland	58.762.979	38.539.201	1.525
Portugal	37.861.802	10.425.292	3.632
Romania	48.458.828	19.015.088	2.548
Slovakia	37.495.834	5.506.760	6.809
Slovenia	22.106.419	2.118.697	10.434
Spain	118.984.844	47.910.526	2.483
Sweden	47.683.238	10.606.990	4.495

Distribution of participations across participating countries

Table 8. Distribution of participations across country groups

Country Group	SO1	SO2	SO3	SO4	SO5	SO6	Grand Total
Associated Countries	28	22	25	40	277	-	392
Member States	132	1.237	952	738	2.865	27	5.951
Non Associated-Third Countries	-	15	-	13	17	-	45
Grand Total	160	1.274	977	791	3.159	27	6.388

With regards to the number and distribution of participations across participating countries, within Member States, Spain and Italy stand out as the countries with the highest number of participations with 643 and 626 participations, respectively. They are followed by France and Germany with 560 and 472 participations, respectively. Regarding associated countries, Norway has the highest number of participations of this country group (89 participations), while for Non-Associated Third Countries, Switzerland, United Kingdom, and United States reported 20, 10, and 8 participations, respectively.

Figure 6: Number and distribution of participations across countries

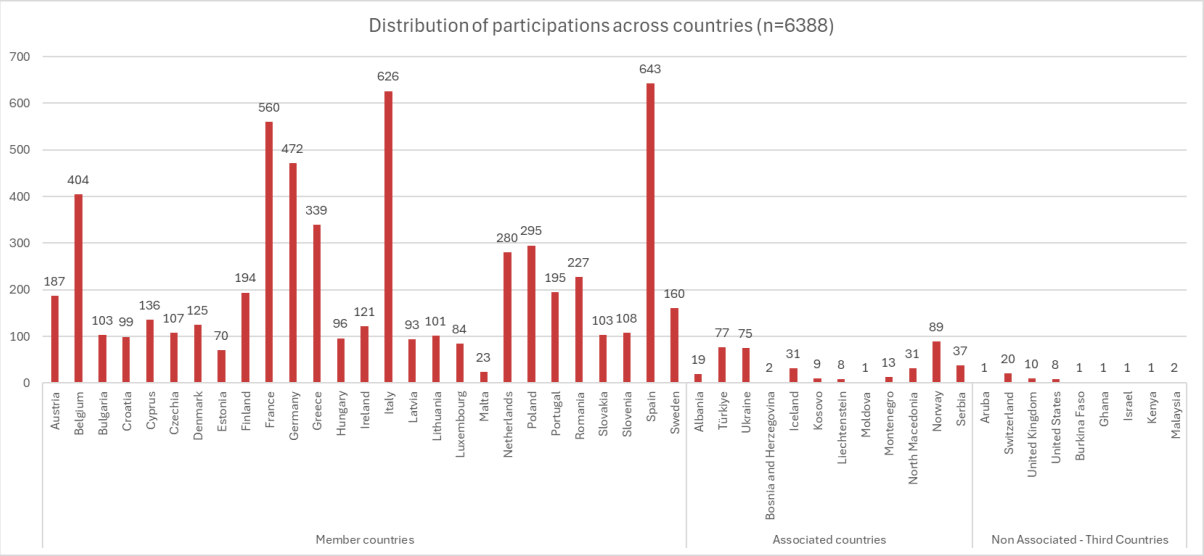


Table 9: Participation per 1 million citizens across Member States

Row Labels	Sum of Participation	Population (N)	Participations per 1000000 citizens
Austria	187	9.120.813	20,50

Belgium	404	11.738.763	34,42
Bulgaria	103	6.757.689	15,24
Croatia	99	3.875.325	25,55
Cyprus	136	1.358.282	100,13
Czechia	107	10.735.859	9,97
Denmark	125	5.977.412	20,91
Estonia	70	1.360.546	51,45
Finland	194	5.617.310	34,54
France	560	66.548.530	8,41
Germany	472	84.552.242	5,58
Greece	339	10.047.817	33,74
Hungary	96	9.676.135	9,92
Ireland	121	5.255.017	23,03
Italy	626	59.342.867	10,55
Latvia	93	1.871.871	49,68
Lithuania	101	2.859.110	35,33
Luxembourg	84	673.036	124,81
Malta	23	539.607	42,62
Netherlands	280	18.228.742	15,36
Poland	295	38.539.201	7,65
Portugal	195	10.425.292	18,70
Romania	227	19.015.088	11,94
Slovakia	103	5.506.760	18,70
Slovenia	108	2.118.697	50,97
Spain	643	47.910.526	13,42
Sweden	160	10.606.990	15,1

Success and oversubscription per SO (grants)

Table 10 below gives an overview of the success rate of proposals and oversubscription rates (i.e. amount of funding requested vs amount granted) per SO. SO6 has the highest success rate among all the SOs (91%), followed by SO1 and SO5 with a 75% and 73% success rates, respectively. SO4 has the lowest success rate (26%) and, not surprisingly, it also has the lowest oversubscription rate (36%), meaning that this SO received the least percentage of funding that was requested by eligible proposals. SO6 has also the highest oversubscription rate (91%), followed by SO1 (86%) and SO5 (83%).

Table 10: Success rates per SO

SO	Successful Proposals (N)	Eligible Proposals (N)	Success Rate (%)	Oversubscription Rate (%)	Av EU Funding (EUR)
EDIH	147	320	46%	47%	2.128.835
SO 1	9	12	75%	86%	9.609.421
SO 2	68	158	43%	66%	8.324.022
SO 3	171	318	54%	58%	2.820.751
SO 4	45	176	26%	36%	4.123.017
SO 5	86	118	73%	83%	1.737.319
SO 6	32	35	91%	91%	3.999.662
Grand Total	558	1.137	49%	58%	3.424.265

Success and oversubscription rates per Types of Action (grants)

When looking at the success and oversubscription rates per types of action (Table 11), proposals under Framework Partnerships and Specific Grants have both an average success rate of 100%, meaning that all the eligible proposals were retained. This could be expected given that these types of action received only one and two eligible proposals, respectively. On the other hand, proposals for budget-based grants have an average success rate of 50%, while proposals for lump sum grant have the lowest success rate (22%).

Table 11: Success rates per types of action

Row Labels	Eligible Proposals	Successful Proposals	Unsuccessful Proposals	Success Rate	Av EU Funding (EUR)	Oversubscription Rate (%)
DIGITAL Action Grant Budget-Based	1.111	551	560	50%	3.414.982	59%

DIGITAL Framework Partnership	1	1	0	100%	-	NA
DIGITAL Lump Sum Grant	23	5	19	22%	5.695.818	19%
DIGITAL Specific Grant	2	2	0	100%	3.150.734	100%
Grand Total	1.137	558	579	49%	3.424.265	58%

Success rates per Type of Applicants (grants)

If we look at Table 12, we see that there are some notable differences of the success rates between stakeholder groups over the SOs. Overall, Public Organisations (PUB) and Research Organisations (REC) have the highest success rates across all SOs; with PUB having a particularly higher rates for SO1 (100%) and SO5 (91%), and REC for SO5 (98%) and SO6 (94%). Other (OTH) type of organisations has higher success rates for SO5 (90%) and SO6 (89%), and same is the case for Higher or Secondary Education Institutions (HES) for SO1 (89%) and SO5 (88%). Private For-Profit Organisations (PRC) follow the same pattern with higher rates in SO5 (88%) and SO1 (86%). Finally, it is noteworthy that SO4 has the lowest success rates across all the stakeholder groups, being particularly low in PUB (30%).

Table 12: Success rates over the SOs per Type of Applicants

SO	HES	OTH	PRC (SME)	PRC (LE)	PRC (Unknown)	PUB	REC	Grand Total
EDIH	49%	49%	37%	43%	38%	46%	51%	46%
SO 1	89%	83%	80%	89%	100%	100%	88%	88%
SO 2	62%	66%	55%	64%	70%	73%	75%	66%
SO 3	73%	54%	60%	51%	69%	76%	79%	67%
SO 4	37%	30%	32%	29%	38%	30%	34%	33%
SO 5	88%	90%	81%	92%	91%	91%	98%	90%
SO 6	87%	89%	55%	100%	80%	83%	94%	89%
Grand Total	56%	55%	51%	61%	54%	65%	65%	57%

Overall success rate is different given that we count all the applicants participating in proposals and not unique proposals.

Success rates per Geography of Applicants (grants)

Lastly, Table 13 indicates the success rates per SO over the geography of applicants. All registered countries are Member States, from which France has the highest success rate (76%) – with particularly higher rates for SO5 (96%) and SO1 (92%) – followed by Denmark and Latvia (each with a success rate of 72%). SO1 presents success rates of 100% for several countries including Bulgaria, Croatia, and Cyprus, and so is the case for SO6 for countries including Austria, Czechia, Finland, and Hungary. In congruence with the previous analyses, all the countries report the lowest success rate for SO4, with Latvia being the lowest of all (15%).

Table 13: Success rates per SO over the geography of applicants

Country	EDIH	SO 1	SO 2	SO 3	SO 4	SO 5	SO 6	Total
Austria	40%	91%	66%	73%	19%	85%	100%	56%
Belgium	56%	83%	67%	72%	39%	93%	94%	63%
Bulgaria	31%	100%	45%	47%	20%	48%	100%	38%
Croatia	73%	100%	37%	71%	18%	65%	100%	55%
Cyprus	46%	100%	50%	93%	44%	67%	NA	65%
Czechia	81%	80%	64%	64%	32%	75%	100%	66%
Denmark	65%	100%	76%	84%	50%	100%	100%	72%
Estonia	100%	100%	61%	48%	20%	95%	100%	57%
Finland	71%	80%	81%	71%	35%	100%	100%	67%
France	84%	92%	82%	62%	39%	96%	86%	76%
Germany	50%	86%	78%	67%	43%	90%	85%	66%
Greece	24%	100%	46%	85%	27%	95%	100%	50%
Hungary	76%	100%	54%	59%	30%	90%	100%	63%
Ireland	37%	75%	57%	86%	50%	85%	86%	61%
Italy	22%	87%	64%	60%	32%	93%	71%	39%
Latvia	100%	100%	75%	42%	15%	100%	100%	72%
Lithuania	100%	100%	62%	69%	34%	82%	100%	71%
Luxembourg	89%	100%	59%	76%	33%	81%	NA	67%
Malta	100%	NA	20%	43%	40%	57%	100%	51%
Netherlands	97%	33%	66%	64%	25%	98%	100%	69%
Poland	54%	89%	58%	53%	20%	100%	69%	54%
Portugal	18%	100%	68%	76%	48%	96%	100%	43%

Romania	58%	100%	46%	60%	26%	100%	75%	54%
Slovakia	51%	100%	35%	71%	28%	88%	100%	57%
Slovenia	62%	93%	53%	81%	37%	91%	100%	67%
Spain	53%	80%	68%	53%	32%	94%	70%	58%
Sweden	43%	57%	72%	48%	43%	91%	100%	58%
Grand Total	46%	88%	66%	67%	33%	90%	89%	57%

Overall success rate is different given that we count all the applicants participating in proposals and not unique proposals.

Time to Grant per SO over time (based on Signature Year)

The time-to-grant (TTG) is calculated subtracting the project signature date and the call deadline date. Digital Europe commits itself to a 9-month maximum TTG. On average, all SOs are within this maximum commitment on average, demonstrating that Digital Europe is reaching is TTG target. The only exception was EDIH in 2023 when its TTG was 11 month (341 days). Over time, EDIH and SO6 have the highest TTG of 9 months (272 days and 271, respectively), while SO1 has the lowest TTG of 6 months (184 days). The rest of SOs (SO2, SO3, SO4 and SO5) have on average a TTG of 8 months (226 – 249 days).

Table 14: Time-To-Grant (TTG) per SO over time

SO	2022		2023		2024		Total Av TTG (Days)	Total Av TTG (Months)
	Av TTG (Days)	Av TTG (Months)	Av TTG (Days)	Av TTG (Months)	Av TTG (Days)	Av TTG (Months)		
EDIH	264	9	341	11	216	7	272	9
SO 1	175	6	237	8	177	6	184	6
SO 2	223	7	249	8	270	9	242	8
SO 3	244	8	239	8	243	8	241	8
SO 4	228	8	222	7	227	8	226	8
SO 5	240	8	261	9	232	8	249	8
SO 6					271	9	271	9
Grand Total	246	8	262	9	243	8	250	8

Table 15: Number of projects TTG > 9 months

SO	2022		2023		2024		Grand Total	
	N	% of Total	N	% of Total	N	% of Total	N	% of Total
EDIH	82	64%	12	55%		0%	94	59%
SO 1		0%	1	50%		0%	1	17%
SO 2	6	22%	3	43%	7	44%	16	32%
SO 3	22	49%	26	30%	5	29%	53	36%
SO 4	4	18%	5	38%	1	8%	10	21%
SO 5	14	36%	5	38%	11	28%	30	33%
SO 6					1	100%	1	100%
Grand Total	128	48%	52	36%	25	26%	205	41%

Annex VII. Rhomolo analysis

RHOMOLO assessment of the macroeconomic impact of the Digital Europe Programme (2021-2025 data) in collaboration with DG CNECT

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Introduction

The Digital Europe Programme (from now on: DIGITAL) is a cornerstone of the EU's commitment to driving forward the digital transformation of its member states, focusing on strategic areas vital for technological advancement and economic resilience. DIGITAL has a total budget of over €8.1 billion, which underscores the EU's commitment to this sector. Supercomputing initiatives within the programme aim to elevate Europe's high-performance computing infrastructure, providing the computational might needed for advanced scientific research, weather forecasting, and complex data analyses. Artificial Intelligence is another pillar, where the programme not only fosters the adoption of AI across various industries but also champions its ethical application, ensuring that European values are embedded in the digital future. Cybersecurity receives a significant focus, as the programme works to fortify the EU's defences against cyber threats, which are critical in safeguarding the integrity and reliability of digital services. Recognizing the importance of human capital, the programme invests in advanced digital skills, preparing the workforce for the demands of a rapidly evolving job market. It also encourages the widespread use of digital technologies to enhance productivity and innovation across all sectors of the economy and society. Additionally, the recent prioritization of semiconductors addresses the urgent need to bolster the EU's production and technological sovereignty in this essential area, aligning with the Chips Act and the Chips for Europe Initiative to mitigate the impact of global shortages and supply chain dependencies.

DIGITAL also aims to provide support through a network of European Digital Innovation Hubs (EDIH). EDIHs, which serve as multipliers in spreading digital innovations to businesses (especially SMEs) and public administrations. The programme aligns with the EU's broader digital policy objectives, including the 2030 Digital Compass and the Path to the Digital Decade. These frameworks set out the EU's vision and targets for digital transformation by 2030. DIGITAL does not operate in a vacuum; it works in concert with other EU funding mechanisms such as Horizon Europe for research and innovation, the Connecting Europe Facility for digital infrastructure, the Recovery and Resilience Facility for post-pandemic recovery, and Structural Funds aimed at regional development. DIGITAL is part of the EU's long-term budget for the period 2021-2027, which provides a structured financial plan for achieving the EU's long-term objectives.

This document presents an attempt at quantifying the macroeconomic impact of the investment under the DIGITAL programme with data on actual disbursements from 2021 to 2025. This is done with the Computable General Equilibrium (CGE) spatial dynamic model RHOMOLO (built and managed by the European Commission’s Joint Research Centre – JRC). RHOMOLO is adept at evaluating the influence of EU policies on diverse regions and sectors by taking into account the intricate web of interconnections within European

economies. For the mathematical description of the RHOMOLO model please see Lecca et al. (2018), and for an overview of the underlying data used to calibrate it please see García-Rodríguez et al. (2025).

When assessing the impact of DIGITAL funding through the lens of the RHOMOLO model, it is important to acknowledge the model's proficiency in capturing spatial spillovers and interregional linkages, which are vital components of the EU's integrated economic landscape. Crucially, the results depend on the assumptions made to model the impact of the DIGITAL investment, in particular those related to the geographic spreading of the effects (spillovers).

DIGITAL fund data and modelling simulation strategy

The total investment in the EU27 + other countries is equal to almost EUR 5,162 million between 2021 and 2025. This includes funds from DIGITAL (EU-funded) and in instances where funding does not cover the entire costs of a project, includes funds from Member States or privately invested capital from beneficiaries, to fulfil the difference. This analysis focuses on the EU27 exclusively, and therefore the total amount is EUR 5,037 million.[175] Table 26 shows the investment data by country and spending category (source: DG CNECT).[176]

These investments are modelled through four specific shocks in the model, meaning that different economic channels are activated by the different types of spending. The shocks are the following: public investment, private investment, training in digital skills for workers, and technical assistance (government current expenditure).[177] Table 27 shows the breakdown of the shocks used to simulate the impact of the DIGITAL funds in the RHOMOLO model.

RHOMOLO is a spatial CGE model, and therefore it is characterised by interregional linkages which favour the existence of spillovers related to trade flows and mobility of factors of production. However, given the nature of the investment under analysis, it is reasonable to assume that there are additional spillovers that need to be modelled. The reach of digital technologies extends well beyond the information and communication technology (ICT) sector, permeating a wide range of industries (Auboin et al., 2021). Although there is little evidence on the diffusion of digital technologies, we can draw on evidence on the diffusion of ICT, which suggests that as a country improves its ICT capabilities, the productivity of workers in neighbouring countries also increases (Shahnazi, 2021). We refer to these additional spillovers arising from the intrinsic digital nature of the policy as digital spillovers, to distinguish them from the *spatial* spillovers endogenously generated in the model.

Table 26 DIGITAL investment per category and country (millions of euros)

Country	Public Investment	Private investment/ Subsidies	Digital skills for workers	Technical Assistance	Total
AL	0.3	0.0	0.0	1.1	1.3
AT	92.5	32.9	16.7	4.9	147.0
BA	0.0	0.0	0.0	0.9	0.9
BE	207.8	58.7	28.9	536.9	832.2

[175] The difference is due to the fact that AL, BA, BF, GH, IL, IS, KE, LI, ME, MK, MY, NO, RS, TR, UA, UK and US are not included in the simulations because they are not part of the EU, and also the region of La Réunion (FRY4) is excluded from the analysis because it is not included in the RHOMOLO model.
[176] Tables A1 and A2 in the Appendix show the EU-funded and MS/privately-funded investment, respectively.
[177] For more details on the exact definition of these shocks, please see Crucitti et al. (2023 *Regional Studies*).

BF	0.0	0.3	0.0	0.0	0.3
BG	25.0	21.4	4.8	2.2	53.3
CY	36.6	5.2	10.9	15.0	67.6
CZ	58.6	14.8	6.0	8.9	88.4
DE	913.6	145.0	49.4	57.4	1165.4
DK	67.3	7.3	17.2	3.2	94.9
EE	16.4	6.0	5.4	7.2	34.9
EL	94.7	19.6	33.2	8.4	156.0
ES	145.3	66.9	29.4	33.0	274.6
FI	81.4	12.9	16.0	12.7	123.0
FR	297.5	97.9	40.3	33.5	469.1
GH	0.0	0.3	0.0	0.0	0.3
HR	21.5	11.0	5.1	9.6	47.2
HU	29.8	11.2	4.2	3.4	48.5
IE	46.3	12.1	29.8	8.8	96.9
IL	0.0	0.5	0.0	0.0	0.5
IS	13.6	4.2	1.2	0.1	19.2
IT	245.3	91.1	45.2	24.0	405.6
KE	0.0	0.0	0.9	0.0	0.9
LI	3.3	0.0	0.0	0.0	3.3
LT	18.1	14.2	9.3	2.7	44.2
LU	62.9	0.0	1.7	33.0	97.6
LV	18.0	6.4	4.9	6.8	36.2
ME	0.0	0.0	0.0	1.1	1.1
MK	1.0	1.1	0.0	2.5	4.6
MT	13.4	5.3	0.2	3.7	22.5
MY	0.0	0.0	0.0	0.1	0.1
NL	112.1	60.2	10.4	46.2	228.9
NO	27.1	12.6	7.7	8.5	55.8
PL	60.4	56.8	4.1	4.5	125.7
PT	48.3	16.9	19.1	3.3	87.6
RO	43.4	25.4	8.3	7.6	84.6
RS	0.0	0.0	0.2	4.5	4.7
SE	75.7	18.2	6.8	17.4	118.0
SI	17.6	10.6	1.5	2.9	32.5

SK	45.7	12.0	1.0	7.0	65.8
TR	0.0	0.0	2.1	2.0	4.2
UA	6.6	1.0	2.3	4.0	13.9
UK	1.3	0.0	0.0	0.2	1.5
US	0.1	0.9	0.0	0.0	1.0
Total	2,948.5	860.9	424.2	929.2	5,161.8

Source: DG CNECT.

Table 27 Modelling shocks breakdown

Description of the intervention	**RHOMOLO Model Shock**	**Raw Amount (EUR million)**	**Simulated Amount (EUR million)**	**Demand-side effects**	**Supply-side effects**
Public investment	Public Investment	2948	2889	Increase in public investment	Temporary increase in public capital stock
Private investment	Total Factor Productivity	861	835	Reduction in the risk premium stimulating private investments	Temporary increase in private capital stock; increase in total factor productivity
Digital skills for workers	Labour Productivity	424	409	Increase in government consumption	Increase in labour productivity
Technical Assistance	Public Current Expenditure	929	904	Increase in government consumption	Increase in government consumption
	Total	5,162	5,037		

Source: DG CNECT (data) and JRC RHOMOLO (modelling assumptions).

General assumptions regarding digital spillovers include the concept that digital services and products created in one region have the potential to be consumed in other regions with minimal additional costs. This facilitates widespread benefits throughout the EU market. Additionally, innovations that emerge in one region can be swiftly adopted by firms in other regions, a process that is increasingly common in a market characterised by digital interconnectivity. Investments in General Purpose Technology (GPT) infrastructure are also assumed to generate network effects, meaning that the value of the investment grows as more users join the network (Syverson, 2011), potentially delivering advantages to multiple regions. Furthermore, digital information, as a public good, is non-competitive and can be reproduced at a very low marginal cost (Brynjolfsson and McAfee, 2014), facilitating its widespread global use at minimal expense.

The inclusion of digital spillovers in this RHOMOLO analysis reflects the growing body of evidence emphasizing the far-reaching effects of digital investments. As Ren and Lin (2024)

demonstrate by studying the digital spillover effect of the Internet industry, digital spillovers are multidimensional, enhancing production, practices, internal and external competitiveness, and supply chain efficiency. These findings suggest that the diffusion of digital innovations is not confined to the regions where investments occur; rather, these technologies permeate interconnected industries and regions, enhancing overall economic productivity.

The role of spatial spillovers is particularly salient in the context of digital technologies. Zou et al. (2024) identify strong spatial spillover effects of the digital economy on urban total factor productivity, revealing that digital advancements in one city can significantly enhance the productivity of neighbouring cities. Such evidence justifies the modelling of digital spillovers in this RHOMOLO analysis, ensuring that the impact of digital investments extends beyond regional boundaries, as observed in EU-wide markets.

Furthermore, digital knowledge spillovers and regional skill endowments are pivotal in fostering entrepreneurship and innovation. Colombelli et al. (2024) show that localized digital knowledge and skill endowments drive the creation of innovative digital start-ups. These findings align with the assumption that digital investments generate additional spillovers that stimulate regional entrepreneurial ecosystems, reinforcing the rationale for modelling supply-side digital spillovers.

For this reason, we present the results of three different scenarios:

1. No digital spillover effect;

2. 0.5% supply-side digital spillover effect;

3. 1% supply-side digital spillover effect.

In the second and third scenarios, we model an additional supply-side digital spillover that reflects the impact of the investments in all regions independently of the investments directly targeted at the regions (the spillover effect is net of the direct supply-side impact of the investment itself). Due to the lack of evidence on the exact magnitude of the supply-side digital spillovers of funds such as those of the DIGITAL programme, we assume either a 0.5% or 1% digital spillover in scenarios 2 and 3 respectively. Recognising the limitations of these assumptions, we offer a range of potential impacts across three scenarios, as there is no reliable evidence on the size of these spillovers and the exact mechanism that governs them.

Therefore, the results obtained under the digital spillover scenarios must be treated with caution, as the impact of the policy increases exponentially as we consider higher digital spillovers. The scenario without digital spillovers serves as a baseline, in which the funds are modelled without taking into account the specific digital characteristics of the intervention. The choice of 0.5% and 1% digital spillovers is simply to illustrate how this baseline assessment changes when digital spillovers are introduced.

The shock-specific assumptions regarding the digital spillover effects are as follows.

For public investment, it is assumed that public spending on digital infrastructure or services in one region will boost productivity (via increased public capital stock – freely available to all firms, although subject to congestion) within that region, resulting in increased output and income. There are also anticipated digital spillover effects to other regions due to enhanced connectivity and efficiency improvements. These effects are represented as increased efficiency of public capital (essentially rising firm productivity).

In the case of private investment, it is assumed that private investment undertaken due to the DIGITAL programme drives innovation and productivity enhancements in the region where

the investment occurs. Digital spillover effects to other regions might occur as digital investment facilitates better market access or the spread of innovations through supply chains increasing total factor productivity.

Lastly, for digital skills training for workers, it's considered that enhancing the skills of workers in a particular region could improve the overall human capital stock and boost labour productivity. Digital spillovers in this context might involve the transfer of knowledge and best practices across regions, which could happen as workers relocate or engage in remote collaboration.

Technical assistance, modelled as a shock increasing government current expenditure, has no supply-side digital spillovers since this is a pure demand shock.[178]

Finally, the policy is assumed to be financed by a lump sum contribution that reduces the disposable income of households. The contribution to EU-funded investment is modelled to mimic the functioning of the EU budget, so that regions pay in proportion to their GDP weight in the EU, irrespective of the funds received. This means, for example, that richer regions pay more than poorer regions even though most of the interventions take place in the poorer regions. On the other hand, the contribution to Member State, and privately funded investment is modelled in such a way that regional investment is fully covered by contributions in the specific region. Thus, in this case, the total amount needed to finance an intervention in a poor region has to be financed by a lump sum contribution taken from the income of households in that region (hence the regional macroeconomic impact of the policy should be expected to be lower).

a. Results

The table below shows the GDP impact at the EU level in million of EUR, in the three scenarios explained above. The table contains both the year-specific impact, and the cumulated one (notice that they are the same in the first year of the analysis, 2021).

