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ANNEX

ANNEX

to the

Commission Implementing Decision

on the financing of the Digital Europe Programme and the adoption of the multiannual work programme for 2021 - 2022

DIGITAL EUROPE

Work Programme 2021-2022

INTRODUCTION

Digital technologies are profoundly changing our daily life, our way of working and doing business, the way we understand and use our natural resources and environment and the way people interact, communicate and educate themselves. The von der Leyen's Commission has presented an ambitious strategy on shaping Europe's digital future on 19 February 2020[1]. The Council conclusions of 9 June 2020[2] confirmed this ambition.

The COVID-19 crisis has further highlighted the critical role of digital technologies and infrastructures in our lives and demonstrated how our societies and economies rely on digital solutions. Moreover, it has accelerated the digital transition. The crisis has also confirmed how important it is for Europe not to be dependent on systems and solutions coming from other regions of the world.

The efforts needed to achieve the abovementioned goals are not limited to Research and Development. The EU must drastically improve its digital capacities. This includes the deployment of digital technologies, as well as the necessary digital skills for all the EU workforce. Europe must also develop key digital infrastructures, innovate and strengthen its industrial base, enhance its resilience and flexibility both in terms of technologies and supply chains. Delivering this will require massive public and private investment and common efforts that no Member State alone could secure.

In this context, the European data strategy[3] has announced a High Impact project on European data spaces, encompassing data sharing architectures and governance mechanisms, as well as the European federation of energy-efficient and trustworthy cloud-to-edge infrastructures and related services. The Digital Europe Programme will also contribute to the achievement of the digital targets, as outlined in the communication: "2030 Digital Compass: the European way for the Digital Decade"[4]. Indeed, the Digital Europe work strands will provide key support to the digital transformation of the economy in the next decade, as well as to achieve a European digital sovereignty[5] by deploying key technological capabilities. The Digital Europe Programme will also contribute to the achieve the goals highlighted in the Commission proposal for a Regulation on a Single Market For Digital Services (the Digital Services Act - DSA)[6] and a Regulation on contestable and fair markets in the digital sector (the Digital Markets Act - DMA)[7] through actions aiming to create a safer digital space in which the fundamental rights of all users of digital services are protected and through actions that aim to establish a level playing field to foster innovation, growth, and competitiveness.

This document sets out the Work Programme for part of the actions to be implemented in the first two years of the Digital Europe Programme. It follows extensive consultations with the Member States, stakeholders and the public on drafts of the strategic orientations. It uses as a reference point the Annex 1 of the Digital Europe Programme Regulation[8].

[1] https://ec.europa.eu/info/sites/default/files/communication-shaping-europes-digital-future-feb2020_en_4.pdf

[2] https://data.consilium.europa.eu/doc/document/ST-8711-2020-INIT/en/pdf

[3] https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1593073685620&uri=CELEX:52020DC0066

[4] https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_en

[5] By strengthening the EU's open strategic autonomy and resilience.

[6] https://eur-lex.europa.eu/legal-content/en/TXT/?uri=COM:2020:825:FIN

[7] https://eur-lex.europa.eu/legal-content/en/TXT/?uri=COM%3A2020%3A842%3AFIN

[8] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=consil%3APE_13_2021_INIT

THE DIGITAL EUROPE PROGRAMME OBJECTIVES

The Digital Europe Programme will reinforce EU critical digital capacities by focusing on the key areas of artificial intelligence (AI), cybersecurity, advanced computing, data infrastructure, governance and processing, the deployment of these technologies and their best use for critical sectors like energy, climate change and environment, manufacturing, agriculture and health.

The Digital Europe Programme is strategic in supporting the digital transformation of the EU industrial ecosystems. The funding will be available for the EU Member States as well as other countries associated with the Digital Europe Programme (unless otherwise specified in the topic description, tender specifications and call for proposals).

The Digital Europe Programme also targets upskilling to provide a workforce for these advanced digital technologies. It supports industry, small and medium-sized enterprises (SMEs), and public administration in their digital transformation with a reinforced network of European Digital Innovation Hubs (EDIH). The Digital Europe Programme will accelerate the economic recovery and drive the digital transformation of Europe.

The twin transitions to a green and digital Europe remain the defining challenges of this generation. This is reflected throughout the Commission's proposals. The Digital Europe Programme will deliver on the goals set out in the European data strategy of realising the vision for a genuine single market for data. It will help bring European human centred AI-solutions as set out in the White Paper on AI[9] as well as promote the deployment of other key digital technologies with respect for Union values[10], and from a human-centric perspective. The Digital Europe Programme will unleash the powers of digital technologies to reach Europe's common climate and environmental goals as set out in the European Green Deal, including being climate neutral by 2050, as well as strengthen the resilience of Europe's industry and increase its open strategic autonomy.

Actions in this Work Programme will support technologies that are strategically important for Europe's future. In particular:

- Unleash the potential of data with European common data spaces built on innovative secure and energy efficient cloud to edge technology. It will promote the testing and adoption of trustful[11] AI technologies with world-class testing and experimentation facilities boosting the development of artificial intelligence and its use to respond to key societal challenges including climate change and sustainable healthcare. Europe is facing global competition and needs to invest in key European digital capacities so that it can become a world leader in digital transformation and contribute to solving societal and global challenges. Digital Europe Programme actions are to support the Union's digital open strategic autonomy. The actions proposed for building essential capacities will be achieved by co-investing with Member States in new high-end infrastructures, and by upgrading and consolidating available capacities at EU and national levels.
- Ensure the deployment of a secure quantum communication infrastructure for the EU (EuroQCI). This infrastructure will become the backbone of a future "quantum internet", connecting quantum

[9] https://ec.europa.eu/digital-single-market/en/news/white-paper-artificial-intelligence-european-approach-excellence-and-trust

[10] Charter of Fundamental Rights of the European Union, OJ C 326, 26.10.2012, p. 391–407

[11] The EC communication: Building Trust in Human-Centric Artificial Intelligence defines the seven key requirements that AI applications should respect to be considered trustworthy.

computers, simulators and sensors to radically enhance their performance and enable a new technological revolution.

- Implement specialised Master's programmes in advanced digital technologies, deploying cutting-edge technologies to address the shortage of digital experts and the gender gap among professionals and researchers in this area, particularly in key technological areas.
- Address key societal challenges such as protecting the environment and fighting climate change through high-impact deployments. It will accelerate the uptake of blockchain in Europe, enable interoperable digital public services centred on the needs of users, facilitating the sharing of data across borders in areas like justice and security and promote an inclusive and trustworthy digital space.

THIRD COUNTRY PARTICIPATION

The objectives of the programme can only be achieved by taking into account essential security interests of the Union, notably in terms of cybersecurity or protection of data against unauthorised disclosure. In the case of the Digital Europe Programme, this would also cover, inter alia, the security of supply chains, critical infrastructures, public order and the protection of the Union's critical technology.

Firstly, it needs to be taken into account that European data can end up in the hands of third country authorities (national intelligence and security agencies in particular) even without the knowledge of the individuals, businesses or public administrations in the EU to which the data relates and without their ability to intervene or to exercise their fundamental rights (e.g. right for an effective legal remedy). This is particularly because of the application of national surveillance legislation of third countries and their jurisdiction over the service providers, such as cloud computing providers and other digital operators, established in the specific third country and providing their services in the Union, which may also extend to their subsidiaries established in the Union. While data access requests could also be directed to EU owned or controlled companies falling under the relevant foreign jurisdiction, e.g. when they have an establishment in the foreign jurisdiction, it is assumed that those companies having their headquarters in the relevant foreign jurisdiction may have a lesser interest to comply with EU law. Uncontrolled access to data by foreign intelligence and security agencies, could expose the Union to security risks.

Secondly, quantum communication is an emerging technology of global strategic importance that will bring a change of paradigm in communication capacities. It has extensive uses in security and dual-use technologies. Building secure European capacities in developing and producing quantum communication technologies has a strategic importance for the EU in the deployment of security applications and dual-use technologies. For these reasons, security interests of the Union require achieving and maintaining secure capacities in this area and ensuring the security of these critical supply chains.

Because of their particular criticality, all topics in section 3 of this Work Programme will be subject to the provisions of article 12(5) of the Digital Europe Programme Regulation. In addition, a set of topics in section 2 of this Work Programme will be subject to the provisions of article 12(6) of the Digital Europe Programme Regulation (see sections 2.1, 2.2, 2.3 and Annex 3).

At the same time, the Digital Europe Programme is open for collaboration with third countries. Specific conditions for the association or partial association of third countries to the Programme are laid down in Article 10 of the Digital Europe Programme Regulation.

The conditions for international cooperation with third countries, international organisations and bodies established in third countries, are specified in Article 11 of the Digital Europe Programme Regulation.

Cooperation and association agreements may be subject to adequate security, intellectual property (IP) protection and reciprocity guarantees.

Participation in the actions is intended to be open to all eligible third countries according to the association agreement they have signed at the time of signature of the grant agreement, even though the text of the actions only refers to the Member States.

INDICATIVE BUDGET AND IMPLEMENTATION

The Digital Europe Programme is implemented by means of multiannual Work Programmes. There will be four independent Work Programmes in the first two years of implementation. This Work Programme covers activities in Data, AI, Cloud, Quantum Communication Infrastructure, advanced digital Skills and deployment activities for the best use of these technologies. The other three Work Programmes are devoted to the following intervention areas: 1) High Performance Computing (implemented under indirect management by the EuroHPC JU); 2)the network of European Digital Innovation Hubs (under direct management by the European Commission); 3) activities in Cybersecurity- (implemented under indirect management by the Cybersecurity Industrial, Technology and Research Competence Centre and the Network of National Coordination Centres) with the exception of the EuroQCI. Synergies and complementarities of the activities in the various Work Programmes will be ensured.

Actions in this Work Programme will be implemented mostly in direct management by the European Commission and a supportive Executive Agency. The exceptions to this are the Investment Platform for Strategic Digital Technologies (see section 7.1) which will be implemented by the European Investment Fund in indirect management; and the Digital Twins and Destination Earth Initiative (see section 5.1.1) which will be implemented through contribution agreements with the European Space Agency (ESA), European Centre for Medium-Range Weather Forecasts (ECMWF) and the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT).

The budget for the actions covered by this Work Programme is EUR 1383 million[12] distributed as follows:

- EUR 410 million for actions supporting the deployment of **common data spaces** including sectorial data spaces and the supporting **cloud-to-edge infrastructure and services**. Additional activities in support of data spaces are included in other actions described below;
- EUR 139 million for actions implementing the AI work-strand including the **sectorial Testing and Experimentation Facilities**;
- EUR 170 million for the deployment of a **secure quantum communication infrastructure** (QCI) for the EU;
- EUR 166 million for actions related to **advanced digital skills in key capacity areas** through specialised education programmes and other actions under Specific Objective 4;

[12] The amounts drawn from the 2022 budget are subject to the availability of the appropriations provided for in the draft budget for 2022 after the adoption of the budget 2022 by the budgetary authority or, if the budget is not adopted, as provided for in the system of provisional twelfths.

- EUR 155 million for actions supporting the **Destination Earth initiative including the core platform, data lake and related digital twins** as well as other preparatory actions in support of the **Green Deal** objectives;
- EUR 38 million for actions deploying the European **Blockchain** Services Infrastructure and its regulatory sandbox;
- EUR 186.15 million for actions implementing, maintaining and operating the European Digital Government Eco System (EDGES) in **support to public administrations and their cross border interoperability, an EU-wide digital identity** as well as support to **public services providers** (i.e. **judiciary** and consumer protection, **health** and **security**) [13];
- EUR 40.5 million for actions to **enhance confidence in the Digital Transformation**;
- EUR 38 million for an Investment Platform for Strategic Digital Technologies;
- EUR 40.2 million for programme support actions, including evaluations and reviews.

Table 1: Breakdown of global expenditure per year, budget line and type of action.

Year	Budget line	Amounts to be implemented in direct management (in million EUR)		Amounts to be implemented in indirect management (in million EUR)	Total per budget line, per year (in million EUR)
		Calls for proposals - grants	Calls for tender - procurement		
2021	**Specific Objective 1 (02 04 02 11)**	-	2.5	45.07	47.57
	Specific Objective 2 (02 04 03)	143	61.4	63	267.4
	Specific Objective 3 (02 04 01 11 02)	154	14.1	-	168.1
	Specific Objective 4 (02 04 04)	82	3.7	-	85.7
	Specific Objective 5 – Deployment (02 04 05 01)	38.5	38	-	76.5
	Specific Objective 5 – interoperability (02 04 05 02)	-	20.3	-	20.3
2022	**Specific Objective 1 (02 04 02 11)**	-	-	63.06	63.06
	Specific Objective 2 (02 04 03)	292	82.4	-	374.4
	Specific Objective 3 (02 04 01 11 02)	32	19	3	54
	Specific Objective 4 (02 04 04)	80	9.3	6	95.3
	Specific Objective 5 – Deployment	20	72.3	8	100.3

[13] This support complements the actions deployed in the context of the Specific Objective 2, i.e. the Data spaces for Public Administrations (see section 2.2.1.12)2.2.1.9)

	(02 04 05 01)				
	Specific Objective 5 –interoperability (02 04 05 02)	3	27.4	-	30.4

The budget figures given in this Work Programme are indicative and subject to change.