Table 28 GDP impact (in million EUR) over 10 years – three scenarios

T	No digital spillover		0.5% digital spillover		1% digital spillover	
	Year-specific	Cumulated	Year-specific	Cumulated	Year-specific	Cumulated
2021	73	73	78	78	84	84
2022	373	446	527	605	680	765
2023	1406	1852	1952	2557	2496	3261
2024	1567	3419	2293	4850	3018	6279
2025	1402	4821	2206	7056	3010	9288
2026	1334	6154	2196	9252	3056	12345
2027	1307	7461	2219	11471	3129	15474
2028	1288	8750	2245	13715	3199	18673
2029	1272	10022	2267	15982	3260	21932

[178] Note that some of the EU regions do not receive any direct investment according to the data provided by DG CNECT. They are the following: BG31 BG32 CZ03 DE24 DE26 DE50 DE72 DE73 DE80 DE93 DEB2 DEE0 EL42 EL65 ES63 ES64 FI20 FRI2 FRI3 HU31 PL61 and PT20. In scenarios 2 and 3, these regions are modelled as receiving uniquely the supply-side spillover effects.

2030	1254	11276	2283	18265	3310	25242

Source: RHOMOLO simulations.

The table below shows the cumulated GDP multiplier, calculated as the cumulated GDP impact divided by the cumulated DIGITAL investment in each year. This can be interpreted as the amount of EUR generated by one EUR invested in the fund. For example, this means in 2026, according to the no spillover scenario, each euro invested in the policy will have generated 1.22 euros of GDP. Over time, the return on investment (measured as the cumulative GDP impact) increases, and it is 2.24 by 2030 according to the same scenario. When digital spillovers are simulated (scenarios 2 and 3), the multiplier increases: it is higher than 3.6 in 2030 in the 0.5% spillover scenario, and higher than 5 in the same year in the 1% spillover scenario.

The results of the scenario without digital spillovers and the scenario with spillovers limited to 0.5% are closer to previous analyses dealing with different funds, but of a comparable nature. For example, Crucitti et al. (2024), using the same model used here to assess the impact of Horizon 2020 investments, find a nine-year GDP multiplier of 2.46, between the 1.99 of the first scenario and the 3.17 of the second. Of course, the funds analysed are different, but the range of macroeconomic impacts is compatible with the results presented here. On the other hand, the 9-year multiplier of 4.35 in the case of the 1% digital spillover seems high compared to previous analyses.

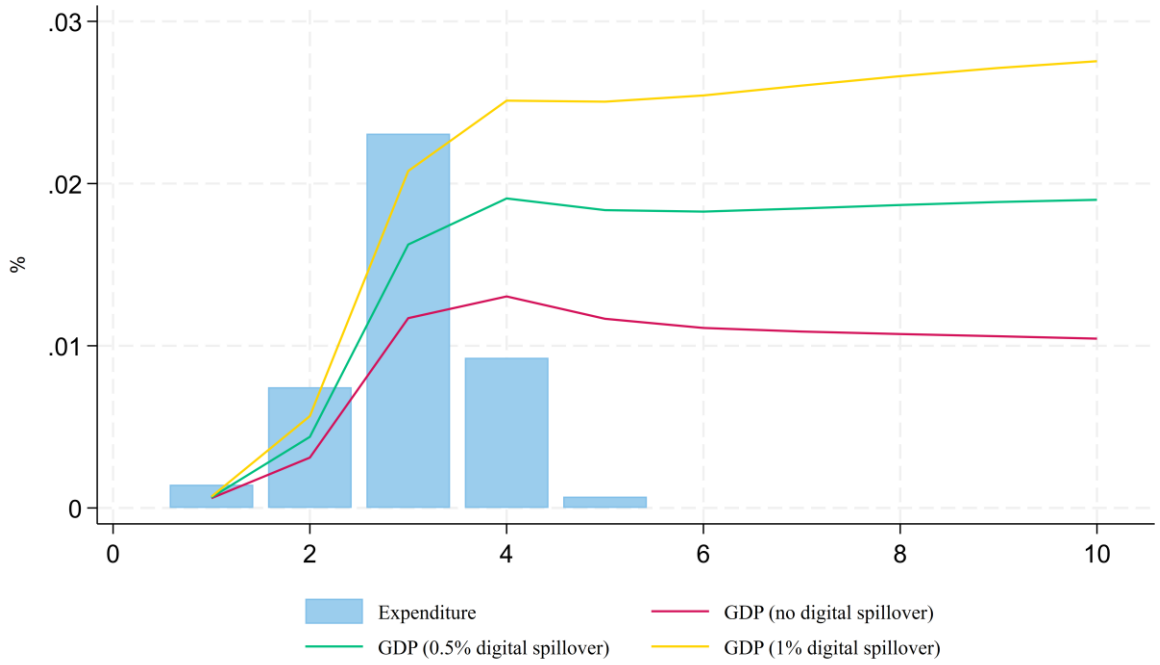
Table 29 EU cumulated GDP multipliers in 10 years – three scenarios

T	No digital spillover	0.5% digital spillover	1% digital spillover
2021	0.42	0.45	0.49
2022	0.42	0.57	0.72
2023	0.48	0.67	0.85
2024	0.69	0.98	1.27
2025	0.96	1.40	1.84
2026	1.22	1.84	2.45
2027	1.48	2.28	3.07
2028	1.74	2.72	3.71
2029	1.99	3.17	4.35
2030	2.24	3.63	5.01

Source: RHOMOLO simulations.

In the figure below, we can observe the GDP impact of the funds on EU GDP in the three different scenarios. The impact in this case is expressed as % difference from the base year value of EU GDP. The figure shows that the larger the supply-side digital spillover assumed in the simulation, the larger and more sustained in time is the impact of the DIGITAL fund on GDP.

Figure 13 EU-wide GDP Impact (% Deviations from baseline) and size of interventions (% of GDP)



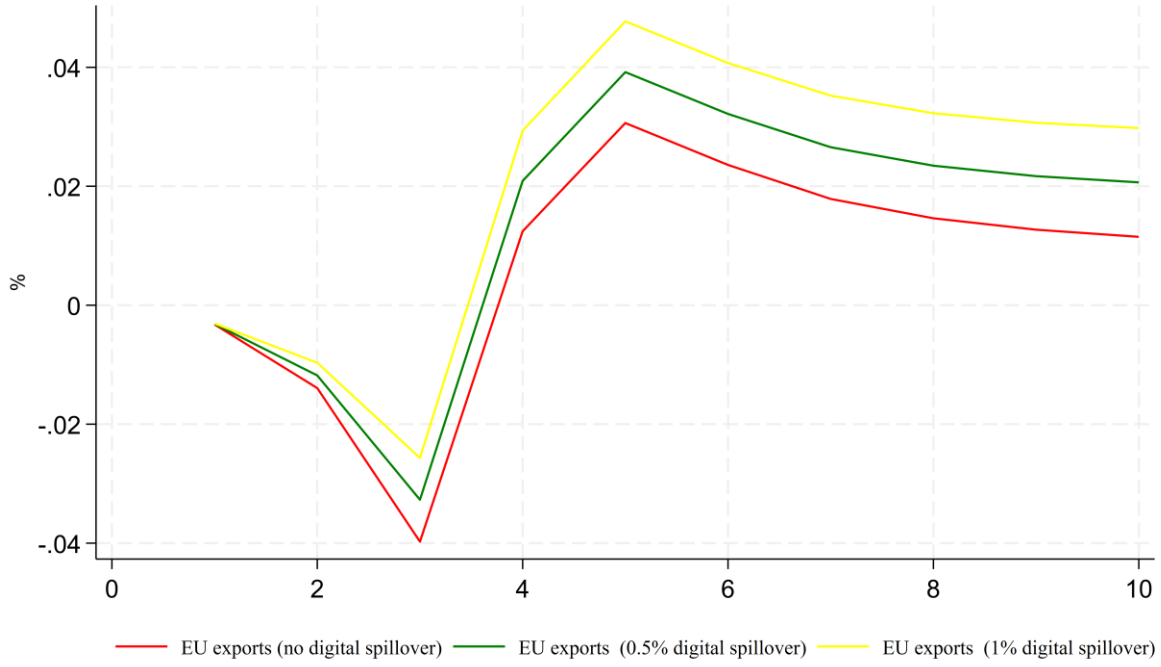
Source: RHOMOLO simulations.

In the next figure (below), we can observe the impact of the funds on EU exports in the three different scenarios. The impact in this case is expressed as % difference from the base year value of EU exports. The figure shows that after an initial decrease in exports during the implementation phase of the policy, EU competitiveness improves thanks to the policy, with lower prices boosting exports to the rest of the world. These effects are sustained over time, thanks to the supply-side effects of the policy intervention.

The initial decline in exports reflects the temporary loss of competitiveness caused by the increase in prices caused by the demand shock. At the same time, the rise in household consumption and investment lead to an increase in imports. This changes when the demand injection ends and the supply-side effects of the policy take hold, improving competitiveness and eventually reducing prices. Productivity gains enhance output efficiency, reduce production costs, and allow exporters to regain their global competitiveness. The robust rebound in exports reflects the economy's capacity to adjust, leveraging the longer-term benefits of the policy.

Digital spillovers further amplify these dynamics. Scenarios with higher digital spillover effects exhibit stronger rebounds compared to the no-spillover case. These spillovers likely facilitate greater technological adoption, streamline production processes, and lower costs.

Figure 14 EU Exports Impact (% Deviations from baseline)



Source: RHOMOLO simulations.

b. Conclusions

The presented results are a modelling assessment of the potential macroeconomic impact of the DIGITAL fund. They indicate that the policy can positively affect the EU economies, with substantial impacts on GDP generating high returns on investment (measured with cumulative GDP multipliers). Also, the modelling simulations indicate that the policy can improve EU competitiveness, measured with EU exports to the rest of the world.

As with any modelling analysis, limitations should be acknowledged. For instance, the lack of evidence measuring the exact spreading and magnitude of digital spillovers related to the investment under analysis makes it hard to construct a scenario capable of an exact estimation of the impact, and this is why we rely on three scenarios demonstrating the uncertainty of the analysis. Furthermore, the positive economic impacts of the funds could be larger if we consider their complementarities with other EU policies. The Digital Europe Programme does not address challenges in isolation, it complements the funding available through other EU programmes, such as the Horizon Europe (for research and innovation) and the Connecting Europe Facility (for digital infrastructure), the Recovery and Resilience Facility and the Structural funds, to name a few.

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Appendix

Table A1. DIGITAL investment EU funded per category and country (millions of euros)

Country	Public Investment	Private investment/ Subsidies	Digital skills for workers	Technical Assistance	Total
AL	0.1	0.0	0.0	0.5	0.7
AT	55.2	14.1	8.4	2.9	80.5
BA	0.0	0.0	0.0	0.5	0.5
BE	139.7	45.0	19.6	265.0	469.3
BF	0.0	0.1	0.0	0.0	0.1
BG	12.9	11.4	2.9	1.2	28.3
CY	19.7	2.7	7.5	8.2	38.0
CZ	30.0	7.4	3.0	4.6	45.0
DE	641.1	74.5	26.8	41.4	783.8
DK	35.9	3.3	8.8	1.9	49.9
EE	8.9	3.0	2.7	5.6	20.3
EL	52.5	9.3	22.2	5.7	89.6
ES	79.3	46.6	17.5	19.9	163.4
FI	45.9	6.5	8.8	9.0	70.1
FR	183.5	41.9	22.3	28.1	275.8
GH	0.0	0.1	0.0	0.0	0.1
HR	11.6	5.3	2.7	5.3	24.9
HU	14.9	5.7	2.5	2.0	25.1
IE	26.5	8.5	16.6	5.7	57.3
IL	0.0	0.1	0.0	0.0	0.1
IS	7.5	2.1	0.6	0.1	10.3
IT	178.5	39.9	25.3	21.1	264.8
KE	0.0	0.0	0.5	0.0	0.5
LI	1.5	0.0	0.0	0.0	1.5
LT	9.8	6.5	4.8	1.4	22.4
LU	42.1	0.0	1.2	17.9	61.3
LV	9.5	3.5	2.6	5.4	21.0
ME	0.0	0.0	0.0	0.6	0.6
MK	0.7	0.5	0.0	1.4	2.7
MT	6.7	2.6	0.2	1.9	11.5

MY	0.0	0.0	0.0	0.1	0.1
NL	53.4	27.9	5.8	28.7	115.8
NO	15.5	6.1	4.4	7.2	33.3
PL	34.8	29.5	2.2	2.6	69.1
PT	23.4	8.5	9.6	1.7	43.3
RO	23.2	12.8	5.0	5.4	46.4
RS	0.0	0.0	0.2	2.4	2.6
SE	39.8	8.5	3.9	8.8	60.9
SI	10.0	5.5	0.9	1.7	18.1
SK	25.9	6.0	0.6	3.5	36.0
TR	0.0	0.0	1.3	1.3	2.5
UA	3.1	0.5	1.3	2.0	6.8
UK	1.0	0.0	0.0	0.2	1.3
US	0.1	0.4	0.0	0.0	0.5
Total	1844.2	446.3	242.7	522.9	3056.1

Source: DG CNECT.

Table A2. DIGITAL investment MS/Privately funded per category and country (millions of euros)

Country	Public Investment	Private investment/ Subsidies	Digital skills for workers	Technical Assistance	Total
AL	0.1	0.0	0.0	0.5	0.7
AT	37.3	18.9	8.3	2.0	66.5
BA	0.0	0.0	0.0	0.4	0.4
BE	68.1	13.6	9.4	271.8	362.9
BF	0.0	0.1	0.0	0.0	0.1
BG	12.1	10.1	1.9	0.9	25.0
CY	16.8	2.5	3.4	6.8	29.6
CZ	28.6	7.5	3.0	4.3	43.4
DE	272.5	70.5	22.6	16.0	381.6
DK	31.4	4.0	8.4	1.3	45.0
EE	7.4	3.0	2.7	1.5	14.6
EL	42.2	10.4	11.0	2.7	66.4
ES	65.9	20.3	11.9	13.1	111.2
FI	35.5	6.4	7.2	3.8	52.9
FR	114.0	56.0	18.0	5.4	193.3

GH	0.0	0.1	0.0	0.0	0.1
HR	9.9	5.7	2.4	4.3	22.3
HU	14.9	5.5	1.7	1.3	23.4
IE	19.8	3.6	13.2	3.1	39.6
IL	0.0	0.4	0.0	0.0	0.4
IS	6.1	2.1	0.6	0.0	8.8
IT	66.8	51.2	19.9	2.9	140.8
KE	0.0	0.0	0.5	0.0	0.5
LI	1.8	0.0	0.0	0.0	1.8
LT	8.3	7.7	4.5	1.3	21.8
LU	20.8	0.0	0.4	15.1	36.3
LV	8.5	2.9	2.3	1.4	15.1
ME	0.0	0.0	0.0	0.4	0.4
MK	0.2	0.5	0.0	1.1	1.9
MT	6.6	2.6	0.0	1.8	11.1
MY	0.0	0.0	0.0	0.1	0.1
NL	58.7	32.3	4.6	17.5	113.1
NO	11.5	6.5	3.3	1.3	22.6
PL	25.5	27.2	1.9	2.0	56.6
PT	24.8	8.4	9.5	1.6	44.3
RO	20.2	12.6	3.3	2.2	38.2
RS	0.0	0.0	0.0	2.1	2.1
SE	35.9	9.7	2.9	8.6	57.1
SI	7.6	5.0	0.6	1.2	14.4
SK	19.8	6.0	0.4	3.5	29.7
TR	0.0	0.0	0.8	0.8	1.6
UA	3.5	0.5	1.1	2.0	7.1
UK	0.2	0.0	0.0	0.0	0.2
US	0.1	0.4	0.0	0.0	0.5
Total	1103.4	414.2	181.7	406.1	2105.5

Source: DG CNECT.

Annex VIII: Case Study 1: Support of digitalisation in SMEs and public administrations

Description

This case study explores the initiatives undertaken by the Digital Europe Programme (from now on Digital Europe) to support digitalisation in SMEs and public administrations. The case study highlights the actions of the **European Digital Innovation Hubs, EU data spaces**, and the **Deployment of public services** using selected projects**: EDIH AI and Robotics Estonia (AIRE), Data spaces for manufacturing and the European data space for health and EU Identity Wallet Large Scale Pilots**. The case study assesses the effectiveness and EU-added value of these actions in relation to the digital transformation of SMEs and public administrations, using the selected projects as examples. The case study is based on desk research, interviews with beneficiaries and surveys with end users. Table 30 presents an overview of specific objectives, actions, and projects the case study cover and the key data sources.

Table 30 Support of digitalisation of SMEs and public administrations

Support of digitalisation of SMEs and public administrations			
Specific objectives	**Action**	**Project**	**Key Data Sources**
European Digital Innovation Hubs	European Digital Innovation Hubs	EDIH AIRE	Desk research and survey with EDIH end users
SO2	EU Data Spaces	Data spaces for manufacturing and the European data space for health	Desk research
S05	Deployment of public services	EU Identity Wallet Large Scale Pilots	Desk research, interviews with Digital Europe beneficiaries

Source: Technopolis Group, 2024

The digitalisation of SMEs and public administrations in Europe

The digital transformation of SMEs and public administrations is key to enhancing the EU's economic competitiveness, increasing technological independence, improving public service, and infrastructure development. There is **a slow and uneven progression of digitalisation among SMEs with** only 20% of SMEs being highly digitised (compared to 58% of large enterprises).[179] The goal of the EU is to have more than 90% of Small and Medium Enterprises (SMEs) reach at least a basic level of digital intensity by 2030 and 75% of companies using Cloud, AI or Big Data by 2030.[180]

SMEs face several challenges when it comes to digitalisation, with common obstacles relating to insufficient digitally skilled workers, finance and access to digital technologies. **Finance is a challenge** as SMEs may face difficulties in accessing finance for intangible digital investments that cannot be used as collateral to secure loans. 24% of small EU non-digital firms mention a lack of available finance as a major obstacle.[181] **Another important challenge to SMEs is access to digital technologies and technical infrastructure that enable digital transformation.** SMEs may not have the resources to invest in the infrastructure required for

[179] See https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=SWD%3A2018%3A305%3AFIN
[180] See https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_en
[181] See https://www.eib.org/attachments/publications/economic_investment_report_2021_chapter05_en.pdf

the use of the advanced technologies such as big data processing and AI. 15% of EU small firms report that securing access to infrastructure is an obstacle.[182]

Similarly, there is a **slow and uneven uptake of digital solutions in the public sector. Less than half of cross-border services are available online**.[183] The EU has set **three key targets** to improve the digitalisation of public services by 2030. The targets are making **100% of key public services digitally accessible**, **enabling 100% of citizens to have access to medical records** and **100% of citizens to have access to digital identity solutions.**[184] The EU's strategy for the digital transformation of public services is centred on enhancing accessibility, efficiency, and user-centricity and aims to promote interoperability among Member States, fostering seamless cross-border interactions. **For public administrations, a major challenge for digital transformation is interoperability,** which is required to ensure the seamless functioning of public services across territorial, sectoral, and organisational boundaries, while preserving the sovereignty of administrations at all government levels. In particular, the promotion of **cross-border and interoperable public services, (the EU Digital Identity Wallets, the Once Only Principle, blockchain),** inclusiveness and accessibility. For example, digital identification systems offered by governments in the EU are not available to the whole population; they are often limited to online public services and do not allow for seamless access cross-border. Only 14% of key public service providers across all Member States allow cross-border authentication with an e-Identity system.[185]

Activities

EU actions for SMEs and Public administrations

Digital Europe offers support for SMEs and public administrations to uptake new technologies. It aims to boost the digital transformation through strategic initiatives to build capacity in skills, data infrastructure and technologies, and innovation support through various actions including **EDIHs, EU Data Spaces, and the deployment of public services.** These actions are briefly explained below.

- **EDIHs**[186] provide companies with access to technical expertise and testing and innovation services such as financing advice, training, and skills development needed to improve business/production processes, products, or services using digital technologies. EDIHs play a central role in the Digital Europe to stimulate the broad uptake of artificial intelligence, high performance computing (HPC) and cybersecurity as well as other digital technologies by industry (in particular SMEs and midcaps) and public sector organisations in Europe. There are 227 European Digital Innovation Hubs, of which 151 are funded through the Digital Europe. In addition, 18 new EDIHs offering a wide range of specialised digital transformation services joined in late 2024 the EDIH network from the associated countries Albania, Montenegro, North Macedonia, Serbia, Türkiye, Ukraine and Kosovo. As the EDIH catalogue shows there are currently 69 EU funded hubs with a focus on public administrations, and 83 hubs with a focus on industry. This case study covers the example of the AI and Robotics Estonia (AIRE) EDIH.[187]

[182] See https://www.eib.org/attachments/publications/economic_investment_report_2021_chapter05_en.pdf
[183] See https://www.capgemini.com/gb-en/news/press-releases/20th-edition-of-the-egovernment-benchmark-report-less-than-half-of-cross-border-services-available-online-due-to-language-and-electronic-identification-challenges/
[184] See https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_en
[185] See https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/european-digital-identity_en#:~:text=Benefits%20of%20the%20EU%20Digital%20Identity&text=identify%20online%20and%20offline,provided%20by%20trusted%20private%20sources
[186] See https://european-digital-innovation-hubs.ec.europa.eu/edih-catalogue
https://www.industriaconectada40.gob.es/Documents/Digital_Innovation_Hubs_in_Digital_Europe_Programme.pdf
[187]See https://european-digital-innovation-hubs.ec.europa.eu/knowledge-hub/success-stories/ai-algorithms-and-sensor-integration-robotic-vessels#solutions

The AIRE EDIH aims to increase the competitiveness of Estonian enterprises by providing a range of services to businesses in the field of AI and robotics. AIRE EDIH offers services such as testing of new technology or software, digital maturity assessments, and AI and robotics trainings.

- **European Data spaces** aim to facilitate data pooling and sharing across Europe in a trustworthy and secure manner, eliminating existing legal and technical barriers. The data spaces will enable EU businesses and public administrations to control their data and unlock data-driven innovation. Digital Europe aims to develop 14 EU data spaces in strategic economic sectors such as health, agriculture, energy, transport and environment [188]. The European Data Spaces is an action under Specific Objective 2 which is directly managed by the Commission through grants and procurement and supported in some areas by the European Health and Digital Executive Agency (HaDEA). This case study covers the example of the UNDERPIN Data Space for manufacturing[189] and the European Health Data Space (EHDS).[190]

UNDERPIN Data Space for Manufacturing promotes cross-organisational data sharing while prioritising data sovereignty. The European Health Data Space (EHDS) is a structured environment where health-related data, including both open data and restricted data, can be securely stored, accessed and shared among authorised stakeholders.

- **Deployment of public services** supports the digitalisation of government and public administrations, piloting of AI applications in the law enforcement domain, as well as the digital transformation of justice, health and consumer protection. Work is ongoing to support interoperability of digital public services within the EU including the development of the Common Services Platform and the deployment of the European Digital Identity framework. The deployment of public administration is linked to SO5 which is directly managed by the Commission through grants and procurement and supported by HaDEA. This case study covers the example of 4 large scale pilots being delivered under the EU Digital Identity Wallet.

The EU Digital Identity Wallet is a convenient and secure method for European citizens and businesses to authenticate their identity, using their digital ID for both public and private sector interactions. Four large scale pilots have been launched to test the EU Digital Identity wallet in different use-case scenarios.

Impact pathway

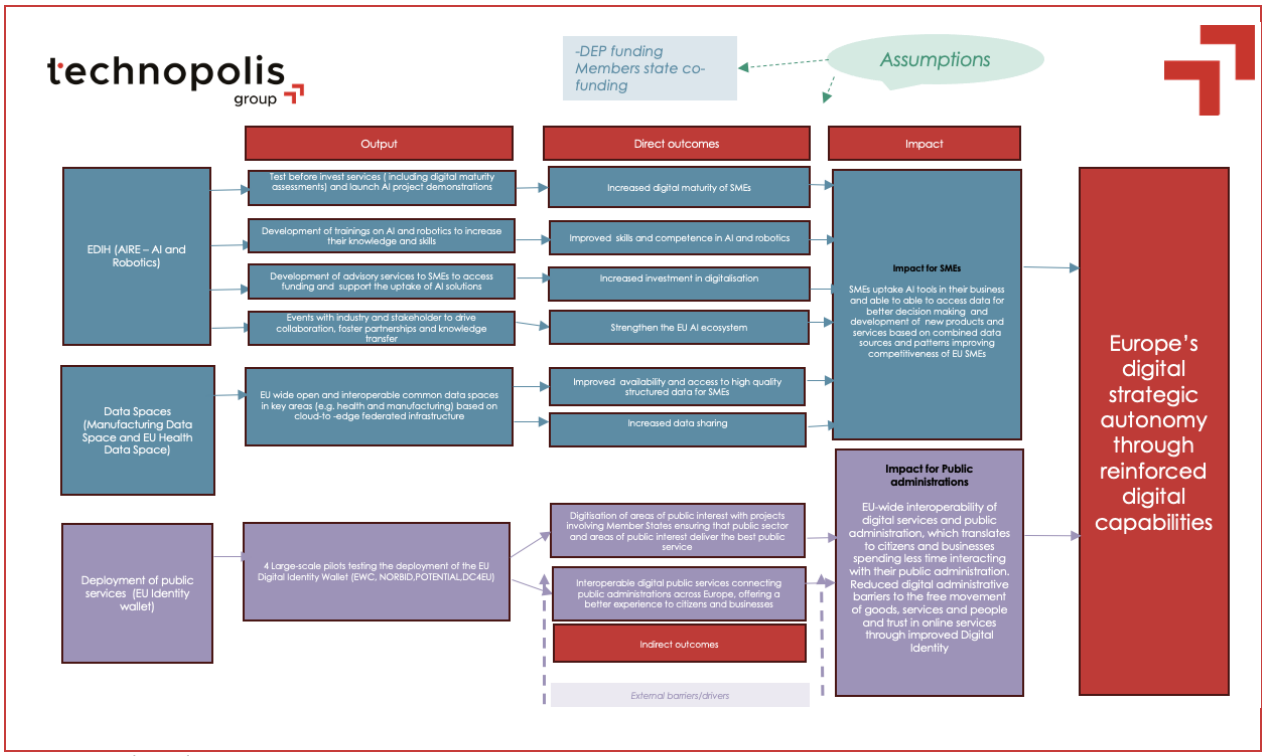
This case study presents specific impact pathways for the digital transformation of SMEs and public administrations based on the actions funded under Digital Europe. The impact pathway serves as the foundational intervention logic, guiding the analysis and in this case, shows the contribution of each of the actions covered in this case study. Figure 15 gives a visual representation of the impact pathway.