LINKS TO OTHER PROGRAMMES AND CO-INVESTMENTS FROM PUBLIC AND PRIVATE SECTOR

Most actions foreseen in the Programme require co-investments from the public and private sectors. The modes of these co-investments are described in the relevant parts of the various Digital Europe Work Programmes. Several actions relate to cross-border or multi-country projects (MCP) as foreseen in the EU Recovery and Resilience Facility (RRF). In addition to the RFF, several programmes at the EU, national and regional levels will also contribute to these projects. The tables below summarise the expected contributions.

Table 2: Multi Country Projects relevant for this Work Programme

MCPs relevant for this Work Programme	**Topics in this Digital Europe Work Programme**	**Other contributing programmes**
Secure quantum communication infrastructure (EuroQCI)	3.1.1 Create a European Industrial Ecosystem for Secure QCI technologies and systems 3.1.2 Deploying advanced national QCI systems and networks 3.1.3 Coordinate the first deployments of national EuroQCI projects and prepare the large-scale Quantum Key Distribution (QKD) testing and certification infrastructure 3.1.4 Deploy a large-scale testing and certification infrastructure for QKD devices, technologies and systems enabling their accreditation and rollout in EuroQCI	HE, CEF, RRF
European Common data infrastructure and services	2.1.1 Smart middleware for a European cloud federation and for the European data spaces 2.1.2 Large scale pilots for cloud-to-edge-based services 2.1.3 Marketplace for federated cloud-to-edge-based services 2.2.2.1 Data Spaces Support Centre 2.2.2.2 Public Sector Open Data for AI and Open Data Platform 2.2.1 All the topics in section data spaces (i.e. all sectorial data spaces covered by this Work Programme)	HE, CEF, InvestEU, RRF
Genome of Europe	2.2.1.7.1 Health data space -Federated European Infrastructure for Genomics data	RRF
Processors and semiconductors chips	2.1.5 Testing and Experimentation Facility for Edge AI	HE, RRF

Connected public administration	5.3.1 European Digital Government Eco System (EDGES) 5.3.2 Justice and consumer protection 2.2.1.12 Data spaces for Public Administrations	RRF
European Blockchain Services Infrastructure	5.2 European Blockchain Services Infrastructure (EBSI) and Regulatory Sandbox	RRF
High-tech partnerships for digital skills and specialized education	4. Advanced Digital Skills	RRF

Table 3: Multi Country Projects relevant for the HPC work strand under Digital Europe Programme to subject to confirmation under the dedicated Work Programme

MCP relevant for the Digital Europe HPC Work Programme [to be prepared by the EuroHPC JU]	Actions in Digital Europe Programme	Other contributing programmes
Supercomputing and Quantum	Jointly investing in acquiring and operating: – Petascale Supercomputer – Pre-exascale and/or Exascale supercomputers – Quantum computers (as standalone machines or as accelerators of supercomputers) – Connecting with the EuroHPC extreme-bandwidth communication network Investing and cooperating in HPC national competence centres and HPC & Quantum skills	HE, CEF, RRF

The first two years of implementation of the Digital Europe Programme are expected to create significant synergies with projects to be funded under CEF Digital and investments under the Recovery and Resilience Facility, in particular regarding the capacity building for data and its infrastructure and the whole dynamic data ecosystem to be deployed as per the EU Data Strategy.

Table 4: Main synergies in the context of the capacity building for data and data ecosystem

	CEF Digital – Work Programme 2021-2023	Digital Europe – Work Programme 2021-2022	Recovery & Resilience Facility (decided by Member States)
Making sense of Data		- National HPC Competence Centres - AI on demand platform - Deployment Demonstrators for industrial/sectorial HPC tools, codes & software environment - Testing and Experimentation Facilities for Manufacturing, Health, Agri-food,	- Building up AI testing and experimentation capacities, and AI digital innovation hubs.

		smart cities and communities - EDIHs supporting SMEs and public sector for AI	
Supporting Data Ecosystems		- Deployment of data spaces for the Green deal, Mobility, Manufacturing, Agriculture, Cultural Heritage, Health, Media, Public administration, Public Procurement, Law enforcement, Finance. - Data spaces Support Centre - Open data Platform and making accessible High Value Datasets held by public sector	- Stimulate the deployment of data infrastructure for the creation of data spaces, including the adoption of common standards, interoperability and governance mechanisms.
80% of European data processing at the edge	- Studies to interconnect cloud backbone networks - 5G coverage along transport corridors - 5G for smart communities	- Cloud-to-edge-based services, built over the smart middleware platform - Testing and Experimentation Facilities on Edge AI	- Stimulate the emergence and deployment of federated European cloud to edge services and platforms, leveraging existing initiatives
A sovereign cloud stack	- European DNS resolver		
A European vendor-neutral multi-cloud management solution		- Smart middleware platform, including a sovereign EU multi-cloud solution - A federated marketplace for cloud-to-edge-based services, AI, etc. - Federation of HPC resources - Acquisition of Supercomputers	
(Interconnected) data processing capacities across Europe	- Cross-border interconnection of cloud and edge capacities - Terabit connectivity for High Performance Computing		- Next generation cloud to edge data centres.

In the area of health, the Digital Europe Programme supports the creation of components of the digital infrastructure for health data space in synergy with the EU4Health programme. The Digital Europe programme contributes also to Europe's Beating Cancer Plan with the two topics under the Health data space. The Digital Europe Programme will also exploit potential synergies Horizon 2020 and Horizon Europe (HE) by building on digital innovations stemming from these programmes, that are 'market mature' and/or demonstrate disruptive potential (as per indicator systems of the JRC's Innovation Radar[14] methodology). The Digital Europe Programme will strive to achieve synergies with all European programmes targeting digital across the value chain from research to marketplace.

CALLS STRUCTURE AND PLANNING

Calls for Proposals

The global budgetary envelope reserved for grants under this Work Programme is 834.5 million EUR out of which 415.5 million EUR is to be committed in 2021 and 419 million EUR in 2022.

The topics included in this Work Programme which are implemented by grants will be called according to the following plan:

[14] https://ec.europa.eu/digital-single-market/en/innovation-radar

Call 1

Table 5: List of topics in the first call for proposals (grants) under this Work Programme

Area	Topics in the Work Programme	Budget in million EUR
Cloud to edge infrastructure	Marketplace for federated cloud-to-edge-based services	99
	Secretariat for the Alliance on industrial data, edge and cloud	
	Secretariat for the Alliance on Processors and Semiconductor technologies	
	Testing Experimenting Facility for Edge AI	
Data spaces	Preparatory actions for the Green Deal data space	43
	Preparatory actions for the data space for smart communities	
	Preparatory actions for the data space for mobility	
	Preparatory actions for the data space for agriculture	
	Health data space - Federated European Infrastructure for Genomics data	
	Preparatory actions for the data space for manufacturing	
	Preparatory actions for the data space for skills	
	Preparatory actions for the data space for tourism	
	Data spaces Support Centre	
AI	Preparatory actions for the AI on demand platform	1
Quantum Communication Infrastructure	Create a European Industrial Ecosystem for Secure QCI technologies and systems	154
	Deploying advanced national QCI systems and networks	
	Coordinate the first deployment of national EuroQCI projects and prepare the large-scale Quantum Key Distribution (QKD) testing and certification infrastructure	
Advanced Digital Skills	Specialised education programmes or modules in key capacity areas	72
	Advanced digital skills analysis	
Enhancing trust in digital transformation	Safer internet Centres (SICs)	32.5
	IT System supporting the removal of online child sexual abuse material	
	European Digital Media Observatory (EDMO) - national and multinational hubs	

Other activities in support to the programme [15]	14
TOTAL for the first call	**415.5**

Call 2

Table 6: List of topics in the second call for proposals (grants) under this Work Programme

Area	**Topics in the Work Programme**	**Budget in million EUR**
Data spaces	Data space for cultural heritage (deployment)	50
	Health data space – Federated European infrastructure for Cancer Images data	
	Data space for security and law enforcement	
	Open Data for AI	
Artificial Intelligence	Testing and Experimentation Facility for Manufacturing	110
	Testing and Experimentation Facility for Health	
	Testing and Experimentation Facility for Agri-Food	
	Testing and experimentation Facility for smart communities	
Advanced Digital skills		28
	Short term training courses in key capacity areas	
	Promoting European innovation in education- Coordination and support action (CSA)	
European Blockchain Services Infrastructure (EBSI)	European Blockchain Service infrastructure (EBSI)– Deployment of services	16
	Blockchain standardisation	
Security and law enforcement	Pilot(s) using AI for law enforcement	5
European Digital Government Eco System (EDGES)	Govtech Incubator	40
	Support to the implementation of the European Digital Identity Framework	
TOTAL for the second call		249

Call 3

Table 7: List of topics in the third call for proposals (grants) under this Work Programme

[15] Governance of the Living-in.eu community, Digital Product Passport: sustainable and circular systems, e-Justice Communication via Online Data Exchange (e-CODEX), uptake of digital solutions in Health and Care, an ecosystem for digital twins in healthcare, Digital Solutions in support of the New European Bauhaus Initiative.

Area	Topics in the Work Programme	Budget in million EUR
Cloud-to-edge infrastructure	Large scale pilots for cloud-to-edge based service solutions	40
Data spaces	Data space for mobility (deployment)	50
	Data space for media (deployment)	
	Data space for smart communities (deployment)	
	Data space for manufacturing (deployment)	
Artificial Intelligence	Deployment of AI on demand platform	28
Advanced Digital skills	Specialised education programmes or modules in key capacity areas	52
TOTAL for the third call		**170**

Calls for tender

In addition to the calls for proposal, a set of actions will be implemented by procurement either using Framework contracts or open calls for tenders, especially in support of cloud infrastructure, data spaces, Public Services, Blockchain, QCI and support to enhancing confidence in the digital transformation, and programme support actions.

The global budgetary envelope reserved for procurement under this Work Programme is 350.78 million EUR out of which 158 million EUR is to be committed in 2021 and 193 million EUR in 2022.

Indirect management

Furthermore, the topics under Destination Earth will be implemented in indirect management, using annual instalments through 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).

The advisory services for the Investment Platform for Strategic Digital Technologies will also be implemented through a Contribution Agreement under InvestEU Advisory Hub Agreement with the European Investment Bank.

Finally, the Investment Platform for Strategic Digital Technologies (see section 7) will also be implemented under indirect management under InvestEU guarantee agreement, more specifically, under European Investment Fund (EIF) specific terms.

The global budgetary envelope reserved for indirect management under this Work Programme is 188 million EUR out of which 108 million EUR to be committed in 2021 and 80 million € in 2022.

Contents

1 High Performance Computing (HPC)

The mission of the Joint Undertaking will be: to develop, deploy, extend and maintain in the Union a world-leading federated, secure and hyper-connected supercomputing, quantum computing, service and data infrastructure ecosystem; to support the development and uptake of demand-oriented and user-driven innovative and competitive supercomputing systems based on a supply chain that will ensure components, technologies and knowledge limiting the risk of disruptions and the development of a wide range of applications optimised for these systems; and, to widen the use of that supercomputing infrastructure to a large number of public and private users, and support the twin transition and the development of key skills for European science and industry. The European High-Performance Computing Joint Undertaking (EuroHPC JU) will draw funds from the Digital Europe Programme, Horizon Europe (HE), and Connecting Europe Facility (CEF-2) Programmes to support the continuation of the EuroHPC JU in the new Multiannual Financial Framework:

- Digital Europe Programme for the deployment of a world-leading federated, secure and hyper-connected supercomputing, quantum computing, service and data infrastructure; industrial codes, applications and tools for industry; the widening of HPC use and the development of key HPC skills.
- Horizon Europe for research and innovation in HPC technologies and applications.
- CEF-2 for the critical high-speed secure connectivity interconnecting the federated supercomputing and data infrastructures.

Synergies between these three programmes will be exploited to be complementary and mutually reinforcing in order to achieve the ambitious objectives of the EuroHPC JU. The JU is the instrument to implement a pan-European vision in HPC for realising the EU's ambition for leadership and technological sovereignty in the digital economy.

A dedicated Work Programme for activities will be prepared separately from this Work Programme, as specified in the EuroHPC legislation[16] and in Article 4(2) of the Digital Europe Regulation. In accordance with Annex 1 of the Digital Europe Regulation, for the first two years of implementation, the activities could focus on the following three main work strands:

- to build capacities towards exascale supercomputing and quantum computing, through the acquisition and deployment of new supercomputing capabilities;
- to federate national and European HPC resources into a common platform to ensure the widest access to HPC infrastructure;
- the wide deployment of essential HPC capabilities in Europe fostering wide HPC uptake for a variety of user communities. In this context, the EuroHPC JU will implement also HPC-related job placement activities as enshrined in the Specific Objective 4 Advanced Digital Skills.

[16] Joint Undertaking established by Council Regulation (EU) 2021/1173 of 13 July 2021 establishing the European High Performance Computing Joint Undertaking

Indicative budget

The Digital Europe budget for the HPC actions implemented by the EuroHPC Joint Undertaking in 2021 and 2022 is indicatively EUR 556 million[17]. In addition, an indicative budget of EUR 10 million will be transferred to the EuroHPC JU from the Specific Objective 4 to implement activities related to Advanced Digital Skills such as HPC-related job placements in line with topic 4.2 under this Work Programme.

[17] The amounts drawn from the 2022 budget are subject to the availability of the appropriations provided for in the draft budget for 2022 after the adoption of the budget 2022 by the budgetary authority or, if the budget is not adopted, as provided for in the system of provisional twelfths.

2 Cloud, data and Artificial Intelligence

Specific Objective 2 of the Digital Europe Programme aims to reinforce the EU's core Artificial Intelligence (AI) capacities as a crucial driver for the digital transformation of the public and private sectors. The EU data strategy[18] outlined the importance of building a thriving ecosystem of private actors to generate economic and societal value from data, while preserving high privacy, security, safety and ethical standards. It announced that the Commission will invest in a High Impact Project that will fund infrastructures, data-sharing tools, architectures and governance mechanisms for thriving data-sharing and Artificial Intelligence ecosystems.

To reach these objectives, three main interlinked work strands are foreseen in the first two years of implementation of the Digital Europe Programme:

- The deployment of **cloud-to-edge infrastructure and services** compliant with EU rules, notably on security, data protection and privacy and environmental aspects. Open-source by default, they will ensure fluid data flows. Completing the picture, the deployment of the Testing and Experimentation Facility for edge-AI will support the green transition with support to advanced low-power computing technologies. Such facility should be a role model in showing effective ways to comply with existing legislation, and taking into account relevant codes of conduct and guidelines.
- The deployment of a Data for EU strand with a focus on building **common data spaces**, based on the above federated cloud-to-edge infrastructure and services that are accessible to businesses and the public sector across the EU. The objective is the creation of data infrastructure with tailored governance mechanisms that will enable secure and cross-border access to key datasets in the targeted thematic areas. Focus will be on data spaces for Green deal, smart communities, mobility, manufacturing, agriculture, cultural heritage, health, media, skills, language technologies, financial sector, public administrations and tourism. Data spaces will be supported by a Data Space Support Centre in order to guarantee coordination between the various initiatives and guarantee that data could be accessed across different sectors. The centre will ensure the best use of the cloud-to-edge infrastructure and services to serve the needs of these data spaces.
- The deployment of **AI reference testing and experimentation facilities** with a focus on four prioritized application sectors (i.e. health, smart communities, manufacturing, and agriculture)[19]. These facilities will provide common, highly specialised resources to be shared at European level. In addition, the **AI-on-demand platform** will be consolidated as a catalogue of AI-based resources and marketplace, for trustworthy AI tools made in Europe for both private and public sector use.

The participation is open to all eligible entities as established by Article 18 of the Digital Europe Programme, in particular public sector as well as private sector organisations including SMEs and NGOs.

All topics under this section are subject to the provisions of Article 12(6) of the Digital Europe Programme Regulation. The topics under Specific Objective 2 are closely interconnected within each area of intervention (for example, individual Testing and Experimentation Facilities (TEFs) benefit from common AI tools) as well

[18] Communication from the Commission, A European strategy for data; COM/2020/66 final

[19] The Commission has worked intensively with Member States to refine to prioritise the four selected sectors (see also the Coordinated Plan on Artificial Intelligence 2021 Review

as between the three intervention areas (for example, Artificial Intelligence is closely linked to the EU data and cloud initiatives, while the data spaces will provide a major source of data for AI-based applications and development as well as links to critical infrastructures, which must operate securely). These links require that the approach towards Article 12(6) must be systematic, i.e. it must take into account not only situations where given action is sensitive from the perspective of the security interest of the Union in itself, but also when it can affect the sensitivity of other actions. The reasoning per intervention area is reflected in sections 2.1, 2.2 and 2.3 respectively.

Indicative budget

The budget for the topics included in this chapter is EUR 548 million[20], distributed as follows:

- EUR 204 million for topics supporting the deployment of the cloud-to-edge infrastructure and services, including the Testing and Experimentation Facility for Edge-AI;
- EUR 206 million for topics deploying the sectorial data spaces and the related support activities, including the High Value Data Sets;
- EUR 139 million for topics implementing the sectorial Testing and Experimentation Facilities and the AI-on-demand platform.

2.1 Cloud-to-edge Infrastructure and services

The EU Data Strategy[21] and the Member States' Joint Declaration on Cloud[22] acknowledge the strategic role of a federated cloud-to-edge infrastructure and services for the successful digital transformation of the EU economy and society. The actions under this section aim at equipping Europe with world class interconnected (i.e. federated), trusted, interoperable and sustainable cloud-to-edge capabilities (infrastructures, platforms, marketplaces, services and testing and experimentation facilities for edge AI). The targeted infrastructures and services will also serve common data spaces supported by the Programme. Furthermore, they will enable a swift uptake of emerging technologies such as artificial intelligence, Blockchain, Internet of Things, High Performance Computing and big data.

The EU Data Strategy also highlights the strategic importance of reinforcing the competitiveness of the European cloud-to-edge supply industry in order to ensure the resilience of the EU in this essential area and to make the EU one of the world's most important data hubs. The update of the 2020 Industrial Strategy[23] identifies cloud technologies as a sector where Europe is strategically dependant on other world regions. This requires the build-up of cloud-to-edge capacities that are secure, resilient, energy efficient, accessible in real time and provide quality of service throughout Europe. This must be aligned with the objectives of the Green Deal: first, by supporting the sustainability and energy efficiency of the cloud and edge sector itself; second, by supporting the deployment of advanced low-power computing technologies, and third by playing an enabling role in the green transformation of our societies and economies.

[20] The amounts drawn from the 2022 budget are subject to the availability of the appropriations provided for in the draft budget for 2022 after the adoption of the budget 2022 by the budgetary authority or, if the budget is not adopted, as provided for in the system of provisional twelfths.

[21] https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/european-data-strategy_en

[22] https://ec.europa.eu/digital-single-market/en/news/towards-next-generation-cloud-europe

[23] https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/european-industrial-strategy_en

The Digital Europe Programme will contribute to the deployment of common European **data spaces.** Public investment in this area is justified in view of the enormous potential in data sharing that is currently not realised. It will bring out the potential of data use for improving services in the general public interest. Moreover, the investments will help to deploy secure, climate-friendly, inclusive, efficient, affordable and high-quality data processing capacities. For these capacities to be interoperable across different data spaces actors, they should ideally be built over a common middleware platform.

To realise this vision, this first Digital Europe Work Programme will make available an open source smart middleware platform (see topic 2.1.1). It will also foster the next generation of European cloud-to-edge advanced services (see topic 2.1.2) and it will build a pan-European marketplace in which these innovative cloud-to-edge services will become available to the public and private sectors, in particular the European data spaces, public administrations of all levels (national, regional, local) and SMEs (see topic 2.1.3). Furthermore, it will set up a secretariat to support the Alliance on industrial data, edge and cloud (see topic 2.1.1). The actions will be completed with the deployment of a Testing and Experimentation Facility for Edge AI hardware (see topic 2.1.5) as well as support to the secretariat for the Alliance on Processors and Semiconductor technologies (see topic 2.1.6).

Beyond the remit of this Work Programme, this same vision is feeding further actions in other EU programmes. In particular, the Connecting Europe Facility will deploy cross-border physical and virtual interconnections among cloud and edge infrastructures of the public sector and services of general public interest; Horizon Europe will fund research and development in low power and ultra-secure hybrid computing architectures and networks; and InvestEU will facilitate the access of private entities to loans, equity and guarantees for sustainable data processing infrastructures. Finally, through the implementation of the Recovery and Resilience Facility, Member States will invest in the development and deployment of cloud and edge capacities.

Cloud and edge-related topics (2.1.1, 2.1.2, 2.1.3 and 2.1.4) will fund the development, large-scale piloting and day-to-day operation of different digital services that are core to the operation of the operators themselves and/or the end-using organisations. Cloud services fall within the scope of the Directive (EU) 2016/1148 concerning measures for a high common level of security of network and information systems, which considers relevant cloud service providers as entities that are essential for ensuring a high common level of cybersecurity within the Union. The Commission proposal (COM/2020/823) for a revision of that directive adds Data centre service providers to the directive's scope. The proposal furthermore highlights the necessity for operators of essential services to address the cybersecurity risks stemming from an entity's supply chain and its relationship with its suppliers, given the prevalence of incidents where entities have fallen victim to cyber-attacks and where malicious actors were able to compromise the security of an entity's network and information systems by exploiting vulnerabilities affecting third party products and services. Consequently, the participation in these calls is subject to article 12(6) Digital Europe Programme Regulation as further detailed in Annex 3. This will contribute to mitigating the threats to network and information systems used to provide essential services in key sectors and ensure the continuity of such services when facing cybersecurity incidents, thus contributing to the Union's economy and society to function effectively.

All eligible entities should include in their proposal on actions subject to article 12(6) evidence on how they will address the underlying security issues, including, wherever relevant, measures to avoid falling under foreign jurisdiction obligations, and how they will deal with confidentiality of the information and include evidence of their security expertise. All selected entities implementing such actions shall have the obligation to prevent access by non-eligible third countries or by non-eligible third country entities to classified and

non-classified sensitive information. When applicable, the persons involved in the actions subject to article 12(6) will have national security clearance issued by a Member State.

2.1.1 Smart middleware for a European cloud federation and for the European data spaces

Objective

The objective is to procure a large-scale modular and interoperable open-source smart European cloud-to-edge middleware platform. Such capability will allow the integration of data infrastructures and services that will address the needs of the different data spaces (see topic 2.2) and enable the realisation of the European Cloud Federation[24]. The smart middleware will utilise existing building blocks as much as possible and serve as an enabling layer for the interconnection of the various data spaces, public authority cloud resources, Artificial Intelligence ecosystems etc., by providing the required interoperability mechanisms.

Among the building blocks to be re-used will be, where appropriate, those deployed under the Common Services Platform (see topic 5.3.1.1) and other relevant solutions developed through EU-funded projects (e.g. other Digital Service Infrastructures developed under past and current Connecting Europe Facility programme). This set of building blocks, relevant solutions and specifications (e.g. interoperability specifications, standards and solutions, federated security and trust management etc.), will form a common technical baseline to be exploited by the EU Common data spaces to enable seamless data flows, streamlined service orchestration and data integration.

The identification of technical components will take into account and encompass the relevant developments on common services stemming from the work of the Data Support Centre, once available (e.g. technical elements related to data and semantic interoperability, data and transactions' brokerage etc.).

By providing this common layer, the smart middleware will also support the emergence of a European cloud federation, which is the integration of cloud services that are geographically distributed and/or supplied by different providers. Such a common smart middleware will enable a high degree of interoperability and portability across services, to serve the needs of a European cloud-edge ecosystem delivering solutions for different verticals, notably the public sector and services of general public interest.

This middleware will cater for embedded business intelligence services for multi-uses; it will be based on crosscutting, secure, low power, and software-enabled services, allowing their orchestration across multiple providers. By stimulating the emergence of new operating models and competitive business offerings, it will allow the EU to develop its own cloud-to-edge supply chain and increase its open strategic autonomy. In line with the objective of the Green Deal, it also improves the energy-efficiency of the software, computing and system integration industries themselves and enables a low-power operating model for the functioning of the common data spaces across the EU.

Scope

Such an endeavour requires a sequential approach, only achievable through a framework procurement where the subsequent steps of the platform will the procured through successive specific contracts.

In the **first step** of the project, the awarded contractor will develop and make available an open-source large-scale modular European cloud-to-edge middleware platform that ensures interoperability between the different national and/or sectoral cloud and data components connected to it. The platform's

[24] See A European strategy for Data, COM/2020/66 final

implementation approach should incorporate the main design principles mentioned in the previous section ("Objective") and should at least:

- Provide a full cloud stack with basic services that can also be operated at the edge, while foreseeing the subsequent integration of High Performance Computing and far edge computing;
- Provide a technical baseline to be used by all EU common data spaces to avoid duplication of effort and overlaps and to ensure a proper alignment of the various implementation approaches;
- Allow state-of-the art data management between cloud and edge, enabling seamless ultra-fast data workload balancing between them, and intelligent data porting between centralised and decentralised data infrastructures;
- Ensure performance and quality of service in the execution of applications across multiple cloud and edge providers;
- Provide a multi-cloud orchestration solution, with built-in identification and security management services;
- Provide data mapping services, data anonymization and masking services;
- Embed business intelligence services for multi-uses based on crosscutting, low power, and software-enabled services;
- Integrate an environmental tracking performance system to ensure services operate in a low power mode;
- Provide secure resource efficient data storage services;
- Be tested in use cases in areas of public interest including the areas of trust services and electronic identity, modernisation of public administration, mobility, as well as industrial data spaces.

The contractor will produce and make available all necessary documentation to promote the uptake of this middleware platform among public and private users, in particular the common data spaces. It will be responsible for animating and coordinating the open-source community around this project. The development phase itself should be transparent all along so as to enable scrutiny by a broader range of interested parties.

Subsequent steps of the project will be launched once a minimum viable cloud-to-edge middleware platform has been released in open source. These further developments will be implemented through different specific contracts of the same framework contract. Based on the same open source approach, and subject to later precisions, subsequent steps, will indicatively serve to:

- Maintain what the cloud-to-edge middleware platform deployed during the first step and keep animating the associated open source community;
- Provide an "High Performance Computing as a service" connector to enable High Performance Computing resources to be accessible to users of the Cloud Federation;
- Ensure that Artificial Intelligence solutions developed under 2.3 (and earlier EU-funded programmes) can operate over the middleware platform.