[188] Agriculture, cultural heritage, energy, finance, green deal, health, language, manufacturing, media, mobility, public administration, research and innovation, skills and tourism

[189] See https://underpinproject.eu/#:~:text=Data%20Space%20for%20Manufacturing%20Excellence,innovation%20in%20products%20and%20services.

[190] See https://www.european-health-data-space.com/

Figure 15 Impact pathway for the digital transformation of SMEs and public administrations under Digital Europe



Source: Technopolis Group, 2025

In summary, two impact pathways exist for the digital transformation of SMEs and public administrations under Digital Europe: the digital transformation of SMEs and the second is for the digital transformation of public administrations.

In summary, for the digital transformation of SMEs, EDIHs provide SMEs with access to AI infrastructure, skills and finance to uptake of AI technologies in developing products and improving business processes. EDIHs will also provide a platform for engagement and collaboration between SMEs and industry players in the EU that is required for ecosystem development. Data spaces are structured environments designed to enable the efficient, secure and sovereign data exchange and interoperability among diverse stakeholders. They provide data, the infrastructure and governance frameworks required to enable SMEs share and access high quality data for better decision-making and the development of innovative products and services. Ultimately, the intention is that the combination of the services provided by the EDIHs, and the data spaces will improve the ability of SMEs to uptake technologies such as AI and improve their digital capabilities. This will result in strengthening the EU's competitiveness and its digital strategic autonomy through reinforced digital capabilities.

For the digital transformation of public administrations, the four large pilots will test the implementation of the EU Identity Wallet in payments, travel, accessing digital credentials and public services. The successful pilot deployment will enable interoperability of public administrations and ensure smooth cross-border identity authentication for citizens, resulting in improved digital identity, which will reduce administrative barriers and easy access to online services. This digital transformation of public administrations will result in strengthening the EU's competitiveness and its digital strategic autonomy through reinforced digital capabilities.

The main assumptions that have to be fulfilled to arrive at the intended impact of digital transformation for SMEs and public administrations are presented in Table 31. The table also

presents external, barriers and drives to the intended outcomes and impact for SMEs and public administrations.

Table 31 Main Assumptions, barriers and drivers

Action	Main Assumptions	External barriers	Drivers
EDIH	SMEs require regional support to develop more competitive business/production processes, products, or services using digital technologies Services such as test before investing activities, training, and access to finance are essential for SME digitalisation AI Infrastructure, access to finance and a digitally skilled work force are important factors for SME digital transformation of SMEs SMEs are willing to invest in the use of AI technologies and tools SMEs are willing to invest in the upskilling of staff	The complex AI regulatory landscape can create compliance issues with varying standards and regulations in Member States and sector specific regulations Limited resources available to EDIHs may hinder their capacity to support of SMEs especially in regions with fewer financial resources. EDIHs may lack infrastructure required for the uptake of AI technologies such as high-speed internet and data	EDHIs stimulate the uptake of AI technologies as a one-stop-shop for technology services EDIH services are provided at no cost to SMEs EDIHs combine the benefits of a regional presence with the opportunities available to a pan-European network, providing easy access for SMEs to get support to help them adopt digital technologies
European Data spaces	Increased data accessibility and sharing will drive innovation and competitiveness for SMEs The data spaces will provide SMEs with access to high quality data assets for developing innovative services and products SMEs will be able to participate in data spaces and benefit from the data value chains Data spaces will provide a secure and trustworthy environment for data exchange, addressing privacy and security concerns Data spaces will provide a secure and trustworthy environment for data exchange, addressing privacy and security concerns SMEs have the data literacy and skills	Inconsistencies in data protection laws and regulations across Member States can create obstacles for cross-border data sharing. Complex regulatory landscape and lack of harmonisation across the EU may create obstacles for SME participation SMEs may face difficulties in accessing and sharing data due to technical and legal barriers Ensuring data confidentiality remains a challenge for healthcare Ensuring seamless data exchange across different systems and countries may be a hurdle Low-quality data can lead to Inaccurate analytics, and poor decision-making	Data spaces in strategic sectors aimed at serving the EU without restrictions to participation Common standards for interoperability and automation Data spaces support centre supports SMEs that want to create sovereign data spaces

Action	Main Assumptions	External barriers	Drivers
	required to understand the value of data and how it can be used in their businesses		
Deployment of public services (EU Identity Wallet)	Digital identity authentication will support the digital transformation of public administrations and improve public services Interoperable infrastructure will facilitate cost-effective and implementable interoperability across the EU Open-source solutions are beneficial, and Member Stated will use the open-source solutions Large scale pilots are effective for testing the EU Digital Identity Wallet functionality Cross-sector and cross-border collaboration will lead to comprehensive testing EU citizens have the digital skills required to navigate the digital identity wallet	Ensuring interoperability across different national systems and existing infrastructure is a challenge for cross-border services EU citizens may not adopt the Digital Wallet due to privacy and security concerns and usability issues Incompatibility with existing regulations across different EU member states could hinder implementation Some EU Members states may lack the technological infrastructure to support the EU Identity wallet	The consortiums leading the large-scale pilots have expertise in digital identity solutions deployment The EU Digital Wallet is being tested in real world scenarios

Source: Technopolis Group, 2025

Effectiveness

This section provides an overview of selected projects and initiatives related to digital transformation that have been implemented to date, highlighting their potential to contribute to the anticipated direct outcomes and wider impacts of Digital Europe. It is important to note that most of the actions under Digital Europe are being implemented and first outputs are still being achieved. The Staff Working Document on Common European Data Spaces reports that the data spaces are in different stages of development. Similarly, for the action on Deployment of public services, pilot projects are being implemented for EU Digital Identity Wallet.[191] The EDIHs are still in varying stages of being set up. However, some of them have begun to deliver services to SMEs. Considering this, the effects of the actions towards the digital transformation of SMEs and public administrations highlighted in this case study are currently limited.

SMEs across the EU have access to EDIHs and support for the uptake of AI technologies

The AI & Robotics Estonia (AIRE) EDIH was established in 2022 and is dedicated to enhancing innovation in AI and robotics. The mission of AIRE is to support the digitalisation, automation and competitiveness of Estonian manufacturing companies through the adaptation of AI & robotics-based solutions. AIRE's goal is to foster digital transformation across the EU, aiming

[191] See https://digital-strategy.ec.europa.eu/en/library/second-staff-working-document-data-spaces

to boost digital literacy and create new value chains within Europe, while supporting SMEs' technological and economic readiness for AI investments. AIRE is run by a consortium led by the Tallinn University of Technology, and its partners are the University of Tartu, the Estonian University of Life Sciences, Tehnopol Science and Business Park, Tartu Science Park, and the competence centre IMECC. The hub is supported by other key stakeholders as associate partners. AIRE is co-funded by the European Commission through Digital Europe and the Estonian State through the Ministry of Economic Affairs and Communications.

The AIRE EDIH supports the European mission of advancing digital transformation across the EU by bringing cutting-edge tech (AI, Cloud, Big Data) to European companies and ensuring that companies have a basic level of digital know-how. Table 32 below provides an overview of the services AIRE provides to SMEs.

Table 32 Overview of AIRE services

AIRE Services	Description of services
Digital maturity assessments	AIRE offers digital maturity assessments to help companies evaluate their ability to implement new technologies, evaluate process productivity and organizational capacity
AI suitability assessments	AIRE offers AI consulting services to assess a company's ability to implement artificial intelligence (AI)solutions.
Robotics suitability assessment	A central analysis of a company's processes to assess the feasibility of robotization.
Trainings and courses	AIRE partners with universities (the University of Tartu, Tallinn University of Technology, the Estonian University of Life Sciences, and the IMECC Development Centre) to offer trainings to industrial enterprises. The trainings and courses are aimed at expanding knowledge and skills in AI and robotics.
Demonstration projects	Demonstration projects enable companies to test, experiment or validate AI and robotics technologies before investing. These demonstration projects are targeted at SMEs with up to 250 employees and a turnover of 50m euros.
AIRE pre-accelerator	The pre-accelerator provides companies with mentorship and training to enable them launch of a new product or service based on the technological solution tested in the demo project. The pre-accelerator also provides support for entering foreign markets through direct contacts and knowledge-building.
Financial sources of funding – Public measures	Financial advisory services to help industrial companies secure additional funding through public measures
Financial sources of funding – Private capital	A market-based consulting service to help companies access capital through private equity investment
AIRE club	A series of events for those interested in the field of robotics and AI to share experiences, communicate and network
International partnerships	AIRE promotes collaboration opportunities between industrial companies, researchers, IT and electronics companies, and innovation project funders

Source: AIRE EDIH website, 2024

Based on the evidence available to the evaluation team, the AIRE EDIH has been able to support SMEs in Estonia in their digital transformation journey through its digital maturity assessments, test-before-invest services, demonstration projects and training.

The AIRE EDIH initiates test-before-invest demonstration projects with manufacturing companies to enable companies to test AI technologies before investing in them. The demonstration projects run from 6-9 months and are implemented in collaboration with enterprise and R&D institutions. The enterprise brings forward problem to be solved or an idea to be implemented, and the AIRE Development Team offer a solution and implements it. The demonstration projects also support knowledge transfer from universities to companies. The AIRE EDIH Development Team is comprised of researchers from AIRE partner R&D

institutions (the University of Tartu, Tallinn University of Technology, the Estonian University of Life Sciences, and the IMECC Development Centre). The AIRE Development Team provides extensive support for selected demonstration projects, which justifiably leverage AI and AI-enabling technologies. The technical solution used in the demonstration project is either an AI prerequisite[192] or AI technology.[193] Ideas eligible for the demonstration projects include testing and validating automatic guided vehicles in a complex warehouse setup, AI-based prediction models, collaborative robots with some never-before-tested application, AI-based employee training, algorithmic or decision tree-based approaches to customer support and novel computer vision solutions.

The outcome and impact of each AIRE demonstration project is outside the scope of this evaluation. However, it is expected that the technical solutions developed should lead to positive business impacts such as increased sales and efficiency and the results from the demonstration projects conducted by AIRE can be reused by other companies in any sector. So far, AIRE has launched and conducted 30 tests before invest demonstration projects with SMEs.[194] These projects include the testing of audio-based and user experience-driven content based on artificial intelligence technology for the time-critical support of children's mental health and testing of efficient AI models for cost reduction of drone navigation modules.

Furthermore, AIRE holds monthly events known as "Clubs" which are aimed at creating an environment for those interested in the field of robotics and AI to share experiences, communicate and network with each other.[195] The AIRE club events also serve as a platform to connect with other EDIHs.[196] Over 1000 participants have taken part in the Clubs about AI and robotics use-cases and best practices.[197]

AIRE offers two trainings, which vary in terms of content and duration are tailored to industry needs. First is an intensive course that provides in-depth learning and practical development of skills in AI and robotics. Second are webinars that enable participants listen to expert lectures, ask questions, and share experiences with other attendees. Around 600 people have participated in AIRE trainings. In future, AIRE plans to offer Massive Open Online Courses (MOOCs) that will provide a deeper understanding of AI and robotics principles, applications, and practical skills.

Based on the review of the completed demonstration projects which aimed at testing and validating the use of AI techniques such as machine learning and neural networks to help businesses in areas such increasing efficiency and safety in production processes[198] and ensuring quality control[199], AIRE has been able to make some progress in enabling SMEs in Estonia to leverage AI. This is in line with the experience of users of the EDHIs. Respondents to the EDIH end-user survey highlighted that the use of EDIH services had a high impact on the innovation, productivity and growth of their company (35% n = 249) and 22% stated EDIHs has a medium impact. Additionally, 80% of end-users responded that EDIHs were effective in addressing their needs.

[192] AI prerequisite technologies - context-aware technologies that create or process data automatically. There is a degree of uncertainty - the technical solution will emerge as the work progresses.
[193] AI technologies - technologies which apply generally accepted AI algorithms and methods
[194] See https://aire-edih.eu/2023/wp-content/uploads/2024/03/aire-visioon.pdf
[195] See https://aire-edih.eu/2023/wp-content/uploads/2024/03/aire-visioon.pdf
[196] See https://aire-edih.eu/en/at-startup-day-aire-hosted-european-partners-and-shared-inspiring-artificial-intelligence-case-studies/
[197] See https://aire-edih.eu/en/at-startup-day-aire-hosted-european-partners-and-shared-inspiring-artificial-intelligence-case-studies/
[198] See https://aire-edih.eu/en/project/2024-testing-of-machine-vision-based-workpiece-misplacement-detection-and-quality-check-of-a-collaborative-robot/
[199] See https://aire-edih.eu/en/project/2024-validation-of-a-multi-purpose-quality-control-system-operated-by-artificial-intelligence-for-food-industry-production-lines-at-noo-lihatoostus/

In the next section, the collaboration between AIRE and Mindchip OÜ as an exemplar of the impact of this EDIH is presented.

AIRE EDIH collaborates with Mindchip OÜ to develop an AI vision system for autonomous navigation

Mindchip OÜ is an Estonian technology company that specialises in the design and development of autonomous navigation technology for the marine industry. The main challenge Mindchip OÜ faced was integrating an AI system to allow reliable identification of other ships and buoys and ensure safer navigation. The AIRE EDIH worked with Mindchip OÜ to develop an AI model trained on high-resolution imagery captured by four strategically positioned cameras, seamlessly integrated into the robust Robot Operating System (ROS).

AIRE EDIH provided Mindchip OÜ with access to technical expertise and its test-before-invest service which enabled the company to resolve its challenges and advance their product. As a result of working with AIRE, Mindchip OÜ were able to develop an AI-based machine vision system that enhanced the company's capabilities in autonomous navigation.

Mindchip OÜ is an Estonian technology company that specializes in the design and development of autonomous navigation technology for the marine industry. The company makes the maritime industry cost-effective by developing autonomous self-adaptive captains that adjusts to different sea vessels. The main challenge Mindchip OÜ faced was developing and integrating its AI-based machine vision system for autonomous ships to allow reliable identification of other ships and buoys and ensure safer navigation. To solve this challenge, AIRE EDIH provided Mindchip OÜ with access to technical expertise and the test-before-invest service which enabled the company to resolve its challenges and advance their product. The AIRE EDIH worked with Mindchip OÜ on two test-to-invest demonstration projects to develop an AI model trained on high-resolution imagery captured by four strategically positioned cameras, seamlessly integrated into the robust Robot Operating System (ROS). A tailored data set was developed to enhance buoy detection accuracy and enabled the AI system to meet the safety standards required for autonomous ship navigation. The system's validation was tested at sea and able to reliably detect small boats from 100 to 150 meters away and larger vessels from farther distances. As a result of working with the AIRE EDIH, Mindchip OÜ was able to develop an AI-based machine vision system with enhanced its AI detection capabilities and the operational efficiency of its autonomous ships. The potential benefits of the project for Mindchip OÜ include a cost-effective autonomous navigation system that reduces operation expenses and enhances maritime safety and efficiency through the AU-based vision system which reduces the likelihood of accidents.[200]

In terms of wider benefits, the ROS used in the project has potential applications beyond maritime including land-based robotics and smart city infrastructure, underscoring the potential of the project to drive innovation across domains.[201] In terms of digital transformation, the AIRE EDIH reports that as a result of this project, Mindchip OÜ has evolved in 3 categories: Green Digitalisation (up 30%), Digital Strategy and Investments (up 23%), Human-Centric

[200] See https://european-digital-innovation-hubs.ec.europa.eu/knowledge-hub/success-stories/ai-algorithms-and-sensor-integration-robotic-vessels#solutions
[201] See https://european-digital-innovation-hubs.ec.europa.eu/knowledge-hub/success-stories/ai-algorithms-and-sensor-integration-robotic-vessels#solutions

Digitalisation (up 13%).[202] Furthermore, the MindChip team noted that the AIRE EDIH has been helpful in supporting them to source funds through its public funding service and introducing them to other EDHIS for collaborations.[203]

SMEs leverage data spaces for better decision-making and product development

The UNDERPIN Data Space for manufacturing project aims to develop and deploy a data space in critical manufacturing sectors for dynamic asset management as well as predictive and prescriptive maintenance. The project is being delivered by a consortium of 11 organisations[204] from 5 EU countries and is expected to run from December 2023 to November 2025.

UNDERPIN Data Space for Manufacturing project aims to develop and deploy a data space in critical manufacturing sectors for dynamic asset management as well as predictive and prescriptive maintenance. The project is piloting two use cases in the oil refinery and wind farm domain. Upon the completion, the UNDERPIN Data Space for Manufacturing project is expected to produce cross-organisational and cross-use-case data sharing and exchanging solution that ensures data sovereignty for SMEs and large industry players to improve products and services.

The UNDERPIN project is currently implementing use cases for the data spaces through two real world demonstrators in the oil refinery and wind farm domains.205 The refinery demonstration aims to improve maintenance processes and decision-making to determine the best time for preventive maintenance scheduling. Thereby minimising downtime and effects on production capabilities. The wind farm demonstration aims to implement a robust predictive maintenance system for wind turbines by developing an advanced Machine Learning model capable of predicting equipment failures and identifying abnormal behaviour trends.[206] These two use cases are expected to validate the benefits of industrial data sharing especially in the area of enhancing operations for SMEs in these sectors. After the demonstrations, the next steps include demonstrating the ability to scale up the UNDERPIN Data Space during production phase, creating a pilot for the first digital product passports (DPPs) and planning the deployment of DPPs for new stakeholders. The consortium is also expected to develop the legal framework for the UNDERPIN data space, a feasible and sustainable business model for the UNDERPIN Data Space and develop actions for commercializing the dataspace service.207 UNDERPIN Data Space is expected to provide a cross-organisational and cross-use-case data sharing and exchanging solution that ensures data sovereignty, with a strong focus on the interplay of SMEs and large industry players to improve products and services. The benefits of the manufacturing data space for SMEs include optimised operations, enabling industries to leverage data spaces to gain insights into their operations, predict maintenance need and optimize processes. This proactive approach could reduce downtime, cut costs and improve overall efficiency.

SMEs leverage health data for research and development of AI solutions for personalised health treatments

[202] See https://european-digital-innovation-hubs.ec.europa.eu/knowledge-hub/success-stories/ai-algorithms-and-sensor-integration-robotic-vessels#solutions
[203] See https://european-digital-innovation-hubs.ec.europa.eu/knowledge-hub/success-stories/ai-algorithms-and-sensor-integration-robotic-vessels#solutions
[204] Motor Oil, Athena, Innov-acts, More energy, Water Meaon Blue Innovation, Tikopro, Semantic Web Company, Ontotext, Austrian Institute of Technology, SPACE and Harokopio University
[205] See https://underpinproject.eu/use-cases/
[206] See https://underpinproject.eu/use-cases/
[207] See https://underpinproject.eu/work-packages/

The European Health Data Space (EHDS) was created to promote digital transformation and widen the use of health data by making it easier to exchange and access health data at the EU level. The EDHS aims to create a federated, EU-wide data infrastructure for health-related data and address key challenges facing healthcare systems in Europe resulting from lack of access to health data. Digital Europe supports the creation of components of the digital infrastructure for EHDS through the Genomic Data Infrastructure (GDI) and European Federation for Cancer Images (EUCAIM). Table 33 gives an overview of the projects.

Table 33 Overview of EHDS projects

Digital Europe Action	Project	Objective	Consortium
Federated European infrastructure for genomics data	Genomic Data Infrastructure (GDI)	To enable access to genomic and related phenotypic and clinical data across Europe by establishing a federated, sustainable and secure infrastructure to access the data.	54 project partners across 20 countries and two infrastructure organisations
Federated European infrastructure for cancer images data	European Federation for Cancer Images (EUCAIM)	To build a pan-European digital federated infrastructure of FAIR, de-identified, cancer imaging data from daily clinical practice (real world data) that will be used to develop, validate and benchmark AI tools towards precision medicine	79 organisations from 14 countries

Source: Digital Europe Programme Work Package (2021/2022 and 2023/2024), GDI and EUCAIM websites, 2024

The GDI project aims to enable secure cross-border access to genomic and related clinical data to improve research, policymaking and healthcare across Europe in at least 15 countries by the end of 2026. The GDI project began in 2022 and is expected to be completed in 2026. So far, the GDI project has delivered a GDI Starter Kit, which gives countries the technical capability to access more than 2,500 synthetic genomics and phenotypic data sets (including cancer, rare diseases and population genomics) across-borders.[208] It is expected that insights from the data will support improved clinical diagnostics, treatments and predictive medicine for European citizens. The project is also expected to lead to better public health measures for citizens, benefit healthcare systems and the economy and create opportunities for personalised medicine.

The EUCAIM project aims to deploy a pan-European digital federated infrastructure which will facilitate access to cancer images data and related patient data and provide a trusted framework for researchers, innovators and clinicians to develop and benchmark trustworthy AI tools based on imaging data. In terms of outputs, the first version of the Cancer Image Europe Platform launched in September 2023 and featured public catalogue of 46 datasets containing over 200, 000 images covering 9 cancer types (breast, colon, lung, prostate, rectum, liver, glioma, neuroblastoma and glioblastoma).[209] The project's goal is to have at least 30 distributed data providers from 15 countries, more than 100,000 cases and 60 million images available, and at least 50 AI algorithms and prediction models for cancer care by 2026. A first version of the rules for data providers and users and the operational procedures for the Cancer

[208] See https://github.com/GenomicDataInfrastructure
[209] See https://digital-strategy.ec.europa.eu/en/news/europes-beating-cancer-plan-first-prototype-cancer-image-europe-platform-goes-live

Image Europe platform have been also published on the EUCAIM project website. The EUCAIM project began in 2023 and is expected to be completed in 2026.

The GDI and EUCAIM projects are still in their development phases and delivering early outputs, One EU level stakeholder, mentioned that EUCAIM is enabling the translation from research to deployment with the establishment of state-of-the-art digital infrastructure in cancer imaging leveraging the use of data and AI. Overall, it is expected that the successful implementation of the GDI and EUCAIM projects will transform healthcare delivery and healthcare research in the EU by providing SMEs with access to large scale data that can be used to develop and test innovative AI tools and solutions in areas such as cancer treatment and diagnosis. In addition, the projects are expected to make it easier for SMEs to access secondary data for research aimed at driving healthcare innovation forward.

Cross-border digital identification through the EU Digital Identity Wallet

The EU Digital Identity Wallet initiative aims to provide European citizens with a secure and interoperable digital identity solution. In 2023, four large-scale pilots (LSP) pilots were launched to evaluate the EU Digital Identity Wallet implementation in travel, payment and education and social security prior to its official introduction to Member States. The LSPs are the EU Digital Identity Wallet Consortium (EWC), POTENTIAL, NOBID and DC4EU. Each pilot is structured as a consortium that merges expertise from both the public and private sectors within the EU, with co-funding provided by grants from the European Commission. Table 34 gives an overview of the LSPs.

Table 34 Overview of LSPs for the EU Digital Identity Wallet

Large scale pilot	Objective	Consortium
EU Digital Identity Wallet Consortium (EWC)	The European Digital Wallet Consortium aims to leverage benefits of digital identity for travel across the EU	27 EU member states and 76 partners and associated partners
POTENTIAL	To foster innovation, collaboration and growth in six digital identity sectors: governmental services, banking, telecommunications, mobile driving licenses, electronic signatures, and health	19 EU member states and 140 public and private partners
NOBID	NOBID pilots the use of the EUID Wallet for payments of products and services	6 countries (Denmark, Germany, Iceland, Italy, Latvia and Norway)
DC4EU	Digital Credentials for Europe provides support to public and private sectors in education and social security	22 EU member states, 43 public organizations and 49 private entities

The 4 LSPs are currently in various stages and are assessing the usability of the EUID. EWC is piloting travel use cases to demonstrate how eIDAS will transform the safety, security and convenience of eCommerce. The EWC will create two common building blocks that will support the travel use case in payments and organizational digital identity. The EWC consortium has been able to build and design three travel scenarios into the technical specifications; using the EUDI wallet for the automation of the collection of Advanced Passenger Information (APIS) during airline check-in, register for workshops and booking of tickets and for online verification when buying tickets. In addition, two payment scenarios were developed for the use of the EUDI wallet for age verification during online shopping and QR code vending machine age verification when buying products of age.[210]

[210] See https://eudiwalletconsortium.org/wp-content/uploads/2024/11/EWC-P1-Overview-Citizen-feedback-and-end-user-piloting-202410.pdf

NOBID focuses on digital payments, one of the top priority use cases in the EU's Digital identity wallet. Its objective is to test the authorisation of payments by wallet holders, as well as examine the issuance of wallets and financial institutions' provision of payment. The NOBID consortium has been able to identify Qualified Electronic Attestations of Attributes (QEAAs)[211] to be tested and is currently planning tests that will demonstrate the ability to issue and revoke QEAAs of national and international interest. This involves ensuring that these attributes are interoperable across-borders and can be used effectively within the European Digital Identity Wallet.[212] QEAAs are required in the EUID wallet to ensure secure, standardised and legally recognised digital attestations. The **DC4EU** project focuses on the development and implementation of four use cases of the EU digital identity wallet for educational credentials, professional qualifications, Portable Documents and the European Health Insurance Card (EHIC) in the fields of Education and Social Security.[213] According to the project timeline, the DC4EU consortium is currently launching LSCs scenarios, which will be followed by a user journey roll out in 2025.[214] **POTENTIAL** seeks to test use cases for the EU digital identity wallet particularly in access to digital public services, opening a bank account online, creating a telephone line using SIM cards, paperless driving licenses, electronic signatures, and digital medical prescriptions. This will allow citizens to quickly and securely prove their identity as part of their online citizenship procedures**.** The POTENTIAL consortium is now working on the national implementations of the digital wallets across Member States and at the beginning of next year will initiate a proof of concept to demonstrate the feasibility and efficiency of the digital wallet ecosystem on a broader scale.[215] It challenging to determine the effectiveness of the four LSPs as they are in their implementation and testing phase. However, it is expected that the successful piloting of the four LSPs will support Member States in meeting their obligation under the upcoming EU Digital Identity Framework Regulation to make a European Digital Identity Wallet available to citizens and businesses by the end of 2026. An interview with one of the partners involved in the EWC project highlighted that the LSPs provide public administrations in EU members states with the opportunity to collaborate with private companies and build the technical capacity required to test and implement the European Digital Identity Wallet.[216]

It is intended that the four LSCs will help drive the provisions of EAA/QEAAs to the wallet by providing support for Member States entities taking on the role of EAA/QEAA providers and support public and private replying parties in adapting the European Digital Identity Wallet as a means for users to authenticate themselves to access public and private services. Furthermore, LSPs are expected to provide feedback on the ARF as they develop and interact with Relying Party services, Qualified or non-qualified Electronic Attestations of Attributes (Q)EAA Providers, Person Identification Data (PID) Providers and Users in meaningful transactions under the proposed use cases.[217]

Coherence

In terms of internal coherence, the EDIHs are supporting the roll-out of the technologies relevant to the EUCAIM, for example, by informing innovators about the legal requirements and testing facilities, offer test before invest services, networking events and training opportunities in advanced digital skills. When the data spaces are completed, they are expected to have synergies with the AI Testing and Experimentation Facilities (TEFs). For example, EUCAIM plans to make cancer image data available to the AI Testing and Experimentation Facility for Health AI and Robotics and enable SMEs who have developed AI

[211] QEAAs are issued by a qualified trust service provider that meet specific requirements laid down in eIDAS 2.0 regulation
[212] See https://www.nobidconsortium.com/meet-the-work-packages-discover-wp6s-work-on-qeaa-issuance/
[213] See https://dm158x9fyyzgp.cloudfront.net/wp-content/uploads/2024/02/DC4EU_D1.1_Project_Management_Handbook_v.01.pdf
[214] See https://www.dc4eu.eu/outputs/
[215] See https://www.digital-identity-wallet.eu/assets/files/Potential%20-%20Press%20Release%202.pdf
[216] Interview with EWC project partner
[217] See https://ai4hi.net/

solutions for cancer care to test them in real-life environments. Some synergies are expected between the Once-Only-Technical System (OOTS)[218] and the EU Digital Identity Wallet. The EUDI Wallet provides an additional means for citizens and businesses for authentication and identification purposes when using the OOTS, facilitating and enriching the procedure in a cross-border context.