- Support sustainable and ultra-low latency digital twins' business applications;
- Allow the hosting of highly specialized tools for complex business activities simulation, forecasting and modelling;
- Provide secured communication, productivity and collaboration services;
- Provide workflow management services;
- Facilitate the integration with the services (see topic 2.1.2) and marketplace (see topic 2.1.3);
- Develop further common services, reusable across sectors, notably those identified by the Data Spaces Support Centre (see topic 2.2.2.1);
- Develop further common services as defined in collaboration with the European Alliance on industrial data, cloud and edge (see topic 2.1.42.1.1).

Outcomes and deliverables

- A secure, reusable and sustainable smart middleware platform across the EU, ensuring interoperability across highly heterogeneous services and providers with adequate quality of service, serving as an enabling layer for the interconnection of the various EU common data spaces and the European Cloud Federation, by providing the required interoperability mechanisms.
- Foster the emergence of a resilient, competitive, end-to-end and sustainable software, data and system integrator ecosystem, based on secure and seamless data exchanges for the cross-fertilisation of the various vertical domains.
- Develop a robust European cloud-to-edge platform supply to enhance the European competitiveness in the digital sustainable age.

Deliverables

- An open-source large-scale, modular, secure and interoperable European cloud-to-edge middleware platform, enhanced over several subsequent steps.

Type of action	Procurement
Indicative Budget	EUR 65 million
Indicative time	2021 and 2022
Indicative duration of the action	36 months
Implementation	European Commission
Security	Call restricted on the basis of article 12(6) of the Digital Europe Programme Regulation

This topic will be subject to article 12(6) for the reasons already provided in section 2.1.

2.1.2 Large-scale pilots for cloud-to-edge based service solutions

Objective

Large-scale pilot projects will be launched aiming at the deployment at scale of innovative, sustainable, secure and cross-border cloud-to-edge based services applied in a set of well-chosen application sectors. These deployments will serve the double objective of, first, being the first actual concrete implementations

and deployments of the middleware platform and its different open source middleware solutions (see topic 2.1.1) serving the needs of a specific application sector and use case and the gained experience should feedback into this separate process. Diversity, both in geography and use cases, of the retained large scale pilot projects will therefore be key in testing the versatility and robustness of the platform. The second objective is to deploy additional cloud-to-edge services that are particularly innovative and/or not (yet) of enough general interest to be procured for the common good (as in topic 2.1.2).

The pilot projects would have to be co-designed and co-created in close cooperation between all the involved stakeholders representing well both the supply and the demand side and addressing concrete services and solutions.

The selected projects should act as showcases for the whole of the Union, providing concrete examples of how they could be taken up and implemented in other application sectors by clearly demonstrating the added-value they bring.

Scope

The projects consist of the large-scale rollout of several of the following advanced 'cloud-to-edge' services across the EU:

- Edge cybersecurity services, notably for shared edge resources;
- Highly secured, low latency local edge services running on green infrastructures that enable federated Artifical Intelligence and;
- Ultra-secure and ethical standards compliant data management such as through scalable blockchain based services.
- Predictive analytics and data visualisation services;
- Edge-cloud native multi-tenancy

This list of services should not be seen as closed[25].

The retained projects need to ensure that:

- they are built over the cloud-to-edge middleware platform made available under 2.1.1;
- they are hybrid, i.e. that they truly cover at least cloud and edge computing and, where possible, more (far-edge or High Performance Computing);
- they track their environmental performance, with a view to allowing an energy-efficient and sustainable data management;
- they are accompanied by an appropriate monitoring system to measure the uptake of cloud-to-edge based services and their associated data flows;
- they coordinate among them and with (i) the Alliance for industrial data, edge and cloud, (ii)- the European data spaces, (iii)- the Data Space Support Centre to ensure, through a common reference

[25] Further ideas can for example be found in the "European industrial technology roadmap for the next generation cloud-edge" https://digital-strategy.ec.europa.eu/en/library/today-commission-receives-industry-technology-roadmap-cloud-and-edge

governance framework, the reuse by other actors of the federated cloud-to-edge based services they develop;

In selecting the pilot projects, the Commission will adopt a portfolio approach, trying to maximise:

- Different use cases in the public sector or of general public interest. Taken together, the retained project portfolio should ideally address the health sector, the mobility sector (in particular the 5G corridors supported under the Connecting Europe Facility 2 programme), the common data spaces supported under section 2.2, public administrations, and smart cities and communities;
- Different geographies, i.e. deployments that cover at least three Member States (and ideally many more), while keeping in mind that some use cases can be very local;
- Different services, i.e. deployments that address several of the services described above.

The Commission will aim at selecting one pilot project in each of the above mentioned application sectors: i.e., the highest-scored project will be retained per sector, provided it is above the threshold in all the evaluation criteria. Should these conditions not be met for a particular sector, the Commission will revert to selecting a project whose use case is in a sector already covered by another better-scored project and that best complements the portfolio approach described above. Furthermore, the Commission will consider how much the deployments:

- involve Small and Medium-size Enterprises;
- contribute, in line with the objective of the Green Deal, to a climate neutral, energy-efficient[26] and sustainable cloud-to-edge service offering, and contribute to the greening of the computing industry while enabling the green transition of other sectors.

In line with the Berlin declaration on Digital Society and Value-Based Digital Government[27], the use of open source software is strongly encouraged as well as making relevant parts of that open source software available for broader exploitation by various public and private ecosystems.

Outcomes and deliverables

Outcomes:

- Reinforced European supply of resilient, competitive, distributed, green and secure cloud-to-edge based services.
- Wider and easier access, shorter time-to-delivery and higher sustainability of public and commercial services supplied to citizens and businesses including notably SMEs across the EU.
- Rapid deployment of EU-wide common data spaces.

Deliverables:

- Secured edge services, reaching a comparable level of maturity and resilience as traditional cloud environments;

[26] This includes, but is not limited, to a strict adherence to the code of conduct for energy efficient data centre supported by the JRC (https://e3p.jrc.ec.europa.eu/communities/data-centres-code-conduct).

[27] https://ec.europa.eu/isa2/sites/default/files/cdr_20201207_eu2020_berlin_declaration_on_digital_society_and_value-based_digital_government_.pdf

- Highly secured, low latency local edge services running on green infrastructures that enable federate AI;
- Ultra-secured and ethical standards compliant data management such as through scalable blockchain based services;
- Predictive analytics and data visualisation services;
- Edge services with high performance and reliability, able to rapidly deploy new applications, and executing multiple intensive workloads stemming from different concurrent users.

Type of action	Simple grant (50% co-funding rate)
Indicative Budget	EUR 40 million
Indicative time of call opening	Third call
Indicative duration of the action	24 to 36 months
Indicative budget per Grant (EU contribution)	EUR 8-10 million
Implementation	European Commission
Security	Call restricted on the basis of article 12(6) of the Digital Europe Programme Regulation

This topic will be subject to article 12(6) for the reasons already provided in section 2.1.

2.1.3 Marketplace for federated cloud-to-edge based services

Objective

The objective is to deploy and operate an EU online marketplace for cloud and edge services. The marketplace should be the single point of access for trusted services, notably cloud and edge services (see topics 2.1.1 and 2.1.2), building blocks deployed under the Common Services Platform (see topic 5.3.1.1) and more generally any software and data processing services developed under EU programmes such as the Digital Europe Programme, Horizon 2020 or Horizon Europe. It should as well complement the AI-on-demand platform, in providing access to the necessary cloud services. By facilitating access to these services for crucial EU sectors, the catalogue of curated services, i.e. of services that comply with EU rules and requirements, will improve the EU's open strategic autonomy. This will ensure that the digital transformation of the economy is undertaken on the basis of secure, fair, inclusive and resource-efficient infrastructures and services.

As a minimum, the EU online marketplace will provide a brokerage for the transaction and delivery of cloud infrastructures and services offered by entities from the public sector. Over time, it should become a critical resource for supplying cloud-to-edge services to the public sector, services of general interest and, where applicable, the private sector. As such, the call described in this section will be restricted according to the basis of article 12(6) of the Digital Europe Programme Regulation.

The marketplace itself should become self-sustainable financially and operationally by the end of this first grant. It should therefore be revenue-driven, wherever necessary. Its implementation, supervision of transparency and fair rules of operation and long-term sustainability should be guaranteed and governed by a broad range of relevant stakeholders (cloud service providers, cloud users, regulators, the public sector and civil society) who would for example, implement the principles included in the upcoming EU Cloud

Rulebook[28]. Ahead of the call, the Commission will consult relevant stakeholders in order to identify the appropriate governance.

Scope

The chosen project shall:

- Define clear rules for the open, fair and transparent functioning of the marketplace, including how these would be guaranteed in the long term through an appropriate governance structure;
- Deploy the technical infrastructure of the marketplace platform, with strong customer focus, user-friendliness, and inclusion and equality principles;
- Ensure that the marketplace is built over the cloud-to-edge middleware platform (see topic 2.1.1);
- Operate the platform according to security, energy and resource efficiency, data protection, ethical standards and portability requirements;
- Ensure the integration of state-of-the-art identity and access management services on the marketplace platform to support its operations;
- Design a curation/vetting process for services offered on the marketplace, notably for sector-specific services in regulated sectors (e.g. health, energy, finance…); these services should, inter alia, include the cloud-to-edge services (see topic 2.1.2) and middleware (see topic 2.1.1), the Artificial Intelligence tools (see section 2.3 3 and earlier EU funded projects), as well as building blocks deployed under the Common Services Platform (see topic 5.3.1.1).
- Where other marketplaces exist, such as marketplaces already developed in some Member States or services platforms addressing specific areas (such as the AI-on-demand platform developed under 2.3), this marketplace will put in place the required mechanisms to offer a seamless and integrated end-user experience.
- Adopt the appropriate governance to ensure the proper supervision of the marketplace by all relevant stakeholders, fostering interconnections with similar marketplaces and service catalogues that exist in some Member States;
- Enable access on such platforms, through a single EU portal for cloud users, to an online catalogue of existing cloud-to-edge based service offerings (such as predictive analytics, data visualisation, edge services, Artificial Intelligence services and language technology services ...) that are compliant with a pre-defined set of EU rules and requirements (to be compiled in the EU Cloud Rulebook), notably those referred under 2.1.2;
- Implement a service brokerage functionality to enable transactions between providers and users to take place on the marketplace;
- Ensure a vendor-neutral technical architecture and reference framework;
- Develop an agile and future-proof revenue model to cement long-term commercial viability of the EU online marketplace, while ensuring unbiased competition and strict vendor neutrality in the

[28] Foreseen in the EU Data Strategy, ibid

positioning of services on the marketplace; and, (If necessary), ensure the integration of trusted payment services on the marketplace platform to facilitate transactions;

- Report regularly (at least once per month) to the Commission throughout the deployment phase of the project.

Where possible, open source software should be used for the development of the marketplace, notably to demonstrate transparency, vendor- independence and neutrality in the offering of services on the platform.

In order to foster common building blocks, the project supported under this action will liaise with those supported by the Data Spaces Support Centre in the areas of data spaces, pool data provision, demand for the cloud, the promotion of competitive and seamless access and use of cloud infrastructures and services in the context of the topics in section 2.2.

Outcomes and deliverables

Outcomes:

- Strengthen the competitiveness and the innovation of the European economy and of common data spaces in the green digital age.
- Cloud-to-edge services uptake among public entities and private sectors that lag behind in cloud adoption, such as the European health sector.

Deliverables:

- The proper governance mechanism to supervise the marketplace by all relevant stakeholders, possibly through the setup of a legal entity.
- A large-scale and user-friendly interoperable European marketplace for cloud-to-edge based services for public and private entities across the EU and common data spaces. Interconnections of the marketplace with existing national cloud marketplaces.

Type of action	Simple grant (50% co-funding rate)
Indicative Budget	EUR 20 million
Indicative time of call opening	First call
Indicative duration of the action	36 months
Indicative budget per Grant (EU contribution)	EUR 20 million
Implementation	European Commission
Security	Call restricted on the basis of article 12(6) of the Digital Europe Programme Regulation

This topic will be subject to article 12(6) for the reasons already provided in section 2.1.

2.1.4 Secretariat for the Alliance on industrial data, cloud and edge

Objective

This action is set to support the activities of the Alliance on industrial data, cloud and edge that was announced in the Communication on "Updating the 2020 New Industrial Strategy".[29] The purpose of the Alliance is to gather relevant stakeholders, including industry, Member States representatives and other experts, from across Europe in view of strengthening Europe's industrial capacities in disruptive cloud and edge technologies. The activities of the Alliance will contribute to the EU's digital targets for 2030, including the establishment of climate-neutral, highly resource and energy-efficient, sustainable data centres; the deployment of 10,000 climate-neutral highly secure edge nodes across the EU; and raising the percentage of European enterprises using advanced cloud computing services in Europe to 75%. The Alliance will focus on fostering the joint development and deployment of next-generation EU native cloud and edge technologies that meet the requirements to process Europe's sensitive personal and/or highly sensitive business and public sector data sets, by addressing use cases for all sectors of the economy, with a specific focus on defence, security, mobility, health, and space. In carrying out its tasks, the Alliance should seek to foster and create synergies with other relevant EU initiatives.