In terms of external coherence, the actions in this case study have synergies with wider EU policy priorities and projects. For example, the EUCAIM project is coherent with the Europe Beating Cancer Plan, which aims to improve the prevention, detection, treatment and management of cancer in the EU while reducing health inequalities between and within Member States. Furthermore, the EUCAIM project builds on the outputs of Artificial Intelligence for Health Imaging (AI4HI) project. AI4HI is a network of multiple Horizon 2020 and Horizon Europe research projects currently working on developing cancer imaging data repositories and AI solutions based on medical imaging to improve clinical practice.[219] improve clinical practice.

Similarly, the GDI builds on the outputs of the Beyond 1 Million Genomes (B1MG) project, which is funded by European Union's Horizon 2020 Research and Innovation programme[220] and the EU's flagship 1+Million Genomes (1+MG) initiative[221] which aims to enable secure access to genomics and the corresponding clinical data across Europe to support research and health policy making and incentivise personalised healthcare treatments with the potential to improve disease prevention. The 1+Million Genomes (1+MG) initiative is connected to the European data spaces and is expected to provide an additional boost to the project benefitting researchers, healthcare professionals and citizens. EU Added Value

As this is an interim evaluation, the impact of the projects covered in this case study in relation to the digital transformation of SMEs and public administration are yet to emerge. Considering this, we highlight the expected EU-added value of the actions and projects where possible.

EDIH

It is important to note that the EDIHs are in varying stages of being set up, therefore, it is too early to state their EU added value to member states. However, in the case of AIRE EDIH, the Digital Europe may complement the country's efforts to provide enterprises with access to AI technologies. Only 5.2% of Estonian enterprises have adopted AI against an EU average of 8%.[222] In this context, the AIRE EDIH is expected to provide SMEs with technological resources to uptake AI. For example, the AIRE EDIH will act as a one-stop-shop in Estonia that provides SMEs with the technical infrastructure and expertise required for the uptake of AI technologies through the test-before-invest service, which reduces risks in adopting new technologies, and trainings on AI to enhance the skills and competency of SMEs.

In terms of finance, Digital Europe allows Member States and the EU to co-invest jointly in the same EDIH, thus stimulating the pooling of resources. The AIRE EDIH is co-funded through Digital Europe and the Estonian government through the Ministry of Economic Affairs and Communication. This funding model allows AIRE to provide its services for free to SMEs in Estonia and contribute to accelerating their digital transformation efforts, thereby helping to bridge the digitalising gap among SMEs in Estonia.

[222] See https://digital-strategy.ec.europa.eu/en/factpages/estonia-2024-digital-decade-country-report

Data spaces

The data spaces are expected to address the unique needs of SME in the manufacturing and health sector by bringing together relevant data infrastructures and governance frameworks to facilitate data pooling, access and sharing. This will enable SMEs in the EU to access and use data for the development of innovative products and services. Digital Europe supports the development of key digital infrastructures for use by EU Member states which can only be achieved at the EU level. For example, stakeholders interviewed commented that the development of digital infrastructures in cancer imaging which permits cross-border access to high quality imaging data requires stakeholders across Europe to develop of AI models for improving detection and screening diagnostics. Similarly, stakeholders commented that the developing a GDI and the representative reference genome set of the European population is again something that can only be achieved at EU level.[223]

EU Digital Identity Wallet

The EU Digital Identity Wallet aim to offers a universal, trustworthy and secure way for citizens to identify themselves when accessing public and private services, digital documents and have control over how their data is handled by both private and public organisations. This implementation of the EU Digital Identity Wallet requires cross-border interoperability and collaboration at the EU level to ensure smooth implementation. Digital Europe enables pooling of resources for this. For example, the EWC Consortium is a collective of stakeholders from across the EU, each contributing their unique strengths to driving the development and implementation of the EU Digital Identity Wallet.

Conclusions

Most projects currently funded under Digital Europe are in their implementation phase, with key activities underway and initial outputs being delivered. The effectiveness of the EUDI wallet in relation to improving citizens and business access to services, requires further analysis. At this point in time and based on the evidence available, Digital Europe has started to contribute in numerous ways to the digital transformation of SMEs. For example, Digital Europe has provided a platform to enable SMEs to access and leverage AI technologies., e.g The test-before-invest services have contributed to enabling SMEs address technological challenges and improve their product offering, as can be seen in the examples of MindChip and AIRE EDIH.

Digital Europe has primarily contributed to the digital transformation of public administrations by enabling the development and testing of key technical infrastructure required for the digital authentication of citizens in travel, online payment, verification of educational credentials and accessing public services. Based on the evidence collected in this case study, Digital Europe funded projects are contributing to the development and piloting of tools to ensure open, efficient, user-friendly, end-to-end digital public services to citizens and businesses across-borders. For example, Digital Europe is enabling the procurement and technical infrastructure to support interoperability and implementation of the EU Digital Identity Wallet through the EWC. The EU Digital Identity Wallet framework is open source, ensuring that resources will be accessible to the public, allowing Member States to develop their own digital wallet. Also, pilot projects have been launched for the deployment of digital identity authentication in public services, in line with the Digital Decade target of ensuring interoperable public services across-borders. Through these projects, public administrations in members states are building the necessary expertise and infrastructure to facilitate provision of the EUDI Wallet by the end of 2026.

[223] Interview with EU implementing organisation

Sources and methodology

This case study was developed using desk research, interviews and the Digital Europe beneficiary survey.

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ANNEX. IX. Case Study 2: Technology Infrastructures as drivers of technological deployment and innovation

Description

The European Innovation Agenda, released in 2022 with the ambition to support deep tech innovation and the innovation capacity across EU regions, recognises the capacity of Technology Infrastructures "to underpin national and regional innovation ecosystems". Specific attention is given to TIs or TI-related activities under a specific "Flagship on enabling deep tech innovation through experimentation spaces and public procurement"[224]. This notably included the launch of testing and experimentation facilities for AI innovation at a European scale, designed to allow innovators to trial state-of-the-art solutions and products in real-world environments established through Digital Europe and among the activities covered in this case study.

Insufficient investments in Digital, Research, and Technology Infrastructures have resulted in significant gaps across various digital ecosystems. As an illustration, the Digital Europe Impact Assessment[225] identifies significant challenges in Artificial Intelligence development in Europe, These challenges include the lack of **large-scale datasets and advanced facilities for testing and validating cutting-edge technologies in real-world settings**. While programs, such as Horizon 2020 have achieved some progress, reaching pilot-phase advancements, they remain inadequate for scaling up to fully deploy shared capacities and infrastructures across Europe. Similarly, the EuroHPC Declaration[226] highlights Europe's reliance on **global High-Performance Computing and data infrastructures** to sustain its scientific excellence and industrial competitiveness. The European Chips Act[227] stresses the urgent need to strengthen Europe's semiconductor ecosystem by bridging the gap between research and production to remain competitive. Achieving this goal necessitates coordinated action among Member States and EU financial backing to establish essential infrastructures, such as Pilot Lines, to drive large-scale capacity building and foster ecosystem growth.

Technology infrastructures lie at the heart of this case study, as they play a pivotal role in supporting the digital transformation by offering tailored services, advanced technical expertise, and specialised facilities. They enable industry players, including SMEs and start-ups, to engage in essential activities, such as research, innovation, technology development, testing, and scaling up.

[224] https://research-and-innovation.ec.europa.eu/strategy/support-policy-making/shaping-eu-research-and-innovation-policy/new-european-innovation-agenda_en
[225] https://commission.europa.eu/strategy-and-policy/eu-budget/performance-and-reporting/programme-performance-statements/digital-europe-programme-performance_en
[226] https://digital-strategy.ec.europa.eu/en/news/european-declaration-high-performance-computing
[227] https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/european-chips-act_fr

Box 1 Definition of Technology Infrastructure according the 2019 SWD

Technology Infrastructures can be defined as: "facilities, equipment, capabilities and support services required to develop, test and upscale technology to advance from validation in a laboratory up to higher Technology Readiness Levels prior to competitive market entry. They can have public, semi-public or private status. Their users are mainly industrial players, including SMEs, which seek support to develop and integrate innovative technologies towards commercialisation of new products, processes and services, whilst ensuring feasibility and regulatory compliance."

This case study will focus on the role of technology infrastructures in scaling up digital technologies from validation in the testing facilities to pre-competitive market entry across three key digital fields: High-Performance Computing, semiconductors, and artificial intelligence. By enabling technological capacity building, these infrastructures play a crucial role in supporting the development of European digital ecosystems. The case study will look at the coherence of TIs funded under the Digital Europe with other EU programmes and initiatives and will explore how these infrastructures integrate with national strategies. The analysis will highlight the added value of funding TIs at the European level. By pooling resources and fostering collaboration across Member States, these investments enable the development of pan-European capabilities that no single country could achieve independently.

Activities

Digital Europe over the period 2021-2024 provided financial support for both capital expenditures (CapEx) and operational expenditures (OpEx) to the acquisition and operations of supercomputers, testing and experimenting facilities and pilot lines (among other infrastructures). While sharing common characteristics, these infrastructures differ in nature as they address the requirements of various digital ecosystems. These differences include the technologies they support, the targeted technology readiness levels, the specific digital ecosystems they target and their varying degrees of structuration, and the different types of end-users they cater to. More specifically:

- **The acquisition of supercomputing infrastructure,** including mid-range, exascale, post-exascale, and quantum computing facilities intends to foster the development of an innovative and widely distributed supercomputing ecosystem across Europe. Through the EuroHPC JU, Digital Europe funding has supported the deployment of Europe's first and second exascale supercomputer at the Jülich Supercomputing Centre in Germany and at CEA in France. Other contributions include the procurement of six quantum computers, the development of mid-range supercomputers, upgrades to enhance AI capabilities in existing systems, and the procurement of an industrial supercomputer.
- The establishment of **Testing and Experimentation Facilities**. These facilities serve as **specialised large-scale reference sites**, enabling technology providers from across Europe to test and experiment with **cutting-edge AI solutions** at scale. TEFs encompass both **software and hardware products and services**, including robotics, and are designed to simulate real-world environments for comprehensive testing and validation.
- The establishment and operational activities of **five pilot lines** as critical infrastructures for the semiconductor industry. These pilot lines are designed to enable the **testing, experimentation, and validation** of semiconductor technologies and system design concepts at higher Technology Readiness Levels. SO6 is implemented through the

Chips JU. As of 2024, Digital Europe has provided funding for five Pilot Lines aimed at advancing semiconductor and photonic technologies.

Table 35 Technology Infrastructures covered under this case study

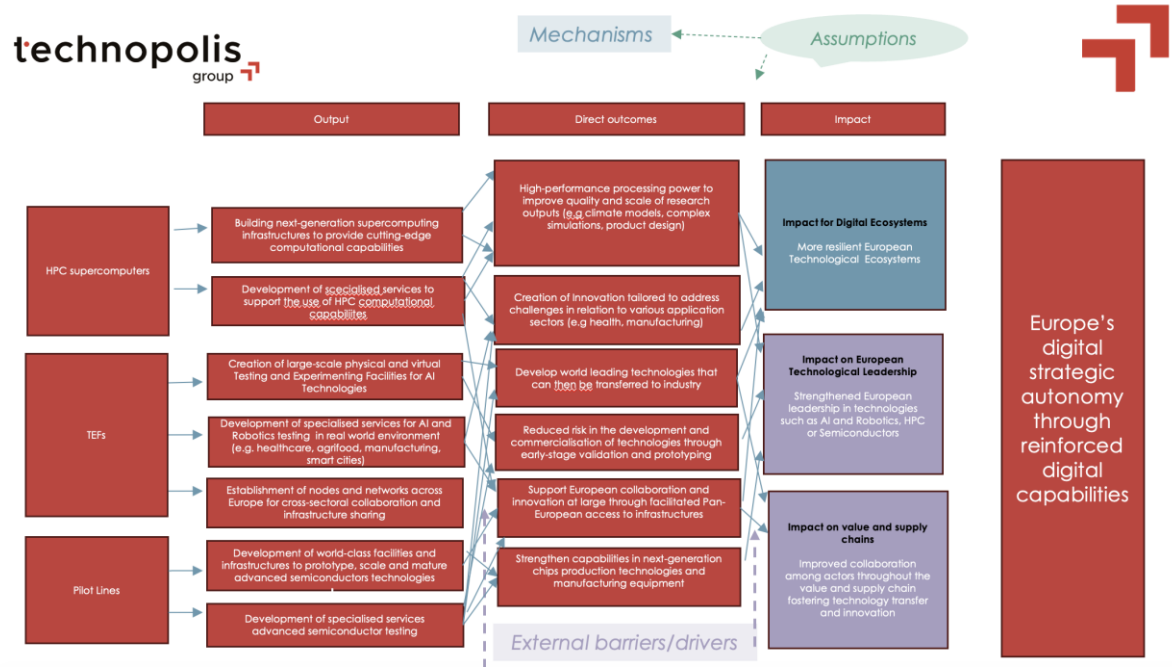
Specific Objective	Digital Ecosystem	Implementing body	Infrastructure	TRL Levels	Main users
SO1	Scientific Research & Academia Artificial Intelligence & Machine Learning	EuroHPC JU	**Supercomputers** Mid-range Exascale Post-exascale Quantum	TRL 1-8	Scientific community (main users) AI start-ups and SMEs Quantum start-ups and SMEs
SO2	Artificial Intelligence & Robotics	European Commission	**Testing and Demonstration Facilities** Health Manufacturing Agrifood Smart Cities & Communities	TRL 6-8	AI start-ups and SMEs SMEs leveraging AI and robotics to innovate / scale operations Large enterprises
SO6	Microelectronics / Semiconductor	Chips JU	**Pilot Lines** Advanced semiconductors at sizes of 2 nm and below Advanced Fully Depleted Silicon on Insulator technologies targeting 7 nanometres Advanced semiconductor devices based on Wide Bandgap materials Heterogenous application Photonic Integrated Circuits (PICs)	TRL 3-7	Research Institutions Semiconductor Manufacturers Start-ups and SMEs Large enterprises

Source: Technopolis 2025

Impact pathway

The case study develops specific impact pathways for technology infrastructures funded under Digital Europe. pathways serve as the foundational intervention logic, guiding the analysis of the evaluation.

Figure 16 Impact pathway for Technology Infrastructures funded under Digital Europe



Source: Technopolis Group, 2025

The impact pathways for these infrastructures must consider that each of them serves distinct and highly specialised ecosystems, catering to unique technological and operational needs. Their varying states of deployment also play a critical role, as the assumptions influencing their outcomes differ significantly depending on the maturity of the technology the infrastructures serve. As a result, their assumptions around service relevance, user accessibility, and long-term sustainability are tailored to their unique operational contexts:

Table 36 Main assumptions identified as part of the Impact Pathway

Main assumptions:	Supercomputers	TEFs	Pilot Lines
Infrastructures services	Services are tailored to meet demand-driven applications, finding a balance between **traditional computing, AI, and quantum computing**. Services are designed to meet the needs of both **the scientific community** and ecosystems such as AI, quantum as well as wide range of industrial application sectors.	Services aligned with demand-driven application Services aligned with specific sectoral needs (e.g. health, manufacturing, agrifood, smart cities)	Services are aligned with **demand-driven applications in the semiconductor industry**

Accessibility	**Access modes** are designed to cater to both the **scientific community's needs for high-demand, large-scale computational projects** and the specific requirements of the **AI community, including SMEs and startups.** **Competence Centres** play a pivotal role in providing services to SMEs, acting as key connectors to the broader infrastructure	**The added value of services provided to SMEs by the TEFs** is well-recognised by startups and small and medium-sized enterprises. **Access modes and tariffs** are designed to be efficient and incentivising, ensuring broad participation and engagement.	**Access modes and tariffs** are designed to be efficient and incentivising, ensuring broad participation and engagement across various ecosystems. Mechanisms facilitate access to cutting-edge pilot lines and testing facilities, allowing startups, SMEs, and other stakeholders to leverage advanced resources and drive innovation. **Competence Centres** play a pivotal role in providing services to SMEs, acting as key connectors to the broader infrastructure.
Community Building	**Competence Centres and Hubs** play a vital role in supporting SMEs and start-ups by connecting them with the services offered by HPC Centres. **AI Factories contribute** significantly to fostering innovation among AI start-ups and facilitating access to HPC service **HPC User Forum** further strengthens community building and ensures a user-oriented evolution of HPC resources and application	**Competence Centres and Hubs** play a vital role in supporting SMEs and start-ups by connecting them with the services offered by the TEFs. **Cross-sectoral initiatives** and events play a crucial role in fostering community building across TEFs, enabling collaboration, knowledge sharing, and innovation among diverse stakeholders.	**Competence Centres and Hubs** play a vital role in supporting SMEs and start-ups by connecting them with the services offered by the Pilot Lines. **Collaboration across pilot lines and alignment with user needs** foster a strong community around different semiconductor ecosystems and members of the value chain. Collaboration also allows for the realisation of innovative solutions that combine the different technologies.
Application support	**Robust application support needed for AI and QC integration**	**Application support needed** for industries especially with SMEs	**Application support needed** on the Pilot Lines for industry
Workforce Development	**Steady talent pipeline** with upskilling initiatives	Skilled workforce to handle TEF operations	**Steady talent pipeline** with upskilling initiatives
Visibility and communication	Outreach to scientific community and AI SMEs and start-ups	Effective outreach to SMEs, Start-ups.	Effective outreach to SMEs, Start-ups.
Strategy development	Effective integration of R&I outputs into supercomputing systems	Long-term viability beyond initial funding	Defined pathway from lab innovations to industrial-scale adoption

Source; Technopolis 2025

Effectiveness

This section is structured around key areas and the assumptions influencing the impact pathways of these infrastructures. It provides an overview of selected projects and initiatives implemented to date, highlighting how these assumptions contribute to outcomes and overall impact.

Access to European world-class infrastructures services

Technology Infrastructures funded under the Digital Europe intend to provide a European access to world-class infrastructures enabling wide range of use both from the scientific community and industrial ecosystem.

Table 37 Access modalities of TIs co-funded under Digital Europe

Name of the TI	Access Modes	Countries	User Base
EuroHPC supercomputers	50% of access granted through EuroHPC 50% of access granted by the Hosting Entity	FR, LX, IT, DE, NL, FI, PT, SI, CZ, ES, BG	Scientific community (main users) AI start-ups and SMEs Quantum start-ups and SMEs
Chips JU Pilot Lines	Access through a Single-Entry Point organised by the main pilot lines. Access is also facilitated by the Chips Competence Centres.	FR, DE, FI, IE, AT, ES, PL, BE	Semiconductor start-ups and SMEs SMEs leveraging AI and robotics to innovate / scale operations Large enterprises such as Foundries, Integrated Device Manufacturers (IDMs)
Testing and Experimenting Facilities	Access through a Single-Entry Point	DK, LU, SK, BE, NL, SE, CZ, ES, PT, IT, AT, FR, GR, DE, PL, FI	Research Institutions Semiconductor Manufacturers Start-ups and SMEs Large enterprises

Source: Technopolis 2025

EuroHPC's supercomputers offer different access modes, **extending beyond the scientific community** to include industry, SMEs, startups, and public sector entities requiring supercomputing resources for artificial intelligence and data-intensive activities. Access models have been adapted to meet these evolving demands, with innovations such as the modification of "queue-based" systems to better serve the AI community. **To support this transition, access policies have recently been fine-tuned, with 20% of system capacity now reserved for AI-driven applications, including SMEs/startups**. Between 2022 and 2024, the Extreme Scale Access consumes 70% of the total node hours, followed by Regular Access (29%) and AI/Data Access (1%)[228]. EuroHPC's access modes and node hour allocation reflect a prioritisation of **high-demand, large-scale computational projects, underscoring a strong commitment to fostering groundbreaking research and delivering excellence in scientific achievements.**

AI and Data-Intensive Applications Access had the smallest share of both proposals and node hours. While this mode had the lowest allocation, it is specialised for AI and data-intensive tasks, which often require more rapid computation over shorter durations. Nevertheless, to ensure equitable and effective AI access, attention must be given to **designing tailored access models that meet the unique needs of AI users**. As it stands, EuroHPC provides a bi-monthly cut off for the AI and Data intensive application access. Further analysis and evaluation should be conducted to ensure that the access model effectively provides the appropriate opportunities for the community.

[228] Important to note that the data only considers AI / Data Access for the period April-June 2024 while the rest access modes data spans from Dec 2021 to March 2024 for Regular Access and Dec 2022- Apr 2024 for the Extreme Scale Access

Table 38 EuroHPC Access Call Statistics

Access Call	Proposal Awarded	Node Hours Awarded
Extreme Scale Access[229] (Dec 2022- Apr 2024)	75	63,113,698
Regular Access[230] (Dec 2021-Mar 2024)	189	25,698,394
AI And Data Intensive Applications Access[231] (Apr 2024-Jun 2024)[232]	25	1,033,500
Total	**289**	**89,845,592**

Source: EuroHPC User Days 2024. PPT Day 1. Link

The **"Destination Earth" (DestinE)** EU flagship initiative launched in 2021 has been developing a highly accurate digital model of the Earth (a digital twin of the Earth) to model, monitor and simulate natural phenomena, hazards and the related human activities. Destination Earth is one of the **initiatives identified as strategic for the Union** in the preamble of the EuroHPC JU Regulation[233].

DestinE provides groundbreaking features assisting users in designing accurate and actionable adaptation strategies and mitigation measures, unlocking the potential of digital modelling of the Earth system at a level that represents a real breakthrough in terms of accuracy, local detail, access-to-information speed and interactivity.

During its first implementation phase (Q4 2021 – Q2 2024), DestinE established the required synergies with EuroHPC, **harnessing its world-leading supercomputing capabilities** and pushing the limits of computing, ML/AI, weather and climate sciences, and leveraging the "path to the Digital Decade" with hundreds of European research and computational scientists from industry, academia and many European and national institutions involved.

During this period, one of the main achievements was the deployment of the overall DestinE infrastructure and the initial release of its first two Digital Twins, demonstrating their production capabilities **at unprecedented scale on the available EuroHPC systems.**

Box 2 Destination Earth access to EuroHPC supercomputers

The first two high-priority digital twins (DT) are the Weather-Induced Extremes Digital Twin (Extremes DT) and the Climate Change Adaptation Digital Twin (Climate Adaptation DT), powered by the first pre-exascale EuroHPC supercomputers.

The Climate DT is setting a unique capability to produce bespoke, cutting-edge numerical simulations addressing 'what-if' questions related to the impact of certain scenarios or policy decisions on the evolution of our planet, generating km-scale simulations of climate scenarios from global to regional and national levels at a multi-decadal timescale.

The Extremes DT will give tailored access to an information system including, e.g., scenarios, forecasts and visualizations of extreme weather events, natural disaster evolution and climate adaptation approaches. The Extremes DT aims to provide an on-demand workflow with co-design of high-resolution predictions about extreme weather

[229] For high-impact and high gain innovative research applications, with very large compute time, data storage and support needs
[230] For research and public sector applications requiring large-scale resources or frequent access to substantial computing and storage resources
[231] For industry, SMEs, startups, and public sector entities requiring access to supercomputing resources to perform artificial intelligence and data-intensive activities.

[233] Council Regulation (EU) 2021/1173 of 13 July 2021 on establishing the European High Performance Computing Joint Undertaking and repealing Regulation (EU) 2018/1488

events combined with decision-making support for impact sectors, including hydrology, air quality and energy meteorology.

LUMI is used for the development of the Climate DT and it's also one of the two EuroHPC supercomputers currently used for the Extremes DT's physics-based and data driven model system and computationally intensive dataflow. As part of DestinE and its digital twins, LUMI's computing power will facilitate technological solutions that make societies safer and more resilient against extreme weather events and the impacts of climate change.

Source: Selected LUMI Use Cases. May 2024.

As highlighted in interviewees, the Destination Earth initiative has **accelerated advancements in weather forecasting and climate modelling. Tasks that previously required access to U.S. supercomputers can now be performed on a daily basis using European systems.**

The Destination Earth System was inaugurated by the former European Commission Executive Vice-President for a Europe Fit for the Digital Age Margrethe Vestager, on Monday, 10 June 2024 in an official launch event hosted in the LUMI Supercomputer Center in Kajaani, Finland. The work continues in Phase II of DestinE through a network of powerful EuroHPC supercomputer infrastructures (CSC (LUMI), CINECA (Leonardo), BSC (Mare Nostrum 5), LuxProvide (MeluXina)).

Accessibility of Infrastructures services to users

User access is further facilitated through the establishment of **Competence Centres** under both SO6 and SO1 for access to the Chips Pilot Lines and the EuroHPC supercomputers.

Box 3 Finnish Chips Competence Centre

The Finnish Chips Competence Centre is based on a coordinated national network of access points in different regions including Tampere (strong tradition of designing large and complex system-on-chips and optoelectronics), Espoo (leveraging research expertise from VTT and Aalto University, particularly in material science and silicon wafer processing), Oulu (known for its strong history in radio technology, tracing back to Nokia's peak years) and eastern Finland (expertise in specialised knowledge in optics and photonics, which complements chip technology development) is being developed to ensure ease of access for end-users. The Competence Centres serve as a key interface for end-user industries, prioritising demand-driven actions tailored to meet their specific needs. Their primary focus is to support end-user industries while occasionally extending assistance to technology developers.

The Finnish Chips Competence Centre is still in the preparation phase, but its operations are expected to begin in early 2025. The centre aims to recruit the best experts in the field and to excellent support structure for the entire industry in Finland and pushing end-user industries to make greater use of advanced technological resources.

Source: Business Tampere, 2024. An enthusiastic drive accelerated swift cooperation in Finland – Recruitments for the Chips Competence Centre begins. Accessed December 2024. Link

Testing and Experimentation Facilities are structured around **"Nodes"**, which offer the infrastructure and services in their areas of expertise and a network of **"Satellites",** which are smaller testing facilities than nodes to complement the nodes' testing services and/or geographical coverage. Funding supports the creation of one large TEF per sector, typically

composed of 4-6 nodes that provide private and public organisations both remote and in-person access to their services. In the context of setting up the TEFs, a single-entry point was established to simplify accessibility. Regarding access, **defining an accessible pricing model for SMEs presents a significant challenge** due to the complexity of parameters, varying node overheads, and the influence of **State Aid Rules** on final pricing (further reinforced in the case of cross-border access). To ensure broad accessibility of TIs to users it is also important to understand the needs and constraints faced by different users, particularly SMEs and start-ups with limited resources.

Tailored Application Support and Sector-Specific Requirements

Technology infrastructure plays a crucial role in bridging research and innovation with practical applications, ensuring sector-specific needs are met while driving the development, application, and commercialisation of future technologies. Technology Infrastructures offer a range of services encompassing both **technological activities** and **business support services**. These include conducting technology feasibility studies and proof-of-concept development, demonstration and prototyping, technology validation, and product testing (e.g., experimenting with new materials or validating innovative processes) but also incubator or accelerator programs, legal and compliance assistance, and facilitating access to financial resources (e.g., grant application support, investor matchmaking).

Examples of specific services delivered to SMEs and startups by the TIs covered in this case study include:

Box 4 Quantscient prepares for quantum future with LUMI supercomputer = NCC

Founded in 2021, Quanscient 's technology combines advanced cloud computing and quantum integration. It is expected to bring significant benefits to industrial applications based on, for example, computational fluid dynamics. Quanscient's vision is to make simulations matching reality by building a next-generation Simulation-as-a-Service platform utilising cloud and quantum computing.

Quantum computing has the potential to revolutionise the way businesses process data in a more profound way than AI is currently doing. Quanscient is already preparing for future business needs and developing quantum software with the help of the LUMI supercomputer. The LUMI supercomputer is used to study how the software being developed can be scaled to the more powerful quantum computers of the future.

Source: Selected LUMI Use Cases. May 2024.

Box 5 Median Technologies – a French SME that delivers AI based radiology solutions – received the first TEF-Health service.

Median Technologies were looking to test out the quality of their AI/ML-based eyonis solutions and improve the robustness of their processes in compliance with the increasing level of requirements of the incoming European regulation on AI systems.

The service provided by TEF-Health partner LNE consisted of an assessment of the process used by the SME to develop and evaluate their AI data-based systems. This assessment is based on the study of the documentation describing the process, such as conception documents, risk analysis matrix or the evaluation plan. This first review

allowed LNE to identify parts of the process where information is lacking and to better prepare the questions and specific topics to be discussed during meetings with the team developing the AI system.

Source: Testing and Experimentation Facility for Health AI and Robotics. Success story – First Service delivered by TEF-Health to an SME. 2024. Link

Without the adequate support mechanisms, even the most advanced infrastructures risk being underutilised, as users may struggle with integration, adaptation, or workflow optimisation. **Comprehensive support structures are essential not only to improve accessibility but also to maximise the impact of these infrastructures.** Support is required across multiple domains and specialists must be integrated within user communities to drive progress. Interviewees underlined that it should be ensured that **existing infrastructures are fully operational, effectively supported, and capable of delivering their intended outcome.** In the context of SO1, **application support is particularly vital for AI and QC, with users emphasising the need for improved future support**. This is especially important to facilitate the transition to hybrid systems that integrate HPC, AI, and Quantum Computing, ensuring that users can effectively leverage these cutting-edge technologies. In addition to Horizon-funded projects like Excellerat and EPICURE, Digital Europe has launched specific initiatives focused on application support for infrastructures financed under the Digital Europe framework including MINERVA which aims to enable AI communities to harness the full potential of EuroHPC systems, accelerating AI research.[234]

Community Building, Communication and Dissemination activities

Community building is essential for making Technology Infrastructures visible and attracting new users. It plays an important role in ensuring that these infrastructures are tailored to the needs of their users by fostering regular dialogue and interaction among stakeholders, including researchers, industry representatives, and infrastructure operators. In the context of High-Performance Computing, the newly established **HPC User Forum** aims to serve as a platform for users and infrastructure providers to exchange insights, share challenges, and identify emerging needs. The forum seeks to ensure impactful representation of current and potential users in the years to come.

As part of the TEFs initiative, over the past two years, substantial progress has been made in community building. This is notably exemplified through the AI. Matters project which **developed a comprehensive service catalogue[235] across the different nodes. This comprehensive repository provides a centralised source of services accessible to any company**. It not only offers detailed information and publishes available services but also streamlines the process of service requests among community members, fostering collaboration and accessibility. Community building was further reinforced through cross-sectoral TEF events, such as the xTEF 2024 event titled "All TEFs Open for Business," which took place in Berlin in 2024. This event fostered collaboration and engagement across various sectors, strengthening the network and promoting the exchange of ideas and best practices among TEF stakeholders.

Effective communication and dissemination activities also contribute to promoting access to European Technology infrastructures and fostering collaboration among stakeholders. Success stories illustrate the benefits and real-world impact of the services offered by technology infrastructures and can contribute to encouraging broader user engagement. In the context of a European network of Technology Infrastructure, stakeholders

[234] EuroHPC Minerva project. https://eurohpc-ju.europa.eu/research-innovation/our-projects/minerva_en
[235] https://ai-matters.eu/services-catalog/

highlighted the potential benefits of transitioning from communication and dissemination efforts focused on isolated use cases to promoting collaborative, multi-stakeholder projects supported by the TIs. For example, rather than having a SMEs relying solely on a technology from a single RTO, the goal should be to encourage joint efforts where an SME collaborates with industry partners to leverage technology across multiple RTOs.

Workforce Development

Both the operation of TIs and the development of the surrounding ecosystem require a skilled workforce and a robust talent pipeline. This involves not only upskilling and reskilling existing engineers but also fostering the growth of a European talent pool capable of effectively **operating and leveraging** these infrastructures and their systems. While some initiatives are in progress, stakeholders across different ecosystems agree that workforce development remains a significant challenge for the successful deployment and utilisation of these infrastructures and the successful growth of the ecosystem. For example, the Digital Europe project Master4HPC addresses skill gaps in high-performance computing; however, its scalability is limited, with only around 100 students graduating per cohort.

Similarly, the **Joint Education for Advanced Chip Design in Europe (Edu4Chip)** initiative strengthens Europe's chip design capabilities by creating and implementing harmonized study programs at leading European universities. This initiative aims to increase the number of skilled chip design experts.

Several initiatives at the national level are also contributing to workforce development in the semiconductor and digital technology domains, but their fragmented nature limits their collective impact, for example as it is the case for the Spain's **'Cátedras Chip' Programme.** This initiative finances the creation of university chairs focused on advancing microelectronics research, aiming to strengthen academic and industrial collaboration in the field. Another example is **HETiA (Hellenic Emerging Technologies Industry Alliance)**, based in Greece, which is an alliance of 47 industrial members and 28 universities and research institutes dedicated to promoting the adoption of digital technologies and fostering entrepreneurship in emerging technology domains. Further evaluations of the coherence and synergies between different EU and national programmes could help shed light on how the fragmented implementations of various skill and workforce development initiatives affect the potential for creating synergies and achieving the scale necessary for building a competitive and robust workforce at the pan-European level. This question seems particularly relevant in emerging fields, such as AI and quantum computing, where foundational knowledge and skills need to be developed or significantly adapted.

Coherence

Internal Coherence: complementarity with R&D&I activities funded under other EU programmes

The Technology Infrastructures under SO1 and SO6 are implemented by **Chips Joint Undertaking and the EuroHPC Joint Undertaking[236].** Their activities are funded through different European Union's programmes including **Horizon Europe for R&D&I activities**, the **Digital Europe for deployment and capacity building activities** and the Connecting Europe Facility (CEF-2 programme) for EuroHPC to support and catalyse investments in digital connectivity infrastructures of common interest. From a strategic perspective, internal coherence and synergies between funding programmes are primarily guided by **the Strategic**

[236] https://eurohpc-ju.europa.eu/index_en

Research and Innovation Agenda. In this context, this strategic document developed by a Joint Undertaking in collaboration with industry and other key stakeholders, has been recognised as a critical tool for aligning priorities and ensuring consistency across the European Union's priorities.

The Strategic Research and Innovation Agenda of the EuroHPC JU[237] was adopted in 2019 by the JU's Research and Innovation Advisory Group (RIAG). The EuroHPC JU builds the Multiannual Strategic Programme (MASP) based on the SRIA, and it is currently under revision and in full consultation with advisory groups. The interviewees referred to a very good partnership between the JU with the RIAG and the second advisory group of the EuroHPC JU, its infrastructure advisory group (INFRAG). There are exchanges at least once a week, and they are fully involved in the development of the new Multi-Annual Strategic Programme[238]. Through its advisory group experts, the EuroHPC JU has access to information on the latest developments in technology and ideas for focusing its investments. Similarly, the Chips JU (ex-KDT JU) is committed to open and transparent processes for consulting all partners and other relevant stakeholders on the identification of their priorities (which is exemplified in the drafting of the SRIA, involving over 300 experts from industry, RTOs and academia in almost all participating states, and collecting feedback on the draft SRIA from stakeholders in annual Stakeholder Forums).[239]

As part of this evaluation, **several examples demonstrate the integration of R&D&I activities and projects funded under the EU Framework Programmes for Research and Innovation** (e.g., FP7, Horizon 2020, and Horizon Europe) within Digital Europe-funded infrastructures. The DEEP project[240] series is a prominent example, beginning with the initial DEEP project (December 1, 2011 – May 31, 2015) and extending through DEEP-ER, DEEP-EST, and DEEP-SEA. Funded under the EU Framework Programmes for Research and Innovation and EuroHPC, these projects contributed to the development of innovative software components, such as "software bricks," which enable dynamic modularity of applications on multi-partition systems. These components are being deployed in EuroHPC systems, including MELUXINA in Luxembourg and JUPITER at Jülich financed through the Digital Europe.

Box 6 DEEP Project Serie deployment in EuroHPC System JUPITER

JUPITER will be based on a dynamic, modular supercomputing architecture, which the Forschungszentrum Jülich have developed together with European and international partners in the DEEP projects funded by the European Commission and EuroHPC JU. The modular architecture will enable an optimised utilisation of the various computing modules during complex simulations. Such architecture also means that the system will be well prepared for integrating future technologies such as quantum computing. DEEP-SEA latest project of this series (and a EuroHPC one) also supported the development of other tools that are deployed in software stacks of EuroHPC computers.

Following the successful completion of DEEP-EST and the launch of the prototype at the Jülich Supercomputing Centre, the DEEP projects face a new challenge: how to design programming environments that can support future Exascale systems with a wide variety of different workloads.

Source: Link and Link

[237] EuroHPC_RIAG_Strategic_Agenda_2019_0.pdf
[238] EuroHPC Joint Undertaking Multi-Annual Strategic Programme (2021 – 2027)
[239] European Commission: Directorate-General for Research and Innovation, Berrada, K., Viscido, S., Lotito, A., Maroulis, N. et al., *Horizon Europe and the digital & industrial transition – Interim evaluation support study – Phase 2 – Horizon Europe – Institutionalised partnership report – ECSEL & Key Digital Technologies (KDT) joint undertakings*, Viscido, S.(editor), Lotito, A.(editor), Boekholt, P.(editor) and Lebhardt, F.(editor), Publications Office of the European Union, 2024, **https://data.europa.eu/doi/10.2777/71518**
[240] https://deep-projects.eu/

The European Processor Initiative (EPI)[241] funded through the EU Framework Programme for Research and Innovation and EuroHPC, has supported **the development of the RHEA General-Purpose Processor by SiPearl**, which is expected to be integrated into Jülich's JUPITER supercomputer in the near future. The first three-year phase of the project (2018–2021) successfully delivered key technologies aimed at improving European sovereignty, including the RHEA GPP and a proof-of-concept for European accelerator technology. Next steps in the second half of the project notably include finalising the development and deployment of the first generation of low-power processor units, advancing the second generation of the GPP with technological enhancements for European Exascale machines, developing second-generation low-power accelerator test chips for use by the HPC community as well as establishing robust industrialisation and commercialisation pathways to ensure long-term economic sustainability.

Another example, still in the pilot stage and not yet a production system, is the **EUPEX project**[242], supported by Horizon Europe. The project focuses **on co-designing a European modular exascale-ready pilot system.** EUPEX brings together results from numerous prior projects while validating processors developed through the European Processor Initiative (EPI). The goal is to create a coherent modular HPC platform, paving the way for a self-reliant European HPC industry capable of manufacturing and delivering exascale-class supercomputers.

Despite existing synergies between R&D&I activities and deployment efforts, stakeholders have expressed concerns about **the pace of technological development,** citing delays in translating research outcomes into tangible applications and scaling up solution. While Europe hosts a significant share of the world's HPC resources, only a small fraction of HPC technology and infrastructure is developed within the EU. This reliance on imports places the European Union at a competitive disadvantage. Currently, the EuroHPC JU relies heavily on off-the-shelf solutions and lacks an integrated pipeline between research and production, unlike models that can be observed in the U.S where research agencies fund early-stage technology development, and public authorities commit to purchasing first-of-its-kind solutions. This approach provides startups with financial security, enabling them to invest in R&D and bring new innovations to market with confidence. This issue is closely linked to **the uptake of EU-funded technological R&D in public procurements**, particularly in encouraging the integration of European technologies in infrastructure projects. Interviewees acknowledged that the High-Performance Computer procurement process is progressing with a clear focus on adopting European technologies when it comes to the acquisition of quantum computers. For instance, the first quantum processors have been acquired from the French startup Pascal, and EuroHPC is advancing with the procurement of additional quantum machines. These include a photonics-based quantum computer from Quandela, another French company, alongside five additional European quantum solutions.

The Chips Joint Undertaking, a strategic initiative funded by both Horizon Europe and the Digital Europe Programme, fosters synergies between the two programmes. R&D activities funded by Horizon Europe fully align with the deployment activities of the Digital Europe Programme. In this context (as it is the case for EuroHPC JU), programming coherence ensures that Horizon Europe supports the development of new technologies, while the Digital Europe Programme funds the pilot lines needed to implement these innovations and make them available for further testing. Integration and coherence must also be established between R&D&I projects under the Chips Joint Undertaking and the broader Chips for Europe initiative. I The relationship between research infrastructures funded through Horizon Europe and technology infrastructures supported under the Chips Act could be improved by exploring the

[241] https://eurohpc-ju.europa.eu/research-innovation/our-projects/european-processor-initiative-epi_en
[242] EUPEX project https://eurohpc-ju.europa.eu/research-innovation/our-projects/eupex_en

potential synergies between these two types of infrastructures. Another critical point is the alignment between the five Pilot Lines and other existing TIs in the microelectronics sector. At this stage, coordination is facilitated by the fact that many major Pilot Lines / Cleanrooms in Microelectronics are managed by the same key stakeholders involved in the Chips Act, such as leading RTOs like CEA, IMEC, Fraunhofer and VTT. Having a clear picture of existing Research and Technology infrastructure within the field of Microelectronics and potential collaborations at the European level would be highly valuable. This could be facilitated by ongoing initiatives, such as the **RITIFI project**[243], funded under Horizon Europe, which aims to map and support synergies between Research Infrastructures and Technology Infrastructures at European level. Coherence must also be strengthened with ongoing initiatives such as the **INFRACHIP - European Research Infrastructure on Semiconductor Chips**[244] to ensure it fits into the broader pipeline and contributes effectively to a unified European strategy for semiconductor development. Questions regarding coherence with existing national microelectronics centres and their alignment with the broader Chips Act initiative merit further exploration. Examining how the capacities developed under the Chips Act can connect with the activities of a wider network of national technology centres could significantly amplify their contribution to the broader European innovation ecosystem.

Internal Coherence: Aligning synergies between EDIHs, Competence Centres and AI Factories to prevent duplications

All three Technology Infrastructures described in the case studies are organised around Competence Centres (SO1 and SO6) or, in the case of the TEF (SO2) a single-entry point. These Competence Centres or Single-Entry Points (SEP) are intended to connect to European network of Infrastructures, serving as access points to other nodes within the network. **Competence Centres and SEP of the TEFs are also complementarity to other EU initiatives such as the European Digital Innovation Hubs (EDIH).** As a matter of example, TEFs and European Digital Innovation Hubs (EDIHs) play distinct but **interconnected roles in fostering innovation and technological adoption**. **EDIHs** focus on supporting the local economy by helping businesses and organisations adopt digital technologies. EDIH play a key role in linking regional activities to a Europe-wide network within sustainable innovation infrastructure preventing redundancy and lowering costs. They also act as local entry points to European AI initiatives, including TEFs, and emphasize the principle of “test before invest,” allowing users to assess the benefits of mature technologies in their environments before purchasing. **TEFs, on the other hand, serve as centralised resources and toolkits for EDIHs and other AI solution users**. Unlike EDIHs, TEFs focus on validating emerging technologies in real-world environments, through TIs bridging the gap between development and market readiness. The complementarity lies in the pipeline from TEFs to EDIHs: TEFs validate and refine new technologies, and once mature, the validated solutions can be distributed via EDIHs to local users and businesses.[245]

As outlined in the Chips Act[246], synergies between **Competence Centres** and existing structures, such as **European Digital Innovation Hubs** established under Digital Europe, should be maximised. As Competence Centres are still being established, some interviewees highlighted that connections with EDIHs have not yet been highly visible. However, the ground for such synergies has been paved with industry players involved in EDIHs recognised as valuable partners for Competence Centres, offering key channels for collaboration. As part of the Finnish Competence Centre, efforts are ongoing to map networks focused on industry digitalisation across Finland, with plans to integrate these existing channels into the Chips Competence Centre’s operations once active. The distributed "access point" model of

[243] RITIFI project - https://ritifi.eu/
[244] INFRACHIP - https://infrachip.eu/
[245] https://digital-strategy.ec.europa.eu/fr/faqs/testing-and-experimentation-facilities-tefs-questions-and-answers
[246] https://eur-lex.europa.eu/legal-content/FR/TXT/?uri=uriserv%3AOJ.L_.2023.229.01.0001.01.FRA

Competence Centres, as outlined in the Chips Act, is specifically designed to leverage these networks, ensuring wide access and effective integration.

As part of SO1, the AI Factories initiative[247], announced in January 2024, aims to support a broad spectrum of European users, including start-ups, SMEs, industry, academia, and the public sector. This initiative seeks to foster a highly competitive and innovative AI ecosystem in Europe by acquiring and upgrading large General-Purpose AI models, supercomputers, and programming facilities. Additionally, it will focus on developing next-generation Graphics Processing Units, including those for quantum computing, to address the global chip shortage[248]. The AI Factories also aim to broaden AI adoption, particularly among start-ups and SMEs, **by offering access to AI solutions while strengthening the European AI research ecosystem.** Interviewees emphasised the initiative's importance in maintaining Europe's competitiveness, not only for public institutions but also for private entities. They highlighted the urgency of acting swiftly and decisively to address the needs of the AI community and demonstrate Europe's commitment to overcoming challenges and seizing opportunities in AI development. **The AI Factories initiative complements the broader strategy of fostering an ecosystem of excellence and trust in AI across the European Union by leveraging initiatives such as the AI Testing and Experimentation Facilities also escribed in this case study**. The synergies between AI Factories and TEFs will improve AI innovation ecosystem, providing pre-market validation for AI innovations developed within AI Factories. Additionally, coherence with other major AI networks, such as CLAIRE (Confederation of Laboratories for Artificial Intelligence Research in Europe) and ELLIS (European Laboratory for Learning and Intelligent Systems), is essential to ensure the alignment of high-investment efforts with Europe's wider AI research and development landscape.

Internal Coherence: Synergies between Specific Objectives within Digital Europe

TIs cannot be decoupled either from the data they utilise and generate. **Effective data management is also an important part of their operation, particularly for Technology infrastructures under Specific Objectives 1 and 2.** Under Specific Objective 1, in the context of exascale resources and AI, which involve enormous training datasets and observational data, **the seamless production, movement, storage, and analysis of data is a growing challenge**. **Data management strategies must ensure that data flows in and out of machines in an integrated, efficient, and secure manner**. According to interviewees, while EuroHPC has made significant strides in this direction, there is an increasing awareness of the need for a data strategy that is linked to the computing strategy. Addressing emerging needs will require a long-term and ambitious vision. **This includes understanding and planning for data growth, particularly in sectors like health sciences, where personalised data brings additional privacy and security concerns**.

In that context, the Technology Infrastructures highlighted in the case studies, present opportunities for synergies with other activities under SO2, such as Data Spaces. TIs are expected to establish strong connections with Common European Data Spaces, which make data more accessible for economic and societal applications while promoting interoperability and cross-sector collaboration.

[247] https://digital-strategy.ec.europa.eu/en/policies/ai-factories
[248] https://digital-strategy.ec.europa.eu/en/policies/ai-factories

External Coherence; Complementary IPCEI Industrial Deployment and Joint Undertaking R&D&I and Deployment Activities

Since 2018, two IPCEIs in the microelectronics value chain have been launched[249]. These IPCEIs comprise 100 projects in 14 Member States including up to €10 billion State aid which is expected to unlock more than €20,2 billion of additional private investment. These projects focus on R&D and First Industrial Deployment of technologies. While IPCEIs focus on strategic value chains with an emphasis on first industrial deployment just before mass production, the Chips JU also supports value chains but operates at a lower TRL, concentrating on research and technology validation as part of the Chips for Europe Initiative. Coherence between the two initiatives is evident in examples such as the ASML EUV projects[250], which demonstrate alignment between IPCEI and Pilot Lines. Synergies between the Chips JU and IPCEI emerge naturally because the same or similar companies participate in both frameworks (e.g. CEA Leti, Silicon Austria Lab), and Member States fund IPCEIs through national co-funding while also co-financing Chips JU projects. A key argument could be that these synergies should be institutionalised to ensure a structured and efficient transition from research to industrial deployment. Further avenues for synergies could also be explored including how pilot lines can eventually evolve into an IPCEI for large-scale industrialisation, strengthening the overall semiconductor ecosystem. Moreover, lab-to-fab **accelerator projects** are also being funded within the Chips Joint Undertaking and aim to **industrialise pilot lines** by bridging the gap between research and large-scale production, ensuring that innovations can transition smoothly from research to manufacturing.[251]

External Coherence: Synergies Between EU-Funded Initiatives and National and Regional Programmes

Technology Infrastructures discussed in this case study, which are funded 50% at the European level, represent strategic investments that many Member States could not have been able to undertake at the same scale independently. This highlights the added value of European-level financing, enabling the establishment of advanced capabilities that serve the collective needs of the Union. These infrastructures complement existing national and regional facilities, offering European-wide capabilities and access.

At the national level, several initiatives align with and complement European efforts. For example, the French "NumPEx" initiative under the France 2030 program is an exploratory research initiative led by CEA, CNRS, and Inria. It focuses on designing and developing software components for future exascale machines, preparing both scientific and industrial users to fully leverage their capabilities. NumPEx also contributed to the Jules Verne consortium's response to EuroHPC's call for expressions of interest, with the aim of hosting and operating one of the two planned European exascale machines by 2025 at the Très Grand Centre de Calcul at the CEA DAM Île-de-France centre.

Box 7 The NumPEx programme

The NumPEx programme (NumPEx) is a six-year project with a budget of €41 million which commenced in 2023. The programme stems from an objective analysis of the current state of the HPC/HPDA community at international, European, and national levels. One of the key drivers of the NumPEx program is the ongoing paradigm shift in

[249] IPCEI - https://www.ipcei-me.eu/
[250] https://www.asml.com/en/products/euv-lithography-systems
[251] See the Decision GB 2024.92 - Annex MAWP - Appendix 6 – CE. DIGITAL-JU-Chips-2025-SG-SSOI. The accelerator for Advanced Strained Silicon on Insulator Substrates will provide the necessary infrastructure to validate SOI substrates on an industrial scale, accelerating their adoption within the European semiconductor ecosystem. By supporting high-volume production, manufacturers can assess the feasibility and cost-effectiveness of SOI in large-scale FD-SOI applications. It will also promote collaboration across the semiconductor ecosystem, working with other pilot lines, as well as connecting to the design platform and competence centres, among others.

HPC system architectures, with rapidly emerging new technologies and applications (e.g., the digital continuum and AI). This shift necessitates the development and adaptation of the HPC software stack to prepare for the upcoming Exascale supercomputer. The program also aims to anticipate and prepare for post-Exascale systems and their applications. The Programmes aims to:

- Contributing to the European Exascale software stack: NumPEx plays a critical role in the European Exascale ecosystem, with a special focus on the Jules Verne project, which will deliver the second European Exascale system in 2025.
- Preparing the building blocks for post-Exascale software solutions: In the long term, NumPEx aims to explore and develop innovative software solutions to address the rapid evolution of complex HPC systems, the increasing prevalence of data flow-oriented applications, and the integration of AI approaches
- Preparing academic and research applications for the Exascale era
- Structuring the French Exascale community

Source: https://numpex.org/wp-content/uploads/2023/11/NumPEx_white_paper.pdf

Synergies between funded infrastructures and national or regional initiatives are also demonstrated through the contribution of regional funds. For instance, the LUMI supercomputer has benefited from additional funding provided by the European Regional Development Fund, allocated by the Regional Council of Kainuu[252].