Scope

The main tasks of the Alliance will include: leverage investment synergies across EU and Member States in the area of cloud and edge, such as Horizon Europe, Digital Europe Programme, Connecting Europe Facility 2, European Defence Fund and the Recovery and Resilience Facility; coordination with common European data spaces and the Data Spaces Support Centre (see topic 2.2.2.1); structured cooperation between the Commission and all Member States's public authorities, including on common specifications for public procurement of cloud services; expertise on relevant technical and self-regulatory norms for cloud services. This action consists in providing the following support services to the Alliance:

- Supporting the day-to-day industry-led operational work of the Alliance, including through (i) the setup and management of a collaborative workspace among participants and (ii) the organisation of relevant thematic working groups in view of ensuring progress towards and delivering on the Alliance's milestones.
- Organisation of the annual General Assembly with all members of the Alliance, in close coordination with the European Commission
- Organisation of the annual Alliance Forum with all members of the Alliance and interested stakeholders, in close coordination with the European Commission
- Creation and maintenance of the Alliance's website and day-to-day content creation to inform the broader audience about the Alliance's activities.

The Secretariat of the Alliance should ensure the principles of inclusivity and diversity for the activities it is entrusted with, and be itself inclusive and diverse, notably by being gender-balanced.

Outcome and Deliverables

The Secretariat of the European Alliance should support the European Commission in delivering on the following outcomes:

[29] COM(2021) 350 final

- A platform for leveraging investment synergies across the EU and Member States in the research, development and deployment of next generation of resource-efficient, interoperable, highly secure and trusted EU cloud and edge technologies, in coordination with other relevant EU investment initiatives.
- A matchmaking platform for businesses on investments in next-generation data processing capacities addressing the needs for processing sensitive personal or highly sensitive public sector and business data.
- A consultation platform in the context of the preparatory work of the EU cloud Rulebook, including expertise on common technical rules and norms for cloud services operating on the EU market.
- A c platform to create synergies with common European data spaces, in particular those hosting sensitive personal, or highly sensitive public sector and business data requiring high security requirements, in close coordination with the Data Space Support Centre and the European Data Innovation Board.

Type of action	Coordination and Support Action
Indicative Budget	EUR 1 million
Indicative time	First call
Indicative duration of the action	36 months
Implementation	European Commission
Security	Call restricted on the basis of article 12(6) of the Digital Europe Programme Regulation

This topic will be subject to article 12(6) for the reasons already provided in section 2.1. In addition, and as detailed in the Alliance' Terms of Reference, some Working Groups of the Alliance will address topics related to defence and security issues.

2.1.5 Testing and Experimentation Facility for Edge AI

Objective

The overall aim of the Testing and Experimentation Facility (TEF) for Edge AI hardware is to ensure the availability in Europe of trusted, high-performance, low-power edge components and technologies to support the massive data-processing requirements of AI and the digital transformation. The emergence of novel computing paradigms, such as neuromorphic, provides an opportunity for the European industry to take the lead in a new generation of edge and distributed computing systems.

The Edge AI TEF will also contribute to societal challenges, in terms of:

- supporting the implementation of the Green Deal, by reducing energy consumption versus centralised computing solutions, also thanks to ground-breaking ultra-low power operation (100 to 1000 times more efficient) and very limited use of the data infrastructure (data transmission consumes even more energy than computing); further, edge AI components enable environmental monitoring as well as increased energy-efficiency of buildings and smart cities;
- protection of personal data and privacy by processing within the edge device;
- security and resilience avoiding or limiting dependency on the network;

- safety and efficiency by reducing latency to near-real-time (e.g. for automotive or manufacturing applications).
- European sovereignty in generation and management of sensitive data with trusted, secure components;
- Open technological autonomy by reducing and diversifying strategic dependencies on components that may expose the EU to supply chain disruptions and security vulnerabilities, or not respecting European values in terms of safety, privacy, AI, equality, ethics or environmental aspects.

Scope

This project aims at delivering a European platform that will enable companies to develop, test and experiment AI product prototypes based on advanced low-power computing technologies, custom-designed for their application environment. It involves the set-up of facilities for design, fabrication, integration and verification, employing leading-edge equipment with advanced semiconductor process and fabrication technologies. Such a platform will be able to bring novel embedded AI technologies to high Technology Readiness Levels (TRLs), delivering prototypes for field validation that can significantly accelerate industrialization and time-to-market for edge AI components, resulting in a competitive advantage for the European ecosystem.

The TEF will realise a joint distributed platform (pilot line) to be led by EU centres of excellence in microelectronics technologies for advanced computing and key industrial actors of the microelectronics ecosystem such as integrated device manufacturers (IDMs) foundries and system integrators. The platform will be open to exploitation by EU industries, including SMEs, through direct support or through projects funded by other European or National programmes. In particular, strong cooperation is envisaged with the Joint Undertaking on Key Digital Technologies, which may support projects in close coordination with the TEF on Edge AI, as well as other EU partnerships in the area of AI, HPC, 5G/6G and cloud computing. Opportunities for future synergies with related actions on quantum computing infrastructure will also be evaluated.

Through the collaboration of a network of European Digital Innovation Hubs, the Edge AI TEF will provide also SMEs and Start-ups with fast and simple access to world-class testing facilities, rich networks of stakeholders and potential customers.

In cooperation with the sectorial TEFs in Manufacturing, Agri-food, Healthcare, Smart communities, the AI components delivered by the Edge AI TEF can be implemented in connected autonomous objects to be integrated in a distributed AI platform for applications such as industrial Internet of Things (IoT), precision agriculture, autonomous vehicles, implanted/wearable medical devices.

The selection of projects to be supported by the Edge AI TEF will be based on the character of innovation, on the business potential and on the strategic dimension for Europe.

The TEF infrastructure will put in place advanced semiconductor equipment that may also serve as a basis for quantum computing technologies, therefore opportunities for synergies with related Digital Europe actions on quantum computing infrastructure will be evaluated.
The first phase of the project will focus on the procurement, installation and preparation of the infrastructure, developing the necessary interfaces and testing of existing solutions, and the development of frameworks for hardware/software co-design and prototyping. In the following phases, the project will develop innovative prototypes employing the most advanced architectures and technologies beyond the

state-of-the-art, incorporating energy efficiency, operational trust and security, which will be tested and validated in the respective field of application, before transfer for industrialization and production by IDMs or foundries.

The activities to be implemented based on this Work Programme are the following:

- Procurement and preparation of the infrastructure - equipment installation, design tool finalisation, definition of devices with users, distribution;
- Production of System Exploration Platform software for emulation of hardware;
- Progress of key building blocks (such as sensing, in-memory computing, 3D architectures) to higher TRLs and validation of their design kits; development of design and prototyping frameworks;
- Integration of building blocks into solutions, implementing rules and procedures for testing and transfer to industry.

Outcomes and deliverables

- Wide availability of world-class experimentation facilities in Europe for edge AI microelectronic components based on advanced low-power computing technologies;
- Service provisioning to a wide range of users: from semiconductor manufacturers and fabless companies, to end-user industries, SMEs and start-ups, requiring a varying degree of support in their further market development;
- Fully tested and validated European IP and edge AI products enabled by European technology, ready for market deployment.

Type of action	Grant for procurement (50% co-funding rate)
Indicative Budget	EUR 78 million
Indicative time of call opening	First call
Indicative duration of the action	30 months
Indicative budget per Grant (EU contribution)	EUR 78 million
Implementation	European Commission
Security	Call restricted on the basis of article 12(6) of the Digital Europe Programme Regulation

This topic will be subject to article 12(6) for the reasons already provided in sections 2.1 and 2.3.

2.1.6 Secretariat for the Alliance on Processors and Semiconductor technologies

Objective

This action is to support the activities of the Industrial Alliance on processors and semiconductor technologies that was announced in the Communication on "Updating the 2020 New Industrial Strategy".[30] The purpose of the Alliance is to gather relevant stakeholders, including industry, Member States representatives and other experts, from across Europe in view of strengthening Europe's industrial capacities in the design and manufacturing of advanced processors and other electronic components. The activities of the Alliance will contribute to delivering on the EU's digital targets for 2030, by addressing use cases for all sectors of the economy, notably mobility, communications, industrial manufacturing, security, and health.

Scope

The main tasks of the Alliance will include: identification of critical gaps in the semiconductor value chain, development of targets and roadmaps, increasing design and manufacturing capacities and leveraging investment and innovation synergies. Member States representatives are invited to participate in the work of the Alliance in relevant working groups. This action consists in providing the following support services to the Alliance:

- Supporting the work of the Alliance, including through the organisation of relevant thematic working groups in view of ensuring progress towards and delivering on the Alliance's milestones.
- Organisation of the annual General Assembly with all members of the Alliance, in close coordination with the European Commission
- Organisation of the annual Alliance Forum with all members of the Alliance and interested stakeholders, in close coordination with the European Commission
- Creation and maintenance of the Alliance's website and day-to-day content creation to inform the broader audience about the Alliance's activities

Outcome and Deliverables

The Secretariat of the Industrial Alliance will support the European Commission in delivering on the following outcomes:

A platform for identifying opportunities for leveraging investment and innovation synergies in the research, development and deployment of next generation of resource-efficient, interoperable, highly secure semiconductor technologies. This platform should enhance coherence and synergies across activities in the IPCEIs, the KDT JU, Digital Europe Programme and the Pact for Skills.

The European Commission will be an observer to the General Assembly, monitoring progress with a view to its policy and investment agenda and act as a facilitator towards cooperation and engagement of all stakeholders, e.g. by providing secretarial services for the on-boarding of new members.[31]

[30] COM(2021) 350 final

[31] Industrial Alliance for Processors and Semiconductor Technologies, Terms of Reference, 19 July 2021, https://ec.europa.eu/newsroom/dae/redirection/document/78326

Type of action	Coordination and Support Action
Indicative Budget	EUR 1 million
Indicative time of call opening	First call
Indicative duration of the action	36 months
Implementation	European Commission
Security	Call restricted on the basis of article 12(6) of the Digital Europe Programme Regulation

This topic will be subject to article 12(6) for the reasons already provided in section 2.1. In addition, and as detailed in the Alliance' Terms of Reference, some Working Groups of the Alliance will address topics related to defence and security issues.

2.2 Data for EU

The aim of the European data strategy is to create a genuine single market for data where personal as well as non-personal data, including sensitive business data, are secure and businesses also have easy access to an almost infinite amount of high-quality data, boosting growth and creating value, while minimising the human carbon and environmental footprint. Europe aims to capture the benefits of better use of data, leading to greater productivity and competitive markets, and improvements in health and well-being, environment, transparent governance and excellent public services.

To speed up the development of the data market, the Commission will invest in **common European data spaces** in strategic economic areas and areas of public interest, such as health, the Green Deal and transport. The data spaces will bring together data, data infrastructures and governance structures in order to facilitate secure data pooling and data sharing, a pre-condition for wider availability of data across the economy.

The European data strategy announced the development of 9 initial data spaces, indicating that the list is open, so other data spaces can be added. The work on the data spaces is accompanied by a review of the policy and legislative framework for data access and use, with a proposal for a Data Governance Act adopted on 25 November 2020 and a proposal for a Data Act, as well as the Implementing Act on High-value datasets under the Open data directive, planned for 2021.

The Digital Europe Programme will contribute to the deployment of European common **data spaces** through the development of an open source cloud-to-edge middleware infrastructure that can be used in the different data spaces and by strengthening governance and supporting data interoperability within and across sectors, both public and private, and for both content and metadata, building where applicable on existing domain-specific models for structured and semantic data. Public investment in this area is justified given the enormous potential in data sharing within and between sectors that is currently not realised. In addition, the investments will foster the use of data for improving services in the public interest and they will also contribute to the deployment of secure, climate-friendly, efficient, affordable and high-quality data processing capacities. The topics under this chapter contribute to achieving the goals highlighted in the Commission proposal for a Regulation contestable and fair markets in the digital sector (Digital Markets Act)[32] by aiming to create a single market for data with a level playing field to foster innovation, growth, and

[32] https://eur-lex.europa.eu/legal-content/en/TXT/?uri=COM%3A2020%3A842%3AFIN

competitiveness. In order to maximise the effect of the investments, the activities in this Work Programme will be sequenced as follows:

- In the first phase, common support actions will lay the basis for the development of each of the data spaces through community building and preparatory work on interoperability and governance. A Data Spaces Support Centre will be created that will define the blueprint architecture and data infrastructure requirements for the data spaces in cooperation with the CSAs. In parallel, open source smart cloud-to-edge middleware building blocks that can be used across the different data-spaces will be developed.
- In a second phase, grants and procurement will support the deployment of the actual data spaces in line with the common architectural requirements. The open source smart cloud-to-edge middleware building blocks will be offered for the deployment of the data spaces, supplemented by support to data storage capacities as enable for Big data and AI applications. At the same time, extensions to the middleware building blocks, built inter alia with input from the Data Space Support Centre, will be developed in view of providing new features and services to the data spaces.

To this end, the Work Programme will provide funding for:

- the development of a common technical layer that can be deployed across the data spaces, in particular, the open source smart cloud-to-edge middleware building blocks (the **European Data Spaces Technical Framework**, see topics 2.1.1, 2.1.2 and 2.1.3);
- the development of **individual data spaces** (see section 2.2.1);
- a **Support Centre** to coordinate all relevant actions on data spaces, including the interoperability of data between sectors (see topic 2.2.2.1);
- **Open Data** related projects, aiming to increase the availability, quality and usability of public and private sector information in compliance with the requirement of the Open Data Directive (see topic 2.2.2.2). The relevant data will feed into the different data spaces;
- **Other topics in this Work Programme** such as the data layer of the activities deployed in the context of the Destination Earth initiative (see section 5.1.1).