EU Added Value

The primary EU added value in co-funding the acquisition and operational costs of Technology Infrastructures through Digital Europe lies in the **effective pooling of resources,** enabling large-scale investments in strategic technologies and digital ecosystems that benefit all Member States. These investments, such as those in EuroHPC supercomputers and Chips Pilot Lines, represent significant financial commitments—amounting to €250m[253] for the former and over €3.6 billion for the latter[254]—that individual Member States would unlikely undertake independently. This collaborative approach facilitates the acquisition of critical infrastructure across Europe, fostering innovation, enhancing the region's technological and industrial competitiveness, and reducing reliance on foreign testing infrastructures. In the context of SO1 for instance, interviewees note that by working together, Europe has achieved pre-exascale and exascale systems much faster than individual Member States could have done independently. **The dual-funding approach, combining EU and national contributions, adds a strong European dimension to infrastructures hosted in Member States while ensuring they retain ownership over identifying infrastructure needs acting as "problem owners"**. This allows Member States to adapt infrastructures to their ecosystems and provide services tailored to the specific demands of their industries, particularly benefiting SMEs and start-ups. At the same time, this model promotes broader access to European collaborations, enabling researchers and stakeholders across Europe to access these infrastructures, fostering innovation and cross-border collaboration.

Technology Infrastructures, as presented in this case study, are conceived and structured as interconnected networks, enabling the establishment of pan-European collaborations—a key aspect of the EU's added value. For instance, **Testing and Experimentation Facilities** fund

[252] https://www.lumi-supercomputer.eu/eurohpcju/
[253] https://digital-strategy.ec.europa.eu/en/factpages/digital-success-stories-jupiter-first-european-exascale-supercomputer#:~:text=The%20DIGITAL%20Europe%20programme%20is,boost%20to%20EU's%20AI%20ecosystem.
[254] Includes Digital Europe Programme, Horizon Europe and Member States participation.

networks of TI providers across at least three countries. EFs enable access to these networked facilities through a digital single-entry point. These infrastructures are organized into "nodes" offering complementary services and focus areas, supported by smaller "satellite". This approach is further reinforced by a Coordination and Support Action under the Digital Europe 2023–2024, which applies a cross-sector perspective to existing TEFs. High-Performance Computing centres generally collaborate across Europe, but this collaboration is set to deepen with the introduction of two new exascale systems in Germany and France. Additionally, the integration of Quantum Computing and Artificial Intelligence across all HPC systems will create common challenges that further strengthen the need for unified efforts among HPC centres throughout Europe. Complementary initiatives like EuroCC and Castiel (1 and 2) aim to establish a European network of National Competence Centres, facilitating coordinated access to supercomputing networks and promoting collaboration across Member States. As part of SO6, the Pilot Lines are supported by an extended network of connected design centres and Competence Centres. These centres act as hubs to coordinate the supply and demand for competencies across Europe, operating through a single-entry point model to streamline access and strengthen connections between facilities and stakeholders

Finally, developing a strategy at the European level, particularly in strategic sectors (e.g. semiconductor, AI, HPC) ensures the participation of major players while influencing smaller countries to prioritise the same objectives. Large Member States and key industrial players, often with pre-existing strategies and infrastructure, align with European initiatives (e.g. Finland's national strategy, "Chips from the North or Belgium IMEC's participation in the Chips for Europe Initiative), leveraging frameworks like the European Chips Act to reinforce their national goals. In that context, Joint Undertakings, which include both Member States and industry stakeholders, play an important role in ensuring coherence and alignment. At the same time, smaller countries are influenced by these European frameworks to make certain critical technologies a priority. In the context of the Chips Act, Croatia, for instance, initiated the Croatian Competence Centre for Semiconductors in 2023, aligning its efforts with the EU's semiconductor targets[255]. Similarly, Czechia implemented the European Chips Act by establishing the Czech National Semiconductor Cluster, which has led to significant progress, such as producing 3 million wafers annually[256]. Malta, through Malta Enterprise, has set up a microchips competence centre to attract industry players and innovators in this strategic sector[257]. These examples illustrate how the European strategy in certain technology sectors can reinforce coherence among major players but also acts as a catalyst for smaller Member States to prioritise certain strategic goals – added value for the EU as such competitive ecosystem across the EU. These examples demonstrate how a European strategy in specific technology sectors can enhance coherence among major players while serving as a catalyst for smaller Member States to prioritise strategic objectives. This approach generates significant added value for the EU by fostering a competitive ecosystem across the entire region.

Conclusions

In conclusion, Technology Infrastructures are instrumental in driving the deployment of technologies, structuring digital ecosystems, and delivering the essential capabilities needed for innovation and growth. They serve as a critical bridge between research and the commercialisation of technologies, acting as backbone of digital ecosystems and enabling technological advancements that support economic and societal development.

Investing in Technology Infrastructures at the European level delivers substantial added value by achieving outcomes that no individual Member State could accomplish independently. Such

[255] DESI Report 2024 – Country Report Croatia
[256] DESI Report 2024 – Country Report Czech Republic
[257] DESI Report 2024 – Country Report Malta

investments guarantee pan-European access and establish a cohesive network of infrastructures, supporting collaboration and innovation across border. However, as demonstrated throughout this report, the ability of TIs to achieve their intended and full impact is contingent on a range of interconnected factors. These factors underline the necessity for a holistic policy framework that integrates TIs within the broader innovation ecosystem. Standalone investments, while valuable, are insufficient to unlock their full potential. To maximise the benefits of TIs, coordinated and comprehensive interventions across policy, funding, and collaboration must be prioritised.

Sources and methodology

This case study was developed based on desk research, analysis of use cases available on the websites of various Technology Infrastructure providers, and interviews with TI providers, including HPC centres, hosting entities, pilot lines, and operators of Testing and Experimentation Facilities.

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ANNEX X. Case Study 3: Synergies

Objective

The aim of this case study is to provide rich, qualitative data on how and why the activities aimed at fostering synergies between Digital Europe Programme (from now on Digital Europe) and other programmes contribute to achieving the **programme's objectives**, with a specific focus on Horizon 2020, Horizon Europe, Connecting Europe Facility and Erasmus+.

The general objectives of Digital Europe are '*to support the digital transformation of industry and to foster better exploitation of the industrial potential of policies on innovation, research and technological development (…) the Programme should also aim to better align Union, Member State and regional policies, and to pool private and industrial resources in order to increase investment and develop stronger synergies.*'[258].

Promoting innovative, green and digital economic transformation and fostering excellence in research and innovation (R&I) are among the EU policy priorities. The European R&I ecosystem is a complex web of different European, national, regional and local instruments. All instruments focus on different Technology Readiness Levels (TRLs) – ranging from fundamental research to the deployment of technologies. This creates interlinkages and potential for synergies between the instruments. An integrated approach and strengthening of synergies between the key EU instruments can reinforce the impact of policies and resources through complementarities and promote the effectiveness and efficiency of utilising the European R&I potential.

Considering the above, this case study analyses how and the extent to which synergies with Digital Europe and other programmes are fostered.[259]

Approach

This case study looks at synergies between Digital Europe and other programmes, with a specific focus on Horizon 2020, Horizon Europe, Connecting Europe Facility and Erasmus+. This case study is based on desk study, a mini-survey for selected Digital Europe projects, a general beneficiary survey, interviews with Digital Europe project managers, data analyses of e-grant data and analyses of the Digital Europe Work Programmes 2021 - 2022 and 2023 - 2024. The case study concludes with an elaborate explanation of the methods.

The case-study is divided into three sections:

- **Synergetic actions**: background piece on the rationale behind the synergies and the type of synergies targeted by the EC, a review of the synergies identified in the various regulations of R&I programmes, the data analysis and the Digital Europe interim evaluation survey.
- **Evaluation criteria**: an assessment of the evaluation dimensions with respect to how Digital Europe fosters synergy with other programmes. This includes six illustrative examples to highlight best practices of targeted, potential and realised synergies.
- **Conclusion**: synthesis of the findings and conclude with best practices.

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[258] Regulation (EU) 2021/694 of the European Parliament and of the Council of 29 April 2021 establishing the Digital Europe Programme and repealing Decision (EU) 2015/2240 (Text with EEA relevance). (14) Retrieved from: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32021R0694

[259] By examining synergies, this case study contributes to the evaluation question COH.04: *To what extent is Digital Europe coherent with actions funded under EU Programmes listed in Annex III of the Digital Europe Regulation, the Recovery and the Resilience Facility, the Digital Decade Policy Programme objectives and targets (22) and other EU Programmes with similar objectives? Have synergies materialised? In which areas should synergies be fostered?*

Limitations

This evaluation is conducted halfway through the programme's implementation and therefore the ability to observe and analyse materialised synergies is limited. Additionally, there is a time-lag between the activities of other European programmes and deployment through Digital Europe. This affects the extent to which synergies already can be achieved. In addition to that, different definitions of synergies exist. This case study is therefore focused on describing some of the expected synergies, using the synergy typology described in the next section, as well as on first indications that these are being realised. However, the study cannot present a complete review of the various ways in which the Commission aims to foster synergies.

Synergetic actions - evidence

This section introduces the scope and definition of *synergies* in the context of this case study. Secondly, it introduces different mechanisms through which synergies can occur. Following that, it describes references to synergies in Digital Europe Regulation and cross-references to four other programmes and the references to Digital Europe in their respective Regulations[260]. Third, a quantitative and descriptive overview of a selection of Digital Europe projects that potentially have synergies with the previously mentioned four other programmes following the data analyses and two surveys is provided. Finally, this section highlights findings from a HaDEA Feedback to Policy Report on synergies.

The definition of 'synergies'

To ensure a common understanding of '*synergies*', it is important to define the term, as different definitions and interpretations exist. According to the **Better Regulation Toolbox** synergies are closely linked with the evaluation criterium *coherence.* This criterium focuses on synergies or inconsistencies between policies in related fields that are expected to work together, especially if the other interventions have the same or similar objectives.[261]

Similarly, the **evaluation study on the external coherence and synergies of Horizon 2020 within the European research and innovation support system**[262] explains that "*synergy occurs when the sum of (expected) results of programmes/initiatives as a whole is greater than the sum of the parts (1+1>2)*". Synergies can occur through coordinated policies, a common approach or through common institutions. The report *Research to Reality Digital Solution to European Challenges* defines horizontal and vertical synergies, reflecting the way governments are involved (i.e. within or between). Horizontal synergies occur between funding programmes at the same government level with complementary objectives. On the other hand, vertical synergies occur across government levels, such as when regional and national levels align with EU level policies.[263] Finally, a guidance **notice** in the context of synergies between Horizon Europe and the ERDF provides insight on how synergy mechanisms can be operationalised.[264]

[260] Horizon 2020, Horizon Europe, Connecting Europe Facility and Erasmus+.
[261] Better Regulation Toolbox. Retrieved from: https://commission.europa.eu/law/law-making-process/planning-and-proposing-law/better-regulation/better-regulation-guidelines-and-toolbox_en
[262] European Commission: Directorate-General for Research and Innovation, *Evaluation study on the external coherence and synergies of Horizon 2020 within the European research and innovation support system – Final report*, Publications Office of the European Union, 2023, https://data.europa.eu/doi/10.2777/90147
[263] Research To Reality - Digital Solution to European Challenges link (download)
[264] Commission Notice Synergies between Horizon Europe and ERDF programmes 2022/C 421/03 Retrieved from: https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52022XC1104(02). The Commission Notice introduces different mechanisms to exploit synergies, including Seals of Excellence, transfers, cumulative funding, support for Teaming and 'upstream/downstream synergies.

In this study, we will use the following **synergy typology** for conceptual clarity (see Table 39). Fostering of synergies can refer to any of the other types of synergies listed in this table. This synergy typology is based on the different previously mentioned sources[265]:

Table 39 Synergy typology

Synergy type	Explanation
Cumulative funding synergies	Cumulative funding synergies bring together **different funding streams** (including both shared and directly managed funds) in the same project, single action or a group of inter-dependent actions or operations (e.g. an institute receives Digital Europe funding and uses other funding streams to co-finance the project or investments).
Sequential synergies	Sequential synergy refers to collaboration where **projects/initiatives build on each other's results/resources**. Within this type, there is a differentiation between: **Upstream synergy**, which occurs when initiatives **pave the way** for new projects (Digital Europe) (e.g., (national) investments into capacities and infrastructures are to be made available to the deployment of innovative new technologies and solutions). **Downstream synergy** aimed to enhance **the take up** of H2020 and other research results towards the market (e.g. the results of a H2020 project are further developed, prototyped and demonstrated to foster or increase the uptake of the developed technology solution).
Concurrent (or parallel) synergies	Concurrent synergy refers to projects/initiatives that **complement each other**. The positive complementary interactions are contemporaneous rather than sequential (e.g. participants are active in multiple programmes that are complementary, and knowledge spillovers take place).
Strategic synergies	Strategic synergies are characterised as **planned synergies through aligning policy objectives, synergy-enhancing services, implementation rules or requirements** (e.g. award criteria aimed to foster synergies).
Operational synergies	Operational synergies refer to **interactions regarding concrete ways to implement the collaboration, including financial and non-financial aspects**. This collaboration can be intentional or incidental. A special case of operational synergy is substitution synergy which occurs when successfully evaluated H2020 (or Digital Europe) proposals are subsequently funded by other sources (e.g., after receiving the Seal of Excellence).

Synergies (mechanisms) in the Regulation establishing Digital Europe

Digital Europe is embedded within a clear policy framework guided by EU priorities (i.e. the digital transformation) and the Digital Decade Framework. The Regulation establishing Digital Europe states that the programme should aim to support digital industry transformation by aligning EU, national, and regional policies and pooling resources to enhance investment and foster synergies. The Regulation introduces different synergy mechanisms and a wide range of references to other programmes:

- The extent to which **a project has** (or explains the) **synergies and complementarities** with other Union Programmes is used as **an award criterion** in the selection process of Digital Europe projects (**strategic synergy**).
- **The implementation of different funding programmes related to one technology by one implementing body, for instance, HPC development by the EuroHPC JU, creates synergies among research and deployment actions (strategic synergies)**
- **Collaboration between the Commission and the relevant Member States authorities** should aim to create synergies between directly and indirectly managed programmes (**operational synergies**);

[265] Including the Evaluation study on the external coherence and synergies of Horizon 2020 within the European R&I support system, the Commission Notice on Synergies, the Better Regulation Toolbox, the Digital Europe Regulation, the Research to Reality Digital Solution to European Challenges-report and the HaDEA Feedback to Policy study.

- The **Seal of Excellence** is introduced as a means to certify and signals the quality of a proposal to other funders, when a project was assessed, complied with the minimum requirements, but was not financed due to budgetary constraints (**operational synergy**);
- **Arrangements for cumulative**/complementary **funding** from Union programmes where the management arrangements allow it (in sequence, in an alternating way, or through the combination of funds), due to the need for co-financing for most actions;
- The **European Digital Innovation Hubs** are a means to foster synergies with Horizon Europe and/or other R&I programmes;

Cross-references between the Digital Europe Regulation and the Regulations of the other four Union Programmes in scope

There are strong complementarities for synergies between Digital Europe and respectively Horizon Europe, Connecting Europe Facility, Erasmus+ and Horizon 2020 in each legal basis. **Horizon Europe** and Digital Europe address similar themes but target different types of actions. Both have different outputs and intervention logics. Horizon Europe is focused on research and innovation, while Digital Europe focuses on deployment. Both the Digital Europe regulation (Annex III) and the Horizon Europe regulation[266] cross-reference each other. For instance, Horizon Europe has dedicated budget for the cluster 'Digital, Industry and Space', which aims to develop technologies relevant to Digital Europe. Horizon Europe has 'digital' as a cross-cutting theme, and it supports research infrastructures and through the pillar 'Innovative Europe' supports scale-up breakthrough innovations. Conversely, Digital Europe focuses on digital capacity building, national, regional and local deployment of digital capacities and digital technologies in areas of public interest. Digital Europe supports infrastructures access for R&D activities supported by Horizon Europe and gradually implements technologies developed under Horizon Europe.

As for the synergies with the **Connecting Europe Facility**, the Digital Europe regulation highlights that the Digital Europe capacities and infrastructures are to be made available to the deployment of innovative new technologies and solutions in the field of mobility and transport. Furthermore, CEF aims to support the roll-out and deployment of these technologies. The CEF regulation[267] specifies that the CEF should focus on funding the digital infrastructure, whereas Digital Europe focuses more on individual digital services and applications in the context of mobility and transport. Finally, the Digital Europe regulation stipulates that coordination mechanisms are to be established.

The synergies with **Erasmus+** lie mostly at complementing the development and acquisition of the advanced digital skills in all Digital Europe domains and through mobility experiences (i.e., Digital Europe projects offer mobility opportunities, which are funded by Erasmus+).

Horizon 2020 was embedded in a clear policy framework that includes a priority on the digital transformation (e.g., the Digital Agenda for Europe), however, logically, in the Horizon 2020 regulation there are no references to Digital Europe or vice versa[268].

[266] Regulation (EU) 2021/695 of the European Parliament and of the Council of 28 April 2021 establishing Horizon Europe – the Framework Programme for Research and Innovation, laying down its rules for participation and dissemination, and repealing Regulations (EU) No 1290/2013 and (EU) No 1291/2013 (Text with EEA relevance) Retrieved from: https://eur-lex.europa.eu/eli/reg/2021/695/oj

[267] Regulation (EU) 2021/1153 of the European Parliament and of the Council of 7 July 2021 establishing the Connecting Europe Facility and repealing Regulations (EU) No 1316/2013 and (EU) No 283/2014 (Text with EEA relevance) Retrieved from: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32021R1153

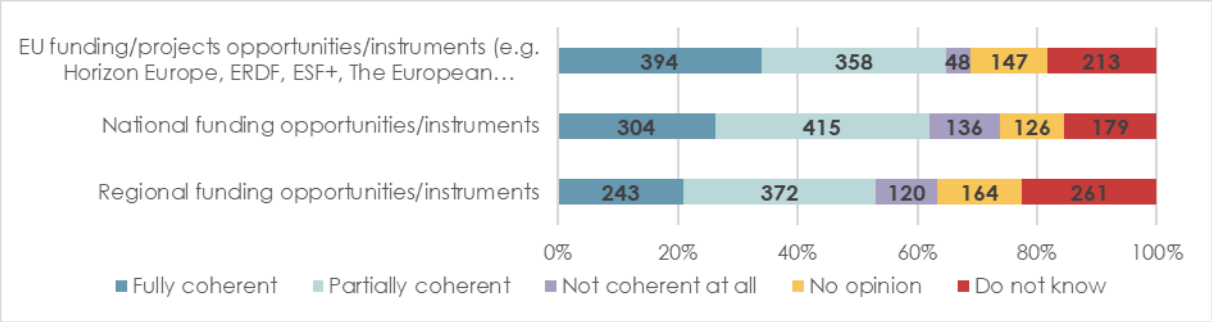
[268] Regulation (EU) No 1291/2013 of the European Parliament and of the Council of 11 December 2013 establishing Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020) and repealing Decision No 1982/2006/EC Text with EEA relevance. Retrieved from: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32013R1291

Finally, in all cases, it is highlighted that programming and implementation processes require a strong coordination mechanisms and governance structure.

Beneficiary survey

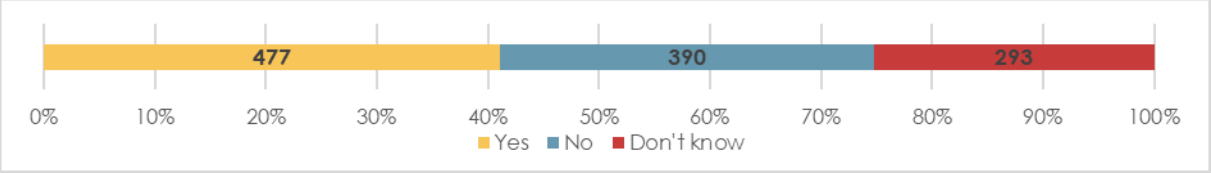
The results of the beneficiary survey show that large shares of respondents value Digital Europe as being complementary to/ having synergies with other programmes' input on synergies. Similarly, for a large part of the respondents, sequential synergies occur.

Figure 17 Beneficiary survey question 35: Please comment whether, and if so to which extent, the Digital Europe is complementary to and/or has created synergies (e.g. collaboration in implementation) with the following type of other instruments: (n=1160):



At the European level, Digital Europe is seen as fully coherent with other EU funding instruments by 38.9% (n=394) of respondents. As for perceptions of coherence between Digital Europe and **regional** and **national funding opportunities**, they are mixed, with several respondents seeing Digital Europe as only partially aligned with these opportunities (34.5% (n=243) for regional and 37.2% (n=304) for national funding) (Figure 17). While the majority of the participants indicated coherence with other EU programmes in an open question, some also indicated that practical challenges (e.g. legal restrictions, administrative barriers, lack of coordination or the integration with national funding sources) hinder the extent to which the synergies can be exploited.

Figure 18 Beneficiary survey question 36: Does your Digital Europe-funded project build directly on activities supported under other European funding instruments, such as Horizon Europe, ERDF, Recovery and Resilience Facility, Digital Decade Policy programme etc.? (n=1160)



As for **sequential synergies**, as much as **41% of the respondents mention that their project builds on the results of another EU funded projects,** which highlights that beneficiaries manage to navigate through different EU funding options further improving or developing previously achieved results. 34% (n=390) did not agree with that statement and 25% (n=293) that did not know (Figure 18).

Data analysis

High-level analysis of cross-participation data

Cross-participation analysis, which can serve as a proxy of potential for knowledge transfer shows an overlap of targeted stakeholder groups between the Digital Europe Programme and Horizon 2020, Horizon Europe and Erasmus+. This analysis shows that

71% (2482) **of all unique organisations participating in Digital Europe** (3474) **also participate in Horizon Europe, Horizon 2020, Erasmus+ and/or the Connecting Europe Facility. Furthermore, the data shows that there are multiple organisations that participate in more than one Digital Europe project** (there are 3474 unique organisations in the dataset and in total there are 5196 project-organisation combinations)**.**

Digital Europe benefits from established networks, where participants have previously collaborated on other EU-funded initiatives or worked as consortium partners. About 1601 unique organisations (representing 46% of all unique organisations that participate in Digital Europe) are common between the Digital Europe and Horizon Europe, 1763 (representing 51%) between the Digital Europe and Horizon 2020 and 856 unique organisations (representing 25% of Digital Europe participants) between the Digital Europe and Erasmus+. There is an existent but more limited overlap of targeted stakeholders between the Digital Europe Programme and the Connecting Europe Facility with 94 unique organisation (representing 3% of all unique organisations that participate in Digital Europe).

There is substantial overlap of targeted stakeholder groups between Digital Europe and Horizon Europe and Horizon 2020, with about 1601 unique organisations (representing 46% of all unique Digital Europe grant participants) in common between the Digital Europe and Horizon Europe, and 1763 (representing 51%) between the Digital Europe and Horizon 2020. Key SOs concentrating cross-participation include SO4 (Advanced Digital Skills), SO5 (EDIH) and SO1(High Performance Computing). Cross-participation in the aforementioned areas (EDIH, High Performance Computing including NCCCs, Advanced Digital Skills) is consistent, as it links research outcomes of tested innovative digital solutions with practical applications. It is also important to note that some activities, including the NCCCs and EDIH, were initially funded under Horizon, which further explains the cross-participation.

Digital Europe also complements Erasmus+ which supports education and training, and which has concrete synergies with SO4. **Cross-participation analysis which serves as a proxy of potential knowledge transfer shows an overlap of targeted stakeholder groups between Digital Europe and Erasmus+** with about 856 unique organisation (representing 25% of the unique Digital Europe participants) in common between the Digital Europe and Erasmus+. Key SOs concentrating cross-participation include SO4 (Advanced Digital Skills) and SO5 (Deployment and Best use of Digital Capacities and Interoperability). Other SOs such as SO1 also include synergies with Erasmus+ as part of their training activities. One of the priorities of the Digital Education Action Plan is to support the development of digital skills and competences. HPC Training Activities builds on the successful pilot project “Digital Opportunity Traineeships”, continued under Erasmus+ as part of the Digital Education Action Plan, and it will focus on highly specialised skills, notably in HPC.

The Digital Europe Programme also has complementarities with the Connecting Europe Facility (CEF) and the Connecting Europe Facility (CEF2) as the latter supports the high capacity broadband and 5G corridors necessary to deploy digital services and technologies across the EU[269]. Cross-participation analysis indicates existent but more limited overlap of targeted stakeholders. There are 94 unique organisation involved in 228 Digital Europe projects that participate in CEF-funded project as well. The 94 unique organisations correspond to 3% of all unique organisations that participate in Digital Europe. Key SOs that show cross-participation include SO3 (Cybersecurity and Trust) and SO5 (Deployment and Best Use of Digital Capacities and Interoperability) (see Table 40). Indeed,

[269] SWD (2024) 37 Final Performance and Evaluation Framework for Digital Europe

some complementary between activities are to be observed between the CEF and the Digital Europe as the first eight EDMO regional hubs (under SO5) and operations were initially funded and supported by the CEF before receiving Digital Europe funding.

In all instances, the organisations that cross-participate (i.e., the organisations that are involved in both Digital Europe and Horizon Europe, Horizon 2020, Erasmus+ and/or the Connecting Europe Facility) **account for a disproportionally large share of all possible Digital Europe project-organisation combinations** (e.g., Digital Europe-Horizon Europe: 46% of the unique organisations account for 57% of all possible project-organisation combinations; Digital Europe-Horizon 2020: Digital Europe-Horizon 2020: 51% of the unique organisations account for 60% of all possible project-organisation combinations; Digital Europe-Erasmus+: 25% of the unique organisations account for 34% of all possible project-organisation combinations; Digital Europe-CEF: 3% of the unique organisations account for 4% of all possible project-organisation combinations). **This means that the cross-participating organisations are relatively more involved in Digital Europe projects, than the non-cross-participating organisations. This suggests that these organisations are well positioned to foster and exploit synergies within the Digital Europe Programme as well as in combination with any of the other four programmes.**

Table 40 Cross-participations (i.e. project-organisation combinations) across SOs and European Programmes

SO / European Programme	Connection Europe Facility (CEF)	Horizon 2020	Horizon Europe	Erasmus +
SO1: High Performance Computing	6	121	115	79
SO2: Artificial Intelligence	39	658	661	305
SO3: Cybersecurity and Trust	74	480	474	204
SO4: Advanced Digital Skills	20	359	364	321
SO5: Deployment and Best Use of Digital Capacities and Interoperability	89	1512	1328	856
SO6: Semiconductors	NA	NA	NA	NA
Total Cross-participations	**228**	**2481**	**2942**	**1306**

Table 41 Cross-participations across SOs and European Programmes (unique organisations)

	CEF Unique Organisations (n / %)		Horizon 2020 Unique Organisations (n / %)		Horizon Europe Unique Organisations		Erasmus+ Unique Organisations (n / %)		Total Unique Organisations per SO
SO1: High Performance Computing	5	*5%*	94	*88%*	90	*84%*	64	*60%*	107
SO2: Artificial Intelligence	22	*3%*	445	*69%*	447	*70%*	188	*29%*	643
SO3: Cybersecurity and Trust	43	*7%*	353	*61%*	344	*59%*	154	*26%*	582
SO4: Advanced Digital Skills	11	*2%*	276	*59%*	279	*60%*	227	*49%*	464

SO5: Deployment and Best Use of Digital Capacities and Interoperability	56	*2%*	1136	*49%*	987	*43%*	610	*27%*	2297
SO6: Semiconductors	NA		NA		NA		NA		NA

Data analysis of selected Digital Europe projects

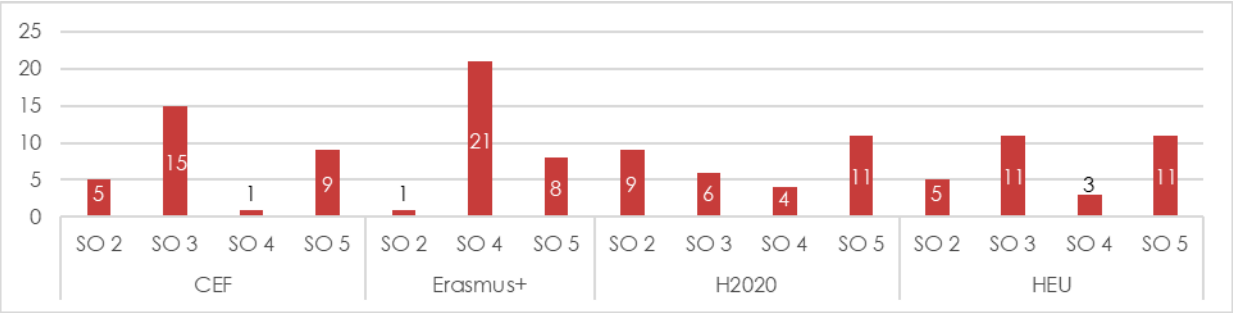
To gain better understanding of the dynamics at play, a selection of 120 *Digital Europe project-programme* combinations[270] that have high potential for synergies with *Horizon Europe, Horizon 2020, CEF and Erasmus+* was developed by DG CNECT – based on cross-participation data, a relevance score, and a manual selection process. This sample was chosen based on the purpose and scope of this case study.

Cross-participation does not necessarily imply that synergies will occur, it can provide an indication of potential synergies. Here, data on cross-participation was used to narrow the amount of the projects to be analysed. The previous sub-section provides an overview of the cross-participation data. After selecting all projects in which beneficiaries also received grants from CEF, Horizon 2020, Horizon Europe or CEF, the sample was further refined[271]. This was done based on references in the Digital Europe proposals to the four EU programmes and their relevance scores – indicating the degree of alignment of the Digital Europe project with one of the four EU programmes (using the indexing software Elasticsearch). Across the four programmes, 1117 out of all 5229 Digital Europe projects received a relevance score comparing them to one of the other programmes. Afterwards, manual selection of the most relevant projects (i.e., the highest relevance score) was conducted based on the description of the planned synergies in the proposals. This approach aims to identify the Digital Europe projects with the greatest potential for synergies. It should be noted that the potential for synergies is higher than the 120 Digital Europe project-programme combinations as shown by the figures on cross-participations in the previous section and the number of projects with high relevance scores. For an elaborate methodological explanation, see Section 0.

The selected sample of 120 *project-programme combinations* signals high potential for concurrent synergies, as knowledge spillovers can be obtained through participation in multiple Digital Europe projects or through the interlinkages between different projects from different programmes. The 120 combinations involve 100 unique Digital Europe projects, indicating that some projects have been identified as having (potential) synergies with more than one of the four programmes. Similarly, there are 1087 unique organisation-project combinations, in which 811 unique organisations participate, indicating that, 22% of the organisations participate in more than one Digital Europe project.

[270] This refers to a combination of a Digital Europe project and potential synergies with either Horizon 2020, Horizon Europe, Erasmus+ and/or the Connecting Europe Facility.
[271] As shown in the previous section, there are there are 3474 unique organisations in the dataset and 5196 project-organisations combinations – this means that there are 5196 cross-participations between Digital Europe and any of the four other programmes in the dataset.

Figure 19 Selection of projects



The identified *project-programme combinations* show strong thematic complementarity when disaggregating them per SO[272]. The strongest thematic links between the SOs and the other programmes can be observed between **CEF and SO3** (e.g., digital infrastructure, including cybersecurity and SO3: cybersecurity and trust), and **Erasmus+ and SO4** (e.g., skills development and SO4: advanced digital skills). The other two SOs in scope (SO2: artificial intelligence and SO 5: deployment and best use of digital capacities and interoperability) have a more cross-cutting theme and therefore are relevant to both Horizon Europe and Horizon 2020.

A further analysis– based on the provided reasons for selection – was made to grasp how likely these potential synergies are. In some cases, it was not possible to clearly identify what type of (potential) synergy would occur. This resulted in **48 project-programme combinations with clear evidence of a (potential) synergy (including 39 unique projects),** which means that for 40% of the pairs there is a high likelihood of creating synergies among the two funding programmes.

Although in some cases, there was limited evidence how the (potential) synergy would occur, a manual in-depth analysis was performed on the 120 project-programme combinations. Through the manual in-depth analysis, the identified synergies were categorised based on the following synergy categories: concurrent synergies and sequential synergies (including direct follow-up projects). Table 42 provides an overview of the categorisation of all 120 project-programme combinations. From this sample, more than half of the project-programme combinations are performed by consortia that already have worked together, (including, but not limited to the four programmes in scope); around half of the projects use knowledge that has been developed by previous projects, and 13 projects are direct follow-ups from previous projects. When considering the 48 project-programme combinations with clear evidence of a (potential) synergy, 88% of the project-programme combinations have concurrent synergies, 79% for sequential synergies, and 10 projects are direct follow-ups from previous projects.

Table 42 Categorisation synergies for selected project-programme combinations

Type of Synergy	**All project-programme combinations**	
	Count	Unique projects
Concurrent	65	52
Sequential	59	45
Direct follow-up project	19	13

[272] The selection of 120 *Digital Europe project-programme* combinations did not contain Specific Objective 1 *High Performance Computing* and Specific Objective 6 *Semiconductors* projects.

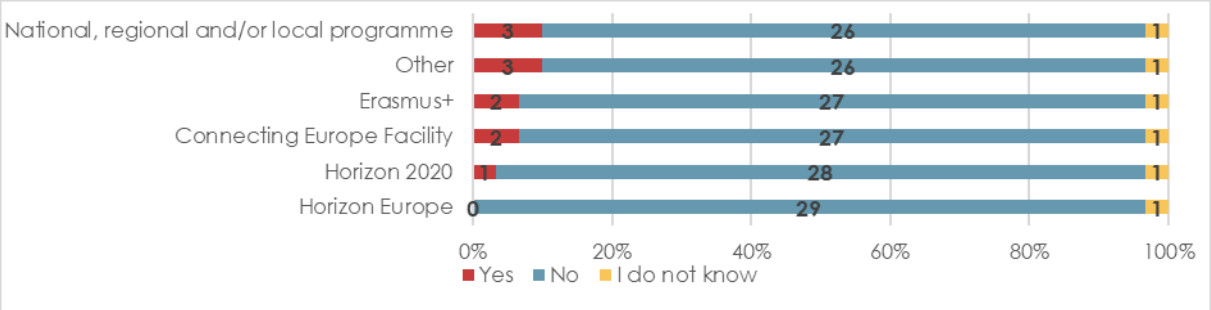
Results mini survey on synergies

To refine and gather insights on the extent to which the 100 identified Digital Europe projects foster synergies, a mini survey was conducted. The objective of the mini survey is to gather information on the extent to which co-funding has occurred, previous collaboration on EU / other projects between participants, whether the project is a direct follow-up project, whether the Digital Europe funded project uses input from other programmes or that its outputs will be used by other programmes, and their general perspective on synergies. 30 projects responded to the survey.

In terms of **co-funding**, according to the respondents of the mini survey, **around half of the projects** (n=16) **were co-funded by other public sources**, while the other projects (n=14) were co-funded from private sources. The majority of the publicly co-financed projects received co-funding from the **Recovery and Resilience Facility** (RRF) or from **national, regional or local funding sources**. In the open questions, respondents refer to Italy and Spain as examples where the RRF was used as a **pre-arranged** source of additional funding[273]. The majority of the projects with national, regional or local funding sources indicated that the co-funding was mostly **self-arranged**, and that this was a difficult process.

The majority of the respondents have **collaborated** on EU funded (or other) projects in the past. For 30% of the respondents (n=9), all consortium members have collaborated in the past, whereas for 63% some consortium members collaborated before (n=19). In terms of **the positioning of Digital Europe in the R&I landscape**, and to what extent Digital Europe is integrated with the other programmes through mutual use of (knowledge) outputs, we notice a strong position for the Digital Europe Programme. Figure 20 shows that **some projects are a direct continuation of a previously funded project** – from national, regional or local programme, Erasmus+, H2020 or the Connecting Europe Facility.

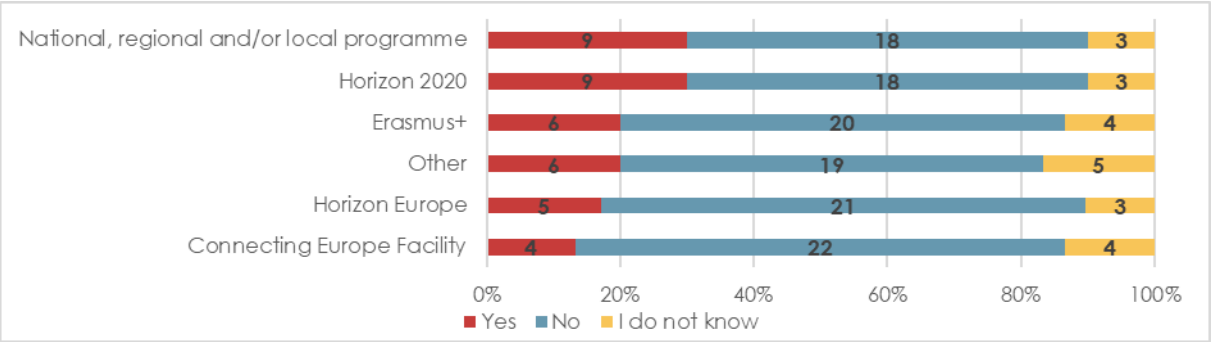
Figure 20 Is your Digital Europe funded project a continuation of a project previously funded by any of the following programmes? (n=30)



As for the **uptake of knowledge, results or outputs from projects funded by other programmes**, Figure 21 shows that relatively more projects indicate that they use knowledge developed by other programmes (ranging for 4 projects using knowledge from CEF to 9 projects using knowledge from national, regional or local programmes, and Horizon 2020). Examples include analysis methods, standards, metadata and data sources previously developed, experiences in developing test beds and robotic laboratories and other findings, such as skills gap analysis.

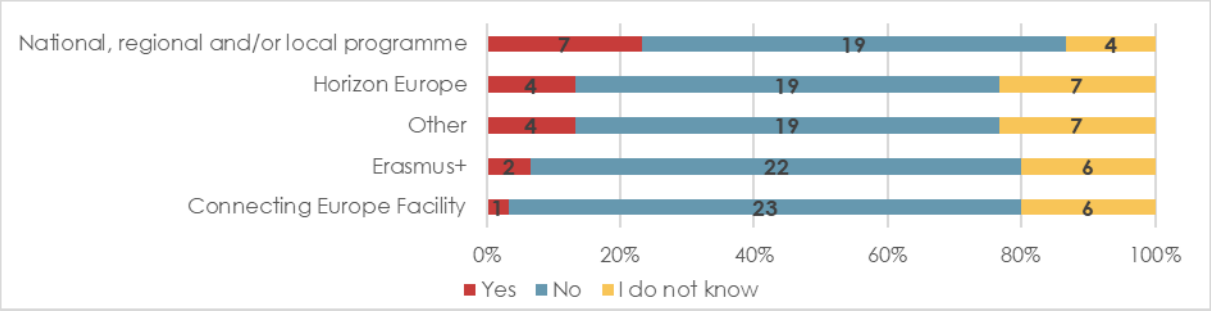
Figure 21 Does your Digital Europe funded project use knowledge, results or outputs developed under one of the following programmes? (n=30)

[273] Please see Section 0 Effectiveness for more information on these examples.



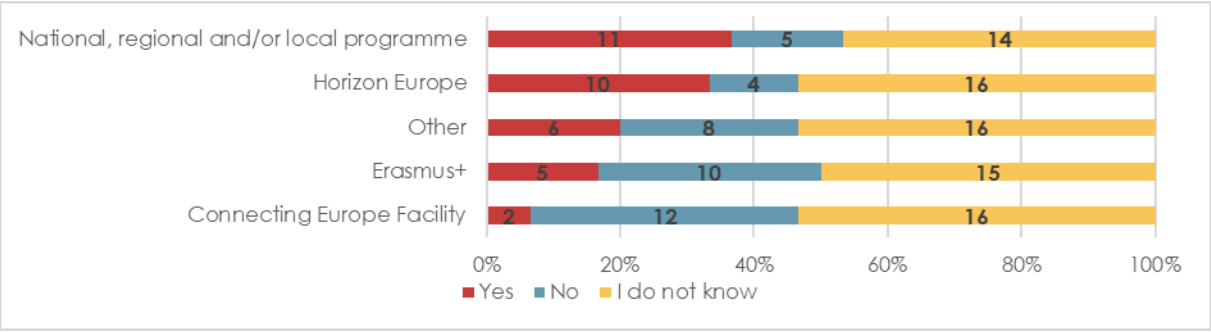
The same holds true for the **use of capability buildings programmes or (digital/research) infrastructures** developed through other programmes by Digital Europe projects (Figure 22). Examples include digital platforms, test beds, HPC, AI infrastructures and also computing and data storage infrastructures procured in CEF.

Figure 22 Does your Digital Europe project use capability building programmes or (digital/research) infrastructures developed by one of the following programmes? (n=30)



As for **the uptake of Digital Europe project outputs, capacities or infrastructure**, respondents indicate their Digital Europe project indeed will produce outputs, capacities or infrastructures that can be taken up in all the other programmes. Examples include EDIHs that will *Test before* Invest-services, training activities in collaboration with other Programmes, online platforms and testing facilities.

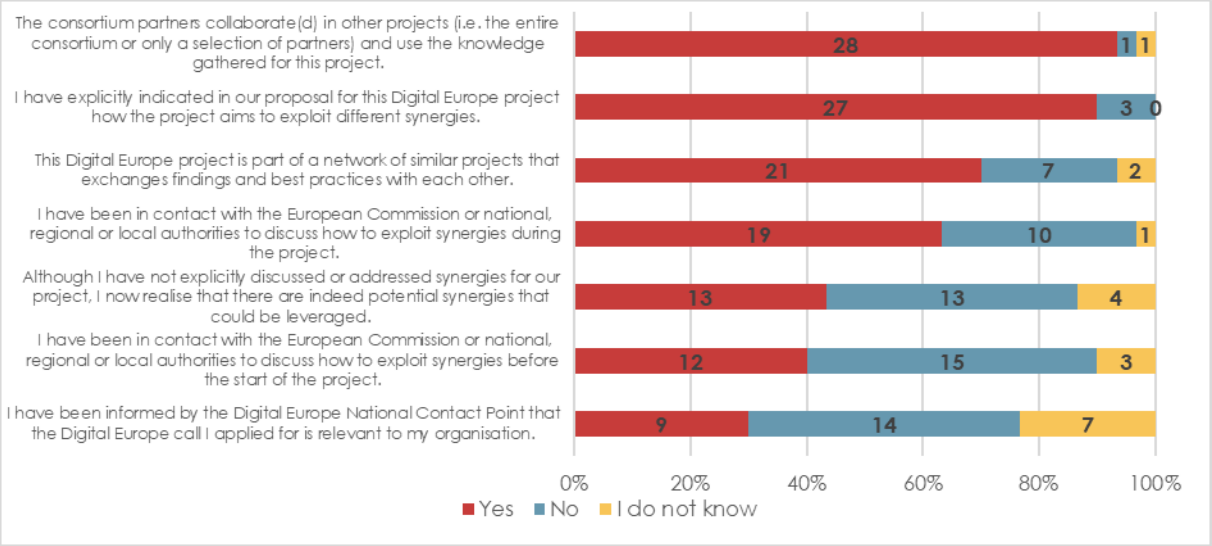
Figure 23 Will the outputs, capacities or infrastructures developed by your Digital Europe project be used, complemented by or made available to the following programmes? (n=30)



Digital Europe project managers suggest that the programme is placed well in the knowledge network. Many consortium partners (93%, n=28) have collaborated in previous projects, and use the knowledge gathered for those projects. Similarly, 21 respondents indicate that their project is part of a network of similar projects, and that they exchange findings and best practices. 90% of the respondents (n=27) have explicitly indicated in their Digital Europe proposal how the project would foster synergies. Only 40% of the respondents (n=12) have

communicated with the European Commission or other authorities on ways to exploit synergies *before* the start of the project. This figure increases to 63% of the projects (n=19) during the project. Finally, in the final open question, some respondents indicate that meetings where the projects can share experiences and results can be useful to further exploit synergies.

Figure 24 Do you agree with the following statements? (n=30)



HaDEA Feedback to Policy study - synergies

HaDEA has written a Feedback to Policy (F2P) that focuses on the topic *synergies* – as it is responsible for the implementation of around 20% of the Digital Europe budget. HaDEA highlights in the report synergies that they identified as best practices. Synergies with Horizon Europe and Horizon 2020 projects are found, and to a smaller extent with Erasmus+. The main mechanisms identified are complementarity of parallel projects or clustering of projects. Complementary funding are areas of further exploration, as the process of combining funds from different programmes remains complex. Finally, HaDEA indicated that a systematic approach is needed to explore realised synergies and extract meaningful insights for policymaking.

Evaluation criteria

Coherence

Evidence suggests that there is (thematic) complementarity between Digital Europe and the other EU-funded programmes[274]. Digital Europe is embedded in a clear policy framework. The *Communication: 2030 Digital Compass: the European way for the Digital Decade* sets out that the key to the digital transformation is the ability of businesses deploy new key digital technologies and their absorptive capacity to adopt them rapidly –roles that the Digital Europe both fulfils.

There are clear cross-references and direct and indirect provisions in the legal bases of the different Programmes, explaining the role and position of the programmes. Whereas Horizon Europe has distinct focus on research and innovation activities (i.e., TRL 4-8), Digital Europe is aimed at the deployment of digital infrastructures and tools and capacity building

[274] Horizon Europe, the Connecting Europe Facility and Erasmus+.

(i.e., TRL 8-9). The regulations of the different R&I programmes stipulate how these synergies should occur.

A strong thematic similarity between the different programmes can also be observed from the data analysis conducted for this case study and the Digital Europe Regulation and analysis of its work programmes. Digital Europe is thematically coherent and complementary with other Programmes. Examples of this thematic similarity are CEF and SO3), and Erasmus+ and SO4 (education and training, see the illustrative examples of AI4CI and GreenChips-EDU).

Illustrative example – CyberSuite (SO3)

The CyberSuite project is a good example of a Digital Europe project that takes up the outputs developed under different EU-funded projects (e.g. Horizon 2020). The objective of CyberSuite is to identify challenges in cybersecurity for SMEs lacking resources. CyberSuite produced a gap analysis for services and helps SMEs access these services through a tailored marketplace for cybersecurity services. It specifically aims to leverage past EU-funded research outcomes, knowledge and innovations by integrating them into the CyberSuite marketplace – this was required by the description of the topic in the Digital Europe Work Programme (DIGITAL-ECCC-2022-CYBER-B-03-UPTAKE-CYBERSOLUTIONS).

The services and tools that will be leveraged by CyberSuite stem from more than 15 past EU-funded projects, in which the different consortium partners have participated. Specific examples of the uptake of previously developed outputs are the PUZZLE marketplace that serves as the basis for the CyberSuite Marketplace, Advanced Cybersecurity Analytics Services (ACAS)-tool, both developed in the H2020 PUZZLE-project, educational support, and smart virtual assistant for assessing cyber-vulnerabilities and offering cyber-protection of SMEs (developed by the H2020-project GEIGER.) The project will also support the market uptake of these solutions.

In terms of direct complementarity between the different programmes, evidence suggests that their programming fosters synergies. This complementarity is also perceived by a large number of respondents of the beneficiaries survey (41%, n=477) – agreeing that their Digital Europe project builds directly on activities supported under other European funding instruments. There are also means through which this complementarity is operationalised. The so-called EU Synergy call grants and procurements are to be linked with other grants funded from any other EU funding programme. For instance, the DIGITAL-2024-BESTUSE-07-MULTICOUNTRY topic (-Support to the implementation of multi-Country Projects (MCPs)) identifies the European Regional Development Fund as the source for additional funding.

Illustrative example – AI4CI (SO4)

The AI4CI project has complementarities with Horizon 2020, Horizon Europe and Erasmus+. During the implementation of different Horizon 2020 projects, the lack of skills of graduates in applying AI to connected industries became apparent (e.g. the programming of robots, distributed AI techniques or integrating AI-based learning loops for network automation). This was the raison d'être of the creation of the master's programme currently underdeveloped by AI4CI. Several outputs of Horizon 2020 projects

serve as input to AI4CI including teaching and training goals (e.g. AI@EDGE produced use-cases for applied AI in connected industries). Similarly, various Horizon Europe or national projects (e.g. Nexasphere, ANR TREES, ANR NET4AI) involving consortium partners will enable updates to the AI4CI Master syllabus with latest knowledge and offer students opportunities to participate in projects or internship where cutting-edge technologies are used. Finally, a mechanism for mobility between European universities, research centres and industry are part of the design of AI4CI study programme (through established Erasmus+ exchange agreements or national systems (e.g. the French state provides co-funding (tax credits or bonuses) for apprenticeship workers/students from AI4CI master)).

Finally, **the EDIHs can be seen as a means to create coherence between different Programmes.** They are specifically referred to in the Digital Europe Regulation as a tool to achieve synergies. Data from the data-analysis of the selected projects and the mini-survey confirm this link between regional, national or Horizon 2020 projects and the Digital Europe EDIH projects. Synergies are achieved through the follow-up of preparatory projects as well as through co-funding opportunities. While participants indicate that co-funding often is difficult, in some countries the government has set-up special schemes to support the co-funding of EDIHs. For instance, in Spain the government published the Royal Decree 174/2023, which regulates the granting of subsidies (EUR 15 million) to EDIHs as well as the Orden ICT/1296/2022, which regulates the granting of aid to SMEs who make use of EDIH services – this second Orden also applies to DIHs that received the Seal of Excellence, but did not receive Digital Europe funding.

Effectiveness

There is a clear funnel of other programmes (inputs) serving as the basis for Digital Europe. Similarly, there is a strong network of beneficiaries in place, as many participants indicate that they have collaborated in the past. However, due to the time lag between preparing and evaluating calls and contractualising beneficiaries, the actual implementation and materialisation of results (the R&I lag[275]) and the timing of this interim evaluation, few projects have been completed (the first Digital Europe project started mid-2022), it is still too early to draw firm conclusions on the amount of actual synergies that have been materialised.

The current evidence indicates that concurrent synergies occur or that there is potential for them to take place. Multiple organisations are involved in various Digital Europe projects, other EU-funded programmes or have previously worked as consortium partners on other projects. The data analysis and the mini survey suggest that Digital Europe participants form a strong network, which subsequently can facilitate the transfer of knowledge. Out of all the 811 organisations that participate in any of the 100 selected projects, 22% participate in more than one Digital Europe project. There is one example of an organisation participating in 10 of the 100 Digital Europe projects. The in-depth analysis of 48 project-programme combinations, showed that 88% of the project-programme combinations showed signs of concurrent synergies. Additionally, in the mini survey on synergies, 93% of the participants (n=28) indicate that the consortium still collaborates or has collaborated in other projects (i.e. the entire consortium or only a selection of partners), and that the knowledge gathered there is being used for the Digital Europe project. Finally, HaDEA's Feedback to

Policy (F2P) Synergy report also stated that their analysis showed that most identified synergies stem from complementarity of parallel projects or (informal) clustering of projects.

Similarly, evidence suggests that sequential synergies occur, and that there is ample opportunity for them to be further fostered. 41% of the respondents of the beneficiary survey mention that their Digital Europe-funded project builds directly on activities supported under other European funding instruments (n=477). There are various mechanisms through which synergies can be fostered – differing in the extent to which a synergy can be attributed to Digital Europe. The most direct way of sequential synergies is when a Digital Europe project is a **follow-up project** from a previously funded project. Several examples of such a synergy exist, such as projects following preparatory actions, a follow-up of research results or a continuation of the development of an EDIH. 27% of respondents from the mini-survey state that their Digital Europe project is a direct continuation of another project. The data analysis of the selected Digital Europe projects with high potential for synergies also show that 21% are a follow-up project of a previous project.

Illustrative example – PrePAI and DeployAI (SO2)

The PrePAI and DeplyAI projects are a good example of sequential synergies. The Pre-PAI project is a preparatory action for the development, deployment and launch of an AI-on-demand platform. The deployment of the platform will be completed by the DeployAI project. Both projects make use of knowledge and outputs developed by a vast range of other projects, most notably: the Horizon 2020 AI4EU project. Six Horizon 2020 projects defined and developed services for the platform (AI4Copernicus, AIPLAN4EU, DIH4AI, BONSAPPS and STAIRWAI), four Networks of Excellence (H2020L ELISE, TAILOR, AI4Media and HUMANAI NET) also contribute to the platform, and under Horizon Europe the project AI4EUROPE is funded. All activities combined are a good example of how different project funded by different programmes each play their distinct role in making the AI-on-Demand platform market-ready.