An overall governance mechanism supporting the development of data spaces will be set up, bringing together Member States representatives, also in view of combining European and national funding, including through multi-country projects.

Synergies will be sought with other data related initiatives funded under EU programmes such as Horizon Europe[33], Health4EU Programme and the space programmes (e.g. Galileo and Copernicus). With the introduction of technology innovations (e.g. smart electricity grids, connected and self-driving vehicles), many essential services and the good functioning of critical infrastructure facilities like electricity or water supply, transportation and health care will become more and more dependent on reliable and secure data and computing infrastructures and services. They will offer the possibility of getting access to data related to most of such critical infrastructures. Once deployed and populated with valuable personal and non-personal data (including sensitive data) and linked to commercial and public services, data spaces should therefore be considered as critical infrastructures, similar to electricity, telecommunications, water and transportation.

[33] E.g. the European Partnership on AI, Data and Robotics under Horizon Europe, the European Alliance for Industrial Data and Cloud, European Open Science Cloud, etc.

They will be subject to the risk of malicious action by individuals, groups or regimes that will attempt to compromise, distort or disclose data in the data infrastructures, thus compromising the availability of the service and the integrity of the information/data used for/within that service. Services based on data available through data spaces will become more and more essential for the proper functioning of critical infrastructures. Any interruptions on the access to data will cause disruptions and affect security or public order.

Given that the data spaces will also provide a major source of data for AI-based applications and development, their integrity and security is essential also for the secure and proper functioning of AI systems.

The main objective of a data space is to give to the data holder full control of the data it creates. In a data space, the data holder will be able to give access only to users that the data holder have chosen and under specific conditions that have been agreed upon. It is not because the data infrastructure and software middleware provide guarantees of security that the data spaces that will be hosted on top are automatically secure. The addition of unsecure elements can undermine the security features of other elements. Moreover, data spaces will be combined, aggregated, recomposed and in many cases software-defined working on top of common or overlapping infrastructures. If such data spaces do not provide the same level of reassurance from the outset, the combined data will always lead to the lowest common denominator for security, which will weaken the trust that organisations have in those data spaces. Furthermore, the exploitation and use of the data will often require access to several data spaces, and the interlinking of access infrastructure will make the whole dataspace ecosystem even more reliant on a common high level of security.

In this context, the security risks should not be assessed separately sector by sector (or data space by data space) but at a more general and systemic level. Some Data spaces will be using common infrastructures and tools, which means that security risks for one data space would also affect the others. In addition, the utility that can be extracted from data (but also the risk related to abuse) increases exponentially when data from different sources and sectors are combined.

As a consequence, the data spaces for Green Deal (see topic 2.2.1.1), smart communities (see topic 2.2.1.2), mobility (see topic 2.2.1.3), manufacturing (see topic 2.2.1.4), health (see topic 2.2.1.7), public administrations (see topic 0), financial data space (see topic 2.2.1.12), data spaces support centre (see topic 2.2.2.1) and public sector open data for AI and Open Data Platform (see topic 2.2.2.2) will be subject to the provisions of the article 12(6) of the Digital Europe Programme Regulation on the specific grounds of public order and inner stability, protection of data privacy and fight against fraudulent and deceptive practices. The reasoning is twofold:

First, there is a need to have trustworthy operators developing and running these data spaces so they can be protected from malicious attacks and be trusted by private and public stakeholders to entrust their data.

Second, these topics will create an ecosystem of trust aiming to facilitate the reuse and take up of the data covered, and thus economic growth. Having different and separate security conditions for the abovementioned data spaces, and/or dividing each thematic data space into more and less sensitive sections, with different operators and levels of interconnection, would damage the ecosystem of trust as well as the desired take up with its positive economic consequences, implying higher transaction and interoperability costs and discourage, in particular, SMEs. The data spaces for agriculture (see topic 2.2.1.5), cultural heritage (see topic 2.2.1.6), media (see topic 2.2.1.8), skills (see topic 2.2.1.10), languages (see topic

2.2.1.11) and tourism (see topic 2.2.1.13.) will not be subject to the provisions of the article 12(6) of the Digital Europe Programme Regulation. These data spaces do not pose security risks since, it is not planned that they will be interconnected with other data spaces, and especially with the data spaces of essential infrastructures. All eligible entities should include in their proposal on actions subject to article 12(6) evidence on how they will address the underlying security issues and how they will deal with confidentiality of information and include evidence of their security expertise. All selected entities implementing such actions shall have the obligation to prevent the access by non-eligible third countries or by non-eligible third country entities to classified and non-classified sensitive information. When applicable, the persons involved in the actions subject to article 12(6) will have national security clearance issued by a Member State.

2.2.1 Data Spaces

2.2.1.1 Preparatory actions for the Green Deal data space

Objective

The Green Deal data space will interconnect[34] currently fragmented and dispersed data from various ecosystems[35], both for/from the private and public sectors. It will offer an interoperable, trusted IT environment, for data processing, and a set of rules of legislative, administrative and contractual nature that determine the rights of access to and processing of the data. The data space will also establish links with activities in other EU programmes such as Horizon Europe (in particular those funded under Cluster 4 "Digital, Industry and Space", Cluster 5 "Climate, energy and Mobility", Cluster 6 "Food, Bioeconomy, Natural Resources, Agriculture and Environment" and the relevant Missions) and the space programmes (e.g. Galileo and Copernicus) providing massive amounts of data including in real time. In order to coordinate among the various initiatives contributing to the Green Deal objectives, the project will propose a roadmap for the deployment of a full-fledged common European Green Deal data space and liaise with potential users and other relevant actors to ensure synergies between users and infrastructures..

The Green Deal data space will be set up in synergy with the various relevant initiatives implementing the Green Deal Goals. In particular, in the context of this Work Programme, synergies will target:

- Relevant high quality data is expected to derive from the activities related to High Value Datasets[36] in the framework of the **Public sector Open data for AI** and **Open Data Platform** (see topic 2.2.2.2).
- Data from **other sectoral data spaces** where relevant.
- The topics implementing **Destination Earth initiative** (see section 5.1.1). It will also contribute through the development of a very high precision digital model of the Earth to enable visualising, monitoring and forecasting natural and human activity on the planet in support of sustainable development.

[34] Data sets may include e.g. High Value Datasets (e.g. from the Environmental, Meteorological and Geospatial thematic areas), Earth Observation data (e.g. Copernicus), Member States and participating EEA EFTA states / Associated countries' INSPIRE platforms, satellite images, IoT/sensor data, sensitive public data, private data with public interest as well as citizens' data (in line with GDPR).

[35] e.g. the European Marine Observation and Data Network (EMODnet) platform in the maritime domain, the EGDI – The European Geological Data Infrastructure, Copernicus programme and its DIAS (data and information access services).

[36] E.g. from the Environmental, Meteorological and Geospatial thematic areas

- To complement the work during the first two years, a **Coordination and Support Action on Digital Product Passport** (see topic 5.1.3) will prepare the ground for a future common European data space for smart circular applications.

Scope

The funding will enable the establishment of a data governance mechanism, with a detailed roadmap on how the data space should progressively develop into a pan-European Green Deal data space, by connecting EU programmes, national, regional and local data ecosystems at the EU level.

The roadmap should describe how to integrate the various activities contributing to the common European Green Deal data space in line with existing policy priorities and existing initiatives, enabling all relevant actors to access and re-use data needed for their purposes in compliance with the dataspace governance scheme. To this end, the roadmap should ensure that relevant users such as climate and environmental scientists are able to access and exploit the opportunities offered by Green Deal Data Space. Action to address potential barriers to such use cases should be identified in advance.

The action will have to work in partnership with the Data Spaces Support Centre (see topic 2.2.2.1) in order to ensure alignment with the European Data Spaces Technical Framework and the rest of the ecosystem of data spaces in section 2.2.1 thereof. The joint work will target the definition of:

- the data space reference architecture, building blocks and common toolboxes to be used;
- the common standards, including semantic standards and interoperability protocols, both domain-specific and crosscutting;
- The data governance models, business models and strategies for running data spaces.

The action should also establish links to relevant initiatives under the Green Deal to ensure a user-driven development of the data space, in particular those (e.g. Horizon Europe activities such as the Green Deal Missions) that will provide significant opportunities to test, experiment and up-scale the input to and use of the data space with local partners.

Outcomes and deliverables

- A sustainable data governance scheme as well as a blueprint that connects existing national, regional and local data ecosystems and enables public and private stakeholders to access relevant data; and to develop cross-sector data services.
- A priority list of datasets relevant to the European Green Deal Strategy;
- A roadmap towards the common European Green Deal data space

Type of action	Coordination and Support Action
Indicative Budget	EUR 2 million
Indicative time of call opening	First call
Indicative duration of the action	18 months
Implementation	European Commission
Security	Call restricted on the basis of article 12(6) of the Digital Europe Programme Regulation

The Green Deal data space will be subject to article 12(6) for the reasons already provided in section 2.2. The data space offers access to a variety of data related to the environment and EU's climate goals. This will include detailed data on geospatial systems, localised water, soil and air pollution, but also detailed geo-localised systems, energy supply and consumption (electricity grids, Member States fossil fuel consumption etc.). The information that can be extracted from data (but also the risk related to abuse) increases exponentially because data from different sources could be combined and could be used for malicious attacks against public order. In addition, such data may be used for further fine-tuning the functioning of European critical infrastructures (such as smart grids, etc.) as well as the AI-based solutions using this data.

2.2.1.2 Data space for smart communities[37]

2.2.1.2.1 Preparatory actions for the data space for smart communities[38]

Objective

Time is critical in addressing the challenges of the twin digital and green transition. Cities and communities are ready for effective innovation, hence the need for the creation of a data space for smart communities[39] as an enabler of the Green Deal goals and Sustainable Development Goals.

Given the systemic nature of the Green transition challenge, the project will bring together existing local data ecosystems, and relevant stakeholders, public and private, to join efforts and identify common principles for sharing large pools of data at the EU level[40], ensuring wide geographical coverage as stipulated in the Digital Europe Programme Regulation Art 16(3)-(4). The action will contribute to the definition of the technical infrastructure for data sharing across relevant domains (in particular, traffic, electricity, pollution, urban infrastructure, extreme weather events, water and waste management, etc.) in order to create cross-domain innovation[41] and move towards the Green transition in each local context[42].

Ultimately, the project outcomes will become a valuable base for real time testing and deployment of AI-based solutions including the deployment of the Testing and Experimentation Facilities for smart cities and communities (see topic 2.3.2.4), Destination Earth Digital Twins (see topic 5.1.1.2) and AI-based solutions for Smart Communities (see topic 2.2.1.2.3).

Scope

The funding will enable the establishment of a data governance mechanism, with a detailed roadmap on how the data space for smart communities will connect local data ecosystems at the EU level that could be

[37] 'Communities' captures both rural and urban communities.

[38] 'Communities' captures both rural and urban communities.

[39] As highlighted by the 'Report of the Mission Board for climate-neutral and smart cities' (see https://op.europa.eu/en/publication-detail/-/publication/bc7e46c2-fed6-11ea-b44f-01aa75ed71a1/language-en/format-PDF/source-160480388), the data space can serve as an important digital enabler for the cities supported by the Mission.

[40] For support to communities less advanced in establishing data ecosystems, see topic middleware.

[41] In compliance with existing sectoral legislation

[42] For inspiration and background information see the Workshop Report of the Expert Consultation held on 25/06/2020 here: https://ec.europa.eu/digital-single-market/en/news/expert-workshop-common-european-smart-communities-data-space ,the Workshop on 'Data-driven cities : fostering common data spaces for urban sustainability' held on 08/12/2020 : https://ec.europa.eu/digital-single-market/en/news/workshop-summary-and-report-data-driven-communities-fostering-local-data-ecosystem as well as the series of workshops on B2G data sharing: https://digital-strategy.ec.europa.eu/en/events/b2g-data-sharing-cities-series-5-workshops

interconnected with the future Green Deal Data space (see also topic 2.2.1.1). The project will grow organically, building on different EU initiatives[43] and data ecosystems, and strengthening the connection between repositories of data. The project will:

- Develop a multi-stakeholder data governance scheme, bringing together local data ecosystem stakeholders, to jointly identify the data infrastructures to federate in order to enable a data space for smart communities at the EU level.
- Elaborate a blueprint for the data space for smart communities based on existing EU legislation and data policies, as well as on common principles agreed at sector or local levels[44].
- Bring an agreed set of priority datasets and data themes (public, private, including citizen-collected, etc.)[45], including real-time data, into conformity with the new blueprint standards and principles.

The action will have to work in partnership with the Data Spaces Support Centre (see topic 2.2.2.1) in order to ensure alignment with the European Data Spaces Technical Framework and the rest of the ecosystem of data spaces in section 2.2.1 thereof. The joint work will target the definition of:

- the data space reference architecture, building blocks and common toolboxes to be used;
- the common standards, including semantic standards and interoperability protocols, both domain-specific and crosscutting;
- The data governance models, business models and strategies for running data spaces.

Furthermore, the project is encouraged to cooperate with the Testing and Experimentation Facilities for smart cities and communities (see topic 2.3.2.4), to define European test and training data sets and to provide support in their establishment. The action should also establish links to those Horizon Europe missions that work with communities and cities as key implementing partners (e.g. Mission on Climate Neutral and Smart Cities and Mission on Adaptation to Climate Change), which would provide significant opportunities to test, experiment and up-scale the input to and use of the data space with local partners.

Outcomes and deliverables

- A sustainable data governance scheme for the smart communities' data space as well as a blueprint that connects existing local data ecosystems and EU systems and enables public and private stakeholders to develop cross-sector, cross-community, data services, including AI-enabled data services.
- A detailed roadmap towards a full-fledged pan-EU smart communities' data space that will be interconnected with the Green Deal data space (see topic 2.2.1.1), and will include a set of technical specifications for interoperability with the European Data Spaces Technical Framework.

[43] E.g. Copernicus land monitoring service pan-EU and local component, ISPIRE, Destination Earth, etc.

[44] The blueprint should propose an appropriate conceptual architecture and when appropriate, refer to existing building blocks. Particularly relevant in this context are solutions such as eID (digital identity), eDelivery (secure data exchange), the Context Broker and the Big Data Test Infrastructure and others, already widely used by EU-wide cross-border systems, should be considered to facilitate interoperability among the actors. The blueprint should also comply with commonly agreed standards and principles and ensure interoperability. Particularly relevant in this context are the Minimal Interoperability Mechanisms (MIMs) Plus, work of SEMIC, the reference community for semantic interoperability, the INSPIRE and location interoperability data models, SAREF as well as the forthcoming interoperability framework for smart cities and communities (EIF4SCC).

[45] In addition to the relevant High Value Datasets.

Type of action	Coordination and Support Action
Indicative Budget	EUR 1 million
Indicative time of call opening	First call
Indicative duration of the action	12 months
Implementation	European Commission
Security	Call restricted on the basis of article 12(6) of the Digital Europe Programme Regulation

The data space for smart communities will be subject to article 12(6) for the reasons already provided in section 2.2. The data space will offer data related to several critical city infrastructures such as energy supply and consumption, water management, waste management, traffic information, etc. which could then be exposed to vulnerabilities and impact EU public order. In addition, such data may be used for further fine-tuning the functioning of such city critical infrastructures (such as smart grids, etc.) as well as the AI-based solutions using this data.

2.2.1.2.2 Data space for smart communities [46] (deployment)

Objective

Activities in this topic will pilot and apply the principles of the data space for smart communities defined in the blueprint developed in topic 2.2.1.2.1, on a large scale and with good geographical coverage, to build EU capacity for connecting data from all relevant domains, following their specific legislation. They will also contribute to the fine-tuning and improving the blueprint via a continuous feedback loop to the project resulting from topic 2.2.1.2.1. This Data Space will be controlled by public data holders, using open standard based tools and supported by the common middleware platform (see section 2.1.1). It should also create synergies with the project resulting from topic 2.2.1.2.3.

Scope

The action will fund a consortium of relevant supply and demand-side stakeholders to foster innovation among a large number of EU cities and communities, without prejudice to sector legislation. The pilots will comply with the smart communities' data space blueprint principles and when appropriate use existing standards and follow sectorial legislation[47]. Pilots should cooperate in their impact assessment and generate a common understanding of progress towards the Green transition. In addition, the pilots should ensure compatibility with the principles of the New European Bauhaus[48] and liaise with the project implementing Digital Solutions in support of the New European Bauhaus (see topic 5.1.4) when relevant.

The action will then support, through cascading grants to third party consortia, pilots, using data available from the data space for smart communities, which should create added value by combining data from at least two of the areas specified below (but can also include other related domains):

[46] 'Communities' captures both rural and urban communities.

[47] In particular rules governing sectorial data spaces and sectorial legislations addressing data accessibility and exchange

[48] https://europa.eu/new-european-bauhaus/index_en

- predictive traffic management/sustainable mobility planning, exploiting synergies with the data available on the mobility data space (see topic 2.2.1.3) and with the data available on transport National Access Points and making use of the Sustainable Urban Mobility Indicators;
- data-services related to extreme weather events to facilitate climate change adaptation, risk prevention and disaster resilience;
- management of energy flows in a city/community specific context and in conjunction with other sectors;
- targeting zero pollution (e.g. air, water, soil pollution or waste)[49].

In order to increase the impact and exploit synergies with the Testing and Experimentation Facilities (TEFs), these pilots would be required to minimise investment in infrastructure by executing their activities as much as possible on the available TEFs infrastructure[50] and make any newly created AI service available via trusted application catalogues and marketplace(s)[51]. The action should also address rules for ethical AI-enabled solutions at the local level, create AI algorithm registries and define sets of rules that the services should comply with.

The action should also establish links to those Horizon Europe missions that work with communities and cities as key implementing partners (e.g. Mission on Climate Neutral and Smart Cities and Mission on Adaptation to Climate Change), which would provide significant opportunities to test, experiment and up-scale the input to and use of the data space with local partners.

The awarded consortium will work in partnership with the Data Spaces Support Centre (see topic 2.2.2.1) in order to ensure alignment with Smart Middleware Platform developed under topic 2.1.1 and the rest of the ecosystem of data spaces in section 2.2.1 thereof:

- The data space reference architecture, building blocks and common toolboxes to be used;
- The common standards, including semantic standards and interoperability protocols, both domain-specific and crosscutting;
- The data governance models, business models and strategies for running data spaces.

Outcomes and deliverables

- An innovative and federated smart communities' dataspace, including a large number of EU communities, supported by middleware service solutions.
- 10 to 12 cross-sector data pilots covering the whole EU by making use of common data sets. These will validate and contribute to the refinement of the blueprint created under topic 2.2.1.2.1 as well as the refinement of its long-term (economic) sustainability plan.

Type of action	Grant for Support to Third Parties
Indicative Budget	EUR 18 million

[49] As set out in the Zero Pollution Action Plan (COM(2021) 400 and the related SWD(2021) 140

[50] Where any additional infrastructure is needed in the pilots, it should, to the largest possible degree, be usable beyond these pilots in line with the testing and experimentation facilities context.

[51] One such market place can for example be https://smart-cities-marketplace.ec.europa.eu/ or the https://oascities.org/catalogue/

Indicative time of call opening	Second call
Indicative duration of the action	36 months
Indicative budget per Grant (EU contribution)	EUR 18 million
Implementation	European Commission
Security	Call restricted on the basis of article 12(6) of the Digital Europe Programme Regulation

The data space for smart communities will be subject to article 12(6) for the reasons already provided in section 2.2. The data space will offer data related to several critical city infrastructures such as energy supply and consumption, water management, waste management, traffic information, etc. which could then be exposed to vulnerabilities and impact EU public order. In addition, such data may be used for further fine-tuning the functioning of such city critical infrastructures (such as smart grids, etc.) as well as the AI-based solutions using this data.

2.2.1.2.3 Advancing the digital transformation of smart communities[52]

European urban and rural communities are advancing in their digital transformations. However, not all are at the same level. Some have already moved towards an integrated cross-sector approach to exploit the strengths of advanced digital technologies such as digital twins, local data platforms, AI, advanced data analytics, high performance computing and cloud computing. Others have started to invest in their digital transformation but need to accelerate. The third group of communities are at an early stage, or have not started at all.

The actions will address all three groups, reinforcing the European capacity for the deployment and scale-up of AI-powered digital twins and enabling local data platforms in a large number of European cities and communities including the EU outermost regions and other economically disadvantaged regions as envisaged in the Digital Europe Programme Regulation recital 14. Where appropriate, they will make use of strategic advice under the Intelligent Cities Challenge and/or the plans developed under the Horizon Europe Mission on Climate Neutral and Smart Cities and on Adaptation to Climate Change.

EU communities have set an ambitious goal through the signatories of the 'Living-in.eu Declaration'[53] to accelerate their digital and green transition. They have agreed on a set of technical specifications that should form the basis of their local data platforms and (in the next phase) local digital twins. The objectives of this action are grouped into three broad categories to support the digital transformation of European communities:

- The first objective is to increase awareness and readiness of EU communities that have not yet started the digital transformation and help them develop their strategy and roadmap, including the required digital tools and access to expertise available in the EU.
- The second objective targets communities that have a digital transformation strategy and are preparing the procurement and deployment of the enabling digital infrastructure. The action will

[52] 'Communities' captures both rural and urban communities.

[53] https://www.living-in.eu/

support such communities to scale up the deployment of the enabling digital infrastructures (interoperable local platforms) and digital tools, based on a commonly agreed, mature set of standards called MIMs (Minimum Interoperability Mechanisms), solutions and indicators.

- The third objective targets the most digitally prepared EU communities. The action will support the creation of a European Local Digital Twin (LDT) toolbox through identifying and developing re-usable tools, reference architectures, open standards and technical specifications for LDT. It will also help mapping EU-based technology providers (corporates, SMEs, developers, etc.) that are active in the development and/or deployment of components of (local) digital twins and propose a plan to prepare for the large-scale roll-out of local digital twins across the EU in the coming years. Communities having a mature LDT ecosystem could offer solutions for ensuring citizens' participation for the creation of greener, liveable aesthetic public spaces, as reflected in the New European Bauhaus initiative[54].

It is expected that cities and communities, in particular, signatories of the 'Living-in.eu' Declaration' will benefit from the action.

Scope

The action will procure a set of services to be made available to relevant supply- and demand-side stakeholders to address the three objectives above. It will include an assessment tool in order to evaluate the level of digital transformation of EU cities and communities addressing all of the following activities:

- Increase the awareness and readiness of EU communities (first objective): The action should provide urban and rural EU communities, with means to disseminate best practices, standards, project results and lessons learned from previous projects and financial plans, and provide mentoring and training. It should also address the uptake of the validated and commonly agreed digital principles (see second objective). The assessment tool will be available in all Member States and allow them to draft or refine concrete customised digital transformation strategies.

- Scale the deployment of an enabling digital infrastructure (second objective): For each community, the action will prepare a detailed roadmap with results, milestones and targets; provide advisory services to assess communities' technological readiness for implementing MIM-compliant[55] local platforms; prepare general and customised procurement templates and documents; develop a certification scheme for MIMplus compliance of the solutions and, provide technical assistance to groups of communities in creating architectures for shared multi-city/community platforms.

- Accelerate the adoption of Local Digital Twins (third objective) making use of all open assets stemming out of topic 2.1.1. As cities and communities have different needs and challenges, the Local Digital Twins may focus on a range of different use cases. The action should:

    - Develop a comprehensive toolbox, the Local Digital Twin toolbox, which all European communities could use when developing local digital twins. Such toolbox will comprise the minimum conditions to qualify as a Local Digital Twin, generic solutions, building blocks, re-usable tools, reference architectures, open standards and technical specifications for the main

[54] https://europa.eu/new-european-bauhaus/index_en

[55] https://living-in.eu/sites/default/files/files/MIMs-Plus-v4-0-Final-Draft.pdf

Local Digital Twin use cases. The toolbox[56] should also include tools for citizen engagement (e.g. Virtual Reality), to enable the use of Local Digital Twins for participatory urban planning aiming at innovative and aesthetic living spaces; an important element of the New Bauhaus Initiative[57]. The toolbox shall serve as an accelerator for the large-scale deployment of MIM-compliant solutions.

- Propose next steps through a roadmap for the implementation and deployment of AI-powered Local Digital Twins in Europe with common elements for all use cases/toolboxes and specific implementation paths for each dataspace cluster to ensure that maximum benefit is taken from the results.

Outcomes and deliverables

These activities are expected to pave the way for the adoption of Local Digital Twins by cities and communities and, in view to create a large EU ecosystem of Local Digital Twins.

The main expected outcomes are:

- The development of a stakeholder agreed assessment tool, which will be owned by the EC at the end of the project for its free use by stakeholders;
- Information sessions in each Member State, for awareness-raising and promoting the resources available, bringing together at least 20% of the Member State's communities, representing a diverse group of citizens;
- A helpdesk facility to support the actual procurement of services and deployment at scale of local digital platforms through other funding (national, The European Regional Development Fund (ERDF), etc.). The support can be provided as procurement contracts for services which will be used for free by other interested cities and communities;
- 150 (2-10 per Member State) advisory reports on digital transformation of communities and procurement templates for servicing local digital infrastructure and local digital twins;
- A ready-to-use EU toolbox for the deployment of AI-powered Local Digital Twins and a roadmap for its deployment.

Type of action	Procurement
Indicative Budget	EUR 34 million
Indicative time of call opening	2022
Indicative duration of the action	36 months
Implementation	European Commission
Security	Call restricted on the basis of article 12(6) of the Digital Europe Programme Regulation

[56] Taking into account user experience, user-centricity and equality principles

[57] https://ec.europa.eu/commission/presscorner/detail/en/AC_20_1916

The data space for smart communities will be subject to article 12(6) for the reasons already provided in section 2.2. The data space will offer data related to several critical city infrastructures such as energy supply and consumption, water management, waste management, traffic information, etc. which could then be exposed to vulnerabilities and impact EU public order. In addition, such data may be used for further fine-tuning the functioning of such city critical infrastructures (such as smart grids, etc.) as well as the AI-based solutions using this data.

2.2.1.3 Data space for mobility

2.2.1.3.1 Preparatory actions for the data space for mobility

Objective

The objective is to contribute to the further development of the common European Mobility data space announced in the Data Strategy and in the Sustainable and Smart Mobility Strategy, built and operated in full compliance with existing EU legislation in the mobility and transport sectors.

The specific aim is to support the creation of a technical infrastructure combined with governance mechanisms that will facilitate easy, cross-border access to key data resources in this area. This will be on the basis of and in full alignment with existing and upcoming mobility and transport initiatives (some of which are regulated) that organise the sharing of data for both passengers and freight in the domains and where relevant become an integral part of the emerging European data and cloud services infrastructure.

Data for sustainable urban mobility indicators (SUMI) and for traffic and travel information in urban and regional areas will be made available for reuse for the development of innovative services and applications, and for policymaking.

Scope

Under the control of Commission services, **support** will be provided to the ongoing Commission initiative launched on the common European Mobility data space, in particular on:

- making an inventory of existing data platforms and marketplaces (“data ecosystems”) which allow storage, processing or sharing of mobility and transport data. Bringing these initiatives together by mapping and providing a catalogue of transport data eco-systems, as well as describing the data types, data quality, related access conditions and (web) links.
- identifying gaps and overlaps of data currently covered (or not covered) by existing initiatives in view of possibly launching additional initiatives to cover such gaps.
- identifying common building blocks which could contribute to the long-term convergence of existing and new data-related initiatives in transport, serving private, public and industrial data sharing. Explore possible options for suitable sustainable frameworks for sharing, managing data exchange across existing and emerging data initiatives in the mobility sector. Include reflections on incentives schemes to motivate participants to provide data.
- identifying opportunities for integrating the mobility data space and/or data ecosystems in the emerging European data and cloud services infrastructure.

The awarded consortium will work in liaison with the Data Spaces Support Centre (see topic 2.2.2.1) and the Alliance for Industrial Data, Cloud and Edge, to ensure alignment with the European Data Spaces Technical Framework with and the rest of the ecosystem in section 2.2.1 thereof, notably concerning common tools such as:

- a data space reference architecture, building blocks, common toolboxes and cloud services;
- common standards, including semantic standards and interoperability protocols, both domain-specific and crosscutting;
- data governance models, business models and strategies for running data spaces, with the aim to recommend possible common tools, building on existing data ecosystems.

Outcomes and deliverables

- Inventory of existing platforms sharing data relevant for mobility
- An analysis regarding gaps and overlaps of data, and identifying potential common building blocks, feeding into the Commission preparatory work establishing the mobility data space.

Type of action	Coordination and Support Action
Indicative Budget	EUR 1 million
Indicative time of call opening	First call
Indicative duration of the action	12 months
Implementation	European Commission
Security	Call restricted on the basis of article 12(6) of the Digital Europe Programme Regulation

The data space for smart communities will be subject to article 12(6) for the reasons already provided in section 2.2. The data space will offer among others data on the transport network and its use in real time. Data can reveal sensitive information about critical points including potential vulnerabilities, hence essential for the Union's security.

2.2.1.3.2 Data space for mobility (deployment)

Objective

The objective is to contribute to the further development of the common European mobility data space announced in the Data Strategy and the Sustainable and Smart Mobility Strategy, built and operated in full compliance with existing EU legislation in the mobility and transport sectors.

The specific aim is to support the creation of a technical infrastructure combined with governance mechanisms that will facilitate easy, cross-border access to key data resources in this area. This will be based on and in full alignment with existing and upcoming mobility and transport initiatives (some of which are regulated) that organise the sharing of data for both passengers and freight in the domains and become an integral part of the emerging European data and cloud services infrastructure.

Data for sustainable urban mobility indicators (SUMI) and for traffic and travel information in urban and regional areas will be made available for reuse for the development of innovative services and applications, and for policymaking.

Scope

The awarded project(s) will make information available and accessible in a machine-readable format in order to allow building a large amount of accurate and reliable data that could be used *inter alia* for artificial intelligence. It will have the following tasks and characteristics:

- support sustainable urban mobility planning and management by making available and accessible in machine-readable format **data for EU sustainable urban mobility indicators**, such as greenhouse gas emissions, congestion, commuting travel times and modal split in line with the EU definition and methodology[58].
- **make traffic and travel information at urban level available and accessible** in a machine-readable format in line with Intelligent Transport Systems (ITS) Directive 2010/40/EU and in particular the Delegated Regulation 2015/962 on real-time traffic information services and delegated regulation 2017/1926 on multimodal travel information services.

Project(s) will have to demonstrate a clear European dimension and should involve at least cities or regions in three different eligible countries (i.e. Member States or Associated countries) sharing common objectives. Projects will have to be closely integrated and use common building blocks. Where relevant, data shall be made accessible through National Access Points set up under the ITS Directive (2010/40/EU).

The projects selected will also have to fully comply with the European Data Spaces Technical Framework. They can profit from and use the smart middleware platform and tools that will be developed under topic 2.1.1. They will also have to coordinate and collaborate with other projects participating in the deployment of the data space and the Data Spaces Support Centre in order to allow integration of existing standards and to ensure interoperability and portability across infrastructure, applications and data.

Outcomes and deliverables

- Digitized processes allowing the public sector and businesses to access a larger pool of high quality data on urban mobility.
- Cities and public transport authorities will make use of compiled data to identify deficiency areas where additional action may be required, to track progress towards set policy goals, and to evaluate the effectiveness and overall impact of urban mobility policies.
- Industry, in particular SMEs, will benefit from larger sets of data to broaden their offers in terms of products and services.
- Improved monitoring/measuring the change of emissions eventually leading to increased environmental performance.

Type of action	Simple grant (50% co-funding rate)
Indicative Budget	EUR 8 million
Indicative time of call opening	Third call
Indicative duration of the action	24-36 months
Indicative budget per Grant (EU contribution)	EUR 4 million

[58] https://ec.europa.eu/transport/themes/urban/urban_mobility/sumi_en

Implementation	European Commission
Security	Call restricted on the basis of article 12(6) of the Digital Europe Programme Regulation

The data space for mobility will be subject to article 12(6) for the reasons already provided in section 2.2. The data space will offer among others data on the transport network and its use in real time. Data can reveal sensitive information about critical points including potential vulnerabilities, hence essential for the Union's security.

2.2.1.4 Data spaces for manufacturing

2.2.1.4.1 Preparatory actions for data spaces for manufacturing

Objective

The preparatory action will establish a multi-stakeholder data governance, an inventory of existing data platforms for manufacturing and a blueprint for manufacturing-specific building blocks which could contribute to the long-term convergence of existing and new data-related initiatives in manufacturing by making use of the data space technical infrastructure. The preparatory actions will support the deployment of these data spaces for manufacturing, and propose sustainable business models and incentives schemes to motivate participants to share data.

Scope

The action contributes to the definition of the technical infrastructure for data sharing and re-use within the manufacturing sector and across relevant sectors. The action will bring together existing national, regional and local data ecosystems, and relevant stakeholders, to join efforts and identify common principles for sharing industrial data and re-using large pools of data at the EU level.

The funding will enable the establishment of a data governance mechanism, with a detailed roadmap on how embryonic data spaces for manufacturing should progressively accelerate into a pan-European manufacturing data space and reach out to a very large user base, in particular SMEs. The manufacturing data space will grow organically, building on different solutions, initiatives and data ecosystems across the EU. The project will lay down the foundations of the common European data spaces by:

- Developing a multi-stakeholder data governance scheme, bringing together national, regional and local data ecosystem stakeholders, to jointly agree on the data interoperability requirements and interfaces, and data federation models. The scheme will also review options in an existing or new governance body to ensure openness, conformity and evolution of these, in agreement with the private sector.
- Delivering sustainable business models for the data spaces, which incentivise data sharing and reuse of the private sector, such as data brokerage, data valuation, and service bundling and pricing.
- Elaborating an inventory of existing data platforms for manufacturing and a blueprint for manufacturing-specific building blocks which could contribute to the long-term convergence of existing and new data-related initiatives in manufacturing by making use of the data space technical infrastructure. It will ensure that the data spaces for manufacturing are based on existing EU legislation and data policies, as well as on common principles agreed at sector or

local levels as well as data sharing and reuse template contractual arrangements. The blueprint will clarify the building blocks and common elements necessary for the management of industrial data in data spaces for manufacturing (connectors, vocabularies…) from the value-added data applications delivered by competing suppliers. It will also propose migration paths for the convergence of broadly established industrial systems to manufacturing data spaces and the data space Technical Infrastructure.

- Bringing an agreed set of priority datasets and data themes, including real-time data into conformity with the new blueprint standards and principles.

The action will have to work in partnership with the Data Spaces Support Centre (see topic 2.2.2.1) in order to ensure alignment with the European Data Spaces Technical Framework and the rest of the ecosystem of data spaces in section 2.2.1 thereof. The joint work will target the definition of:

- the data space reference architecture, building blocks and common toolboxes to be used;
- the common standards, including semantic standards and interoperability protocols, both domain-specific and crosscutting;
- The data governance models, business models and strategies for running data spaces.

Furthermore, the action should work with the European Digital Innovation Hubs and the Manufacturing Testing and Experimentation Facilities for developing a model concerning the long term sustainability of the Manufacturing Dataspaces.

Outcomes and deliverables

The selected action will deliver:

- A sustainable data governance scheme and the identification of a proper governance body, including, where relevant, European Digital Innovation Hubs and Testing and Experimentation facilities.
- an inventory of existing data platforms for manufacturing and a blueprint for manufacturing-specific building blocks which could contribute to the long-term convergence of existing and new data-related initiatives in manufacturing by making use of the data space technical infrastructure.
- A detailed roadmap towards pan-EU data spaces for manufacturing and migration paths for the convergence of broadly established industrial systems to manufacturing data spaces and the data space technical infrastructure.

Type of action	Coordination and Support Action
Indicative Budget	EUR 1 million
Indicative time of call opening	First call
Indicative duration of the action	12 months
Implementation	European Commission
Security	Call restricted on the basis of article 12.6 of the Digital Europe Programme Regulation

The data space for manufacturing will be subject to article 12(6) for the reasons already provided in section 2.2. The data space will provide information on the entire manufacturing and distribution chain. Such data can reveal sensitive information about critical manufacturing sectors in the EU, such as aerospace or automotive. This data could also expose dependencies and potential vulnerabilities in the production and supply chain which could be used for malicious attacks impacting EU security of the production and supply chains and more broadly public order.

2.2.1.4.2 Data spaces for manufacturing (deployment)

Objective

Data sharing among manufacturing companies and with (service) providers will be increased by the deployment of two data spaces of the manufacturing industry, which will demonstrate how sharing industrial data improves company operations (1) across supply chains and (2) using deep industrial data within production environments, enhances business opportunities for industrial data value added services, and supports the transition towards a circular economy.

Manufacturing data spaces and their AI-based analytics and optimisation applications can influence company-internal processes as well as processes across organisations. On the basis of the preparatory actions (see topic 2.2.1.4.1), the main objective is to deploy two operational data spaces across value chains in the manufacturing sector, which enable companies in different user roles (e.g. supplier, client, service provider) to interact with large amounts of industrial data across their organisational borders. The first data space will address agile supply chain management and execution across a large set of supply chain stakeholders, and the second one dynamic asset management and predictive/prescriptive maintenance, unlocking deep industrial data for trustworthy and reliable value-added services by parties outside a production site, such as machine tool manufacturer and integrator, improving production line operations.

Scope

The action calls for the deployment of two operational data spaces of the manufacturing industry, building on the results of the preparatory actions (see topic 2.2.1.4.1). The projects should have sufficient activities to lead to sustainability at the end of the action, as identified in the preparatory actions mentioned above.

Such data spaces will offer a secure and trustworthy way of making data usable between supplier and user companies on the basis of voluntary agreements. Starting from existing 'embryonic' data spaces with manufacturing companies, their data sharing will be completed, deepened, expanded, and/or enlarged with other organisations (e.g. reuse, repairing, remanufacturing, refurbishing or recycling companies in order to improve circularity) and gradually integrated into the Data Space Technical Infrastructure. The data spaces for manufacturing must be operated and coordinated by companies, an industrial association or a non-profit organisation demonstrating their capacity to act as trustworthy data brokers and to continue operations beyond the end of the action.

The actions need to target one of these two specific complementary data spaces for manufacturing:

- Performing agile supply chain management and execution by continuously monitoring and exchanging status data on e.g. purchase orders, sales orders, inventory levels, order progress, demand forecasts, raw materials, chemicals and energy use and supply, etc. across the value chain. End users are different tiers in a supply chain (suppliers, OEMs, and customers).

- Carrying out dynamic asset management and predictive/prescriptive maintenance by continuously monitoring and exchanging data on machine status, breakdowns, downtimes, service orders, etc. End users are machine users, machine vendors, maintenance service providers, and remanufacturers.

In addition, the actions need to address the following mandatory activities:

- Bringing together relevant stakeholders to industrial data agreement(s) on design, reuse, recycling, and environmental impact and indicators for continuous monitoring and exchange of data on product performance and reuse, material content and origin,, feedback to design, product recycling, product remanufacturing, etc. The work should demonstrate data-based sustainable business models and the benefits of data sharing for the organisations participating in the value chains.
- Carrying out further actions needed to effectively track and report resource use (e.g. CO_2) from a manufacturer's perspective in going forward. Actions should preferably target data sharing for circularity in line with the Circular Economy Action plan (COM(2020) 98 final).

The actions for the deployment of these two data spaces for manufacturing will have to gradually make use and be in full compliance with the European Data Spaces Technical Framework. They can profit from and use the smart middleware platform and tools that will be developed under topic 2.1.1. They will also have to coordinate and collaborate with other projects participating in the deployment of the data space, the Data Spaces Support Centre and the governance body identified by the first phase in order to allow integration of existing standards and to ensure interoperability and portability across infrastructure, applications and data.

Furthermore, the actions implementing