Additionally, in terms of **knowledge uptake** and **creation** (i.e. upstream and downstream synergies), **there is evidence that suggests that Digital Europe well integrates knowledge from other EU funding instruments. Furthermore, the evidence suggests that the Digital Europe projects' outputs will provide knowledge bases for other (future) R&I programmes**. This was suggested by part of the respondents of the mini survey, the data analysis of selected Digital Europe projects and HaDEA's Feedback to Policy (F2P) Synergy report. The results of the mini-survey show that knowledge, results or outputs, capability building programmes or (digital/research) infrastructures developed through other programmes are all being taken up by the Digital Europe projects – this is the case for national, regional or local projects, or Horizon 2020 and to a much lesser extent the Connecting Europe Facility. Similarly, the results indicate that Digital Europe outputs will be used in other programmes, most notably national, regional or local programmes or Horizon Europe. The data analysis identified sequential synergies for 38 of the 48 Digital Europe projects where synergies were classified. This synergy mechanism is strategically applied in the Work Programmes and/or topic texts. For instance, in the Digital Europe Work Programme for 2023-2024 in the text on the *European Green Deal Data Space* there is a clear reference that the action should take up the work from a preparatory Digital Europe CSA as well as the results of Horizon Europe projects funded under HORIZON-CL6-2021-GOVERNANCE-01-17. The previously highlighted CyberSuite-project also considers results from previous projects. This

highlights the importance of systematic signposting to other related activities in work programmes.

Illustrative example – GreenChips-EDU (SO4)

The GreenChips-EDU project is a good example of the uptake of knowledge created in other programmes and an example of a strong knowledge network. The aim of the GreenChips4EDU project is to meet the microelectronics industry's demand for skills (through the development of education and trainings), attract talent (both staff and students), exploit the benefits of cutting-edge technologies and infrastructures, and establish partnerships between the network of organisations. GreenChips-EDU makes use of the outputs of the Erasmus+ METIS project. METIS developed a need assessment for the microelectronics industry to see what kind of training needs there will be in the future. Based on that assessment, trainings and education programmes for students and for up- and re-skilling people of employees i were developed. The consortium is partially composed of university partners that are also part of the Unite! -University Network for Innovation, Technology and Engineering (co-funded by Erasmus+) – in theory this allows for a further exploitation in the future of the results stemming from this project.

It is expected that Digital Europe funding that was allocated to establish infrastructures will, in the future, provide opportunities to exploit synergies. EuroHPC infrastructures will be made available to the sectorial data spaces. In January 2024, the launch of AI Factories integrated into EuroHPC Regulation was announced. The first seven AI factories will be established in 15 member states to deploy new AI-optimised supercomputers and upgrade existing systems, significantly enhancing Europe's AI capabilities.

Some Digital Europe beneficiaries indicate that a factor that slows down the ability to foster synergies is related to co-funding. In some cases, there are public arrangements for organisations to use. In other cases, there are no arrangements nor a supporting legislative framework, due to the novelty of the Programme**.** Especially for smaller firms or when there are large consortia, the administrative burden is high. There are also examples of countries where there are well functioning mechanisms for co-funding. Italy, for instance, uses the RRF for EDIHs and TEFs[276], and there are specific schemes to provide co-funding to beneficiaries of Digital Europe in Denmark[277] and in the Netherlands[278]. Finally, some respondents from the mini survey on synergies indicate that there should be more opportunities to actively foster synergies through the grouping of similar projects, which would allow them to use the results or best practices or generally network with each other.

EU Added Value

Digital Europe demonstrates strong EU added value due to its strategic approach to digital deployment across the EU to promote its competitiveness and positioning in the EU R&I system – provides a unique position for projects and organisations to exploit the benefits of working together in a multi-national context. EU added value is an intrinsic element of the Programme as its actions aim to **improve digital competitiveness** and **reinforce strategic autonomy** across the European Union. The large-scale complex deployment projects cannot be achieved at the level of Member States alone but require

[276] https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52023PC0765#footnoteref100
[277] https://digst.dk/digital-transformation/digital-europe/tilskudsfond-for-medfinansiering/
[278] https://www.rvo.nl/subsidies-financiering/digital-europe/aanvraagproces

strategic EU coordination. The developed digital solutions and services are to be used across borders serving the whole EU Community.

Illustrative example – CloudCamp4SMEs

CloudCamp4SMEs has the objective to support the digital transformation of SMEs through training courses on digital skills for Cloud Technologies. The project is set up to make sure that the trainings will address the needs of SMEs, based independent of the innovation status of a country. There are 5 pilot countries that cover the different levels of innovations (i.e. Innovation Leader, Strong Innovator, Moderate Innovators and Emerging Innovators). After finishing the pilots, the programmes will be scaled across Europe to deliver the trainings that correspond to the actual needs of SMEs.

Evidence from different sources shows that there is a transmission mechanism of knowledge, funding or outputs from Digital Europe to national or regional programmes and vice versa. In multiple cases, projects make use of knowledge prepared under national and/or regional programmes as shown in previous illustrative cases. Three project managers in the mini-survey on synergies indicate that national or regional projects were followed-up by Digital Europe projects. The HaDEa analysis shows eight instances of synergies with national or regional funds or the RRF[279].

Illustrative example – DATAlife (EDIH) (SO5)

The DATAlife project is a good example of how a Digital Europe project can be a follow-up project from previously funded regional projects. The objective of the DATAlife project is to support the deployment of Artificial Intelligence and Data Analytics for Galician primary, biotech and health sector SMEs. In 2019, DATAlife was selected by the Galician Innovation Agency as a strategic DIH for the region. In an elaborate open call, a mapping exercise was done to see the strengths of the regional innovation ecosystem, a seminar was organised to identify weaknesses for the implementation and a training programme to improve the set-up of the proposed DIH were done. Besides the content of the EDIH, DATAlife was considered strategic based on their contribution to the RIS3. The Galician Innovation Agency provides DATAlife with funds to create the EDIH and develop their services . Following that, DATAlife also obtained funding from the Galician Institute for Economic Promotion (co-financed by ERDF) for the project Obradoiros 4.0 and the HIBA project (Interreg-POCTEP) . Because of this, DATAlife was able to respond to the Digital Europe EDIH call. The Digital Europe project allows DATAlife to further exploit their services.

Digital Europe provides clear EU added value in the context of digital skills and the mobility of students and staff. The programme enables the ability to involve a wider range of expertise, as opposed to internal expertise available to an organisation. One interviewee indicated that this is a real benefit for the students that will participate in new masters that are being supported by Digital Europe. This also holds true for the projects AI4CI and GreenChips-EDU as well.

[279] The RRF should address country-specific challenges that i.e. should support the digital transition.

Conclusions

Digital Europe and efforts by the European Commission to foster synergies play an important role in the *digital transition*. The *digital transition* requires multi- and transdisciplinary research, the inclusion of a wide range of stakeholders and active valorisation of research results into market-ready products.

Digital Europe is guided by, and coherent with, a clear policy framework. Through cross-references and direct and indirect provisions in the legal bases of the different Programmes, the (thematic or operational) complementarities of different programmes are outlined, setting the foundations for the materialisation of synergies **This thematic complementarity can also be observed in the cross-participation data analysis and the analysis of the work programmes**.

While the project implementation is still ongoing, it is evident that various conditions are present paving the way for a successful exploitation of synergies. There are different means through which synergies are fostered. **A strong network of implementing organisations is in place** – many participants indicated that they have collaborated in the past**.** At the same time, some interviewees suggested that Digital Europe is new to them and that networking activities with other projects would be beneficial to them. **There is evidence that knowledge developed by other programmes from different levels of the R&I system are being taken up** or will be taken up in the future. The manual in-depth analysis of 120 project-programme combinations showed that more than half of the project-programme combinations are performed by consortia that already have worked together, around half of the projects use knowledge that has been developed by previous projects and more than 10% are direct follow-ups from previous projects. In terms of cumulative funding, there is no evidence whether this has been materialised.

The activities aimed to foster synergies help to create EU-added value for Digital Europe, due to the pan-European nature of the programme, the extent to which Digital Europe takes up national, regional or local knowledge outputs and the mobility of students and staff through its link with Erasmus+.

An EU-wide definition of *synergies* and a systematic way of identifying and an automated tracking mechanisms to monitor synergies are suggestions to improve future identification of synergies. Finally, some respondents indicated that there should be more opportunities for learning, alignment and best-practices sharing between Digital Europe projects, through a repository of projects, results and/or new related calls and meetings to share experiences and networking activities.

Sources and methodology

This case study employs a mixed-methods approach to analyse how and why the activities aimed at fostering synergies between Digital Europe and other programmes contribute to achieving **Digital Europe's objectives**, with a specific focus on Horizon 2020, Horizon Europe, Connecting Europe Facility and Erasmus+.

Data collection was conducted through a variety of methods, including:

- Desk study (incl. the HaDEA report and publicly available information on Digital Europe projects);
- Beneficiary survey;
- Mini survey on synergies;

- Interviews (targeted interviews and beneficiary interviews conducted for the evaluation);
- Data analysis

In this section, we will highlight the mini-survey and the data analysis.

Data analysis

The data was performed on the input provided by DG CNECT following their analysis of Digital Europe project proposals using Cortex tool – based on cross-participation, a relevance score and manual selection. The output of this analysis was a selection of 120 *Digital Europe project-programme* combinations[280] that have high potential for synergies with *Horizon Europe, Horizon 2020, CEF and Erasmus+.* DG CNECT used the following methodology to identify the list of 120 Digital Europe project-programme combinations:

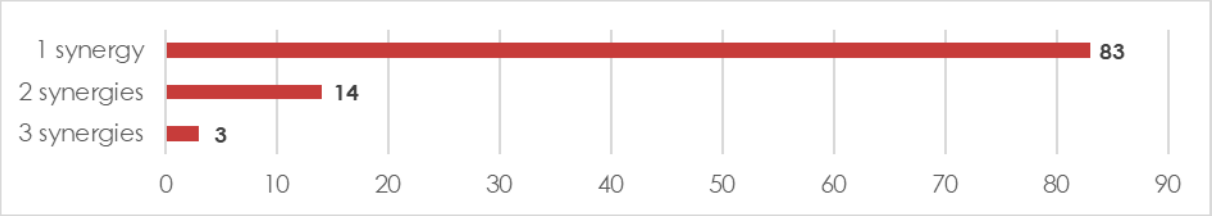
- First of all, projects with cross-participations (i.e., at least one beneficiary in the Digital Europe project that also participates in the other programmes (CEF, HE, H2020, or Erasmus+) were identified. Please note that cross-participation does not necessarily results in synergy. This especially holds true for larger research organisations such as universities. The cross-participation information was subsequently used to filter the number of projects that were to be screened in subsequent steps.
- Following that, all Digital Europe proposals were screened in Cortex. The projects proposals (part B of the proposal) that have a reference to the four other EU funded programmes 'Horizon Europe', 'H2020', 'CEF' and 'Erasmus+' were listed.
- At the same time, all Digital Europe projects received a *relevance score*. The indexing software Elasticsearch analyses Digital Europe project proposals based on their similarity/relevance to the four other EU funded programmes.
- DG CNECT then listed Digital Europe projects that have both a common participant and a reference to one of the four programmes in part B and ranked them based on their relevance score.
- Following that, a manual selection was performed to identify 30 Digital Europe projects per programme (so 120 *project-programme* combinations in total) where synergies are likely to occur. This manual selection was done through the analysis op part B of the Digital Europe proposal. The analysis consisted of identifying if the Digital Europe project builds on/or complements other projects funded in a different programme (or intends to do so), the name and if available number of these projects, and how this would occur. In case of no concrete evidence other types of potential synergies were checked for (e.g. consortia collaboration before or a large number of similar previous projects in the same area).
- Finally, as part of the analysis of this case study, an additional classification of the 120 *project-programme* combinations was performed. This was done on the basis of the provided reasons for selection. In some cases, there was not enough evidence to clearly identify what type of (potential) synergy would take place. This does not mean that those projects do not foster synergies, merely that for our analysis there was too limited information on the (potential) synergy. In other instance, it was clear in what way and how likely the potential synergies would occur.

Descriptive statistics data analysis

[280] This refers to a combination of a Digital Europe project and potential synergies with either Horizon 2020, Horizon Europe, Erasmus+ and/or the Connecting Europe Facility.

A total of 120 Digital Europe project-programme combinations have been identified through the process described earlier. These 120 combinations involve 100 unique Digital Europe projects, indicating that some projects have been identified as having (potential) synergies with more than one other programme.

Figure 25 Distribution synergies (project-programme combinations) for the selected Digital Europe projects



There are 811 unique organisation that participate in one or more Digital Europe project – there are 1087 unique organization-project combinations.

Figure 26 Participation in synergetic Digital Europe projects per organisation

Mini-survey on synergies

To refine and gather insights on the extent to which the 100 identified Digital Europe projects (i.e. the 120 project-programme combinations) foster synergies, a mini-survey was shared with the project managers of the selected projects.

The objective of the mini survey is to gather information on the extent to which these projects with a high likelihood of synergies to occur, actually exploited synergies. The survey covered whether co-funding has occurred, previous collaboration on EU / other projects between participants, whether the project is a direct follow-up project, whether the Digital Europe funded project uses input from other programmes or that its outputs will be used by other programmes, and their general perspective on synergies. In the mini-survey, the following definition of synergies was provided: *Synergies can be defined in terms of funding (e.g. cumulative funding), sequential synergies (e.g. Digital Europe projects build on results previously achieved in other Programmes , or Digital Europe projects pave the way for other projects), parallel (e.g. knowledge spillovers due to involvement in multiple projects), strategic (e.g. synergy-enhancing implementation rules and requirements) or operational synergies (e.g. Seal of Excellence).*

The response rate to the survey was 30% (i.e. 30 responses). Please find below the responses to the survey (excl. the open answers).

Figure 27 What is the current status of the Digital Europe funded project? (n=30)

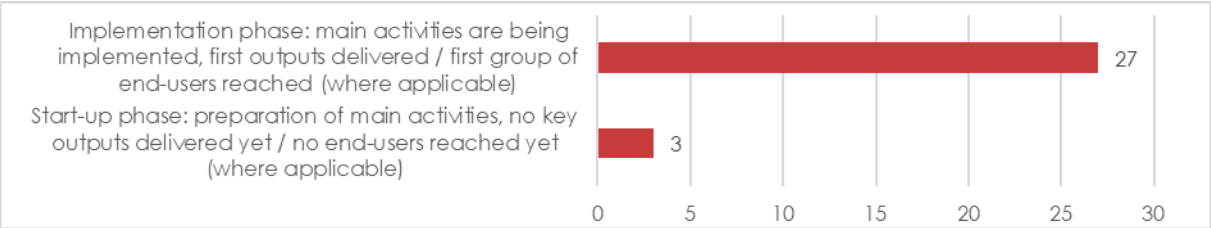


Figure 28 Does or did your Digital Europe funded project make use of additional or complementary funding from another EU, national or regional programme? (n=30)

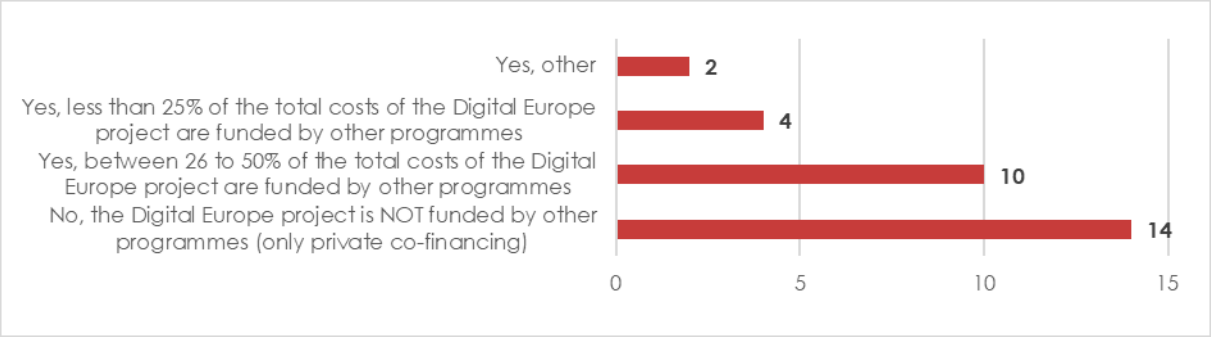


Figure 29 Have the members of your consortium collaborated on EU funded or other projects in the past?

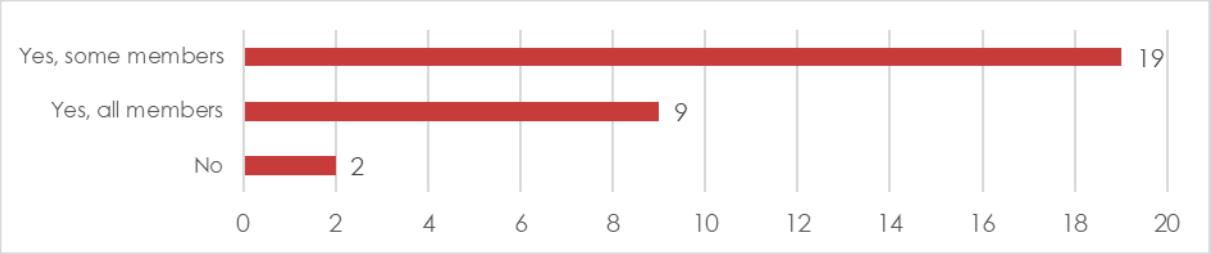


Figure 30 Is your Digital Europe funded project a continuation of a project previously funded by any of the following programmes? (n=30)

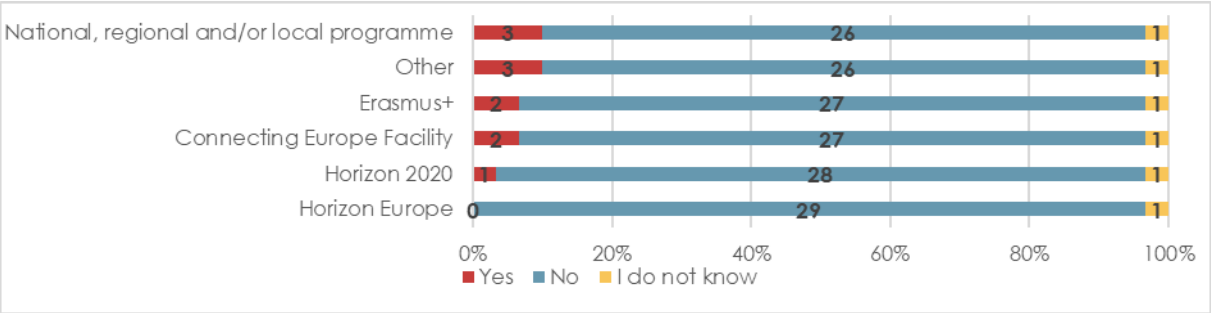


Figure 31 Does your Digital Europe funded project use knowledge, results or outputs developed under one of the following programmes? (n=30)

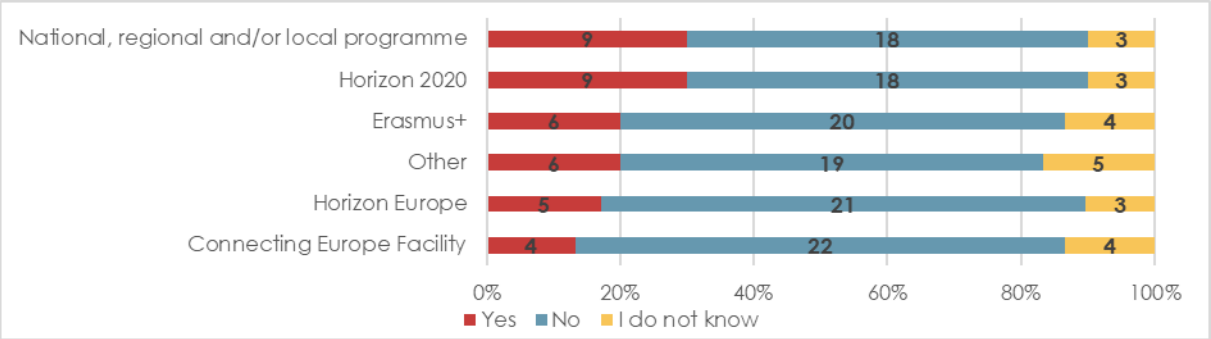


Figure 32 Does your Digital Europe project use capability building programmes or (digital/research) infrastructures developed by one of the following programmes? (n=30)

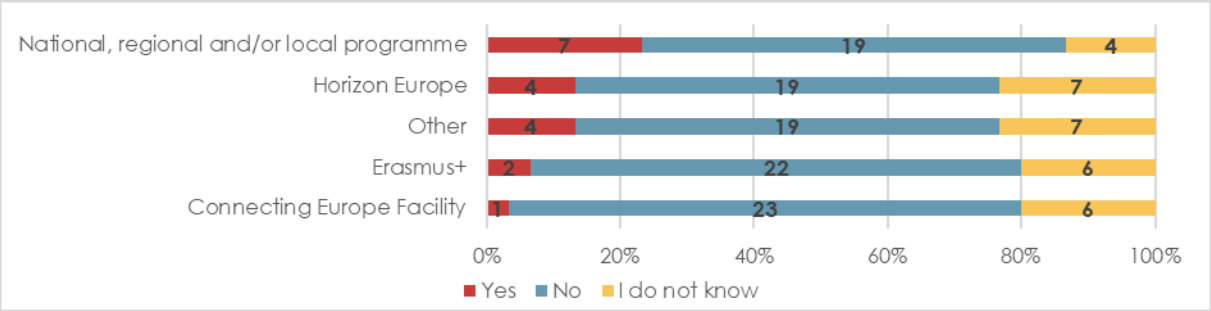


Figure 33 Will the outputs, capacities or infrastructures developed by your Digital Europe project be used, complemented by or made available to the following programmes? (n=30)

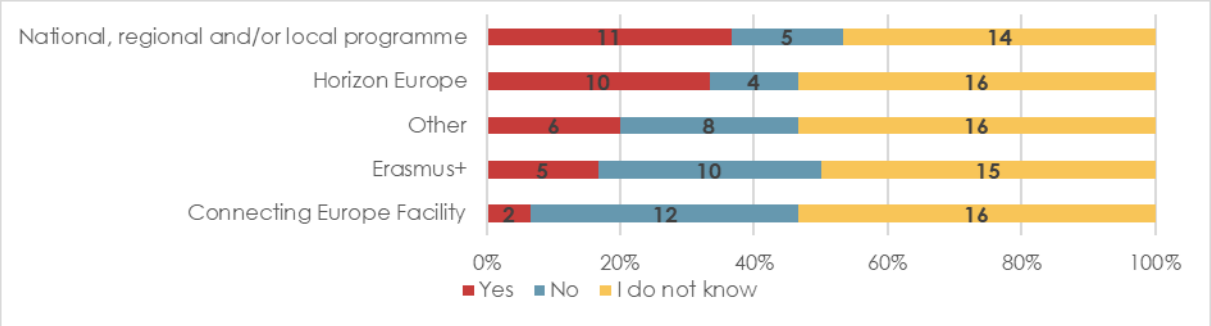
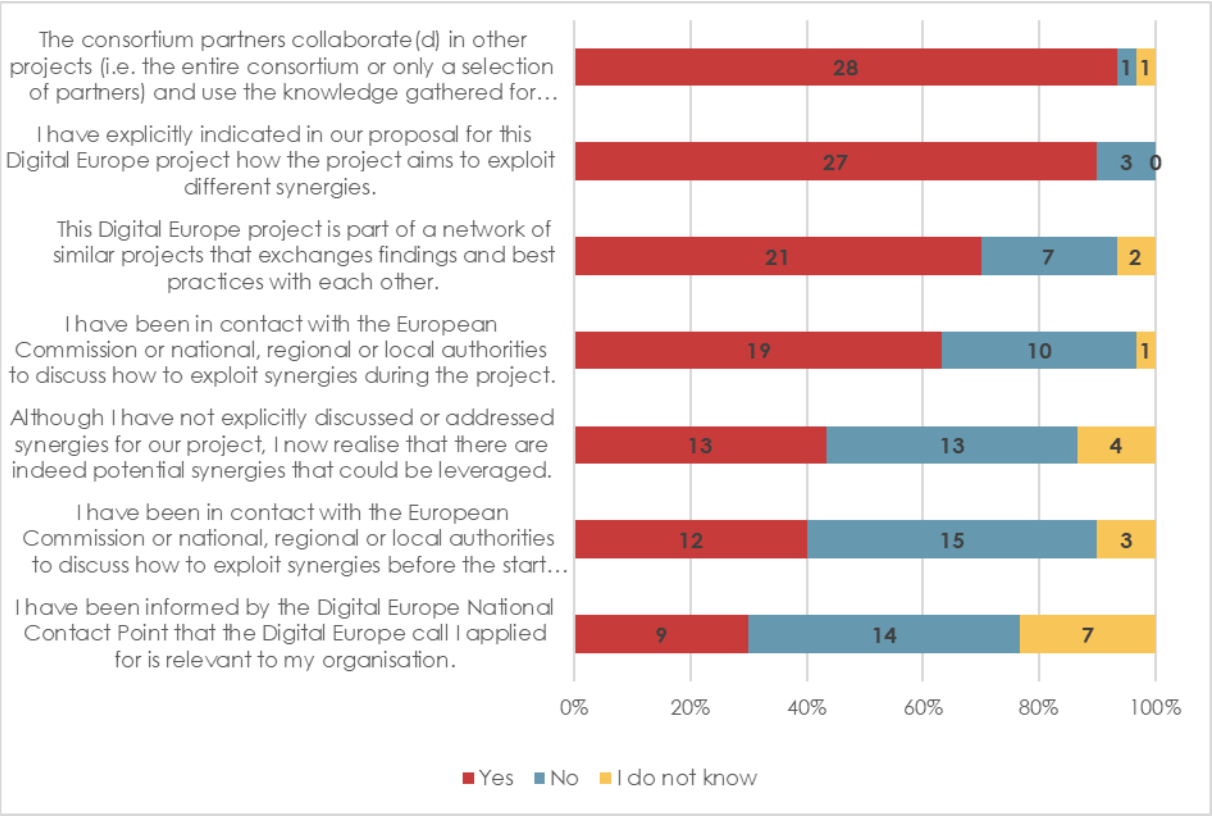


Figure 34 Do you agree with the following statements? (n=30)



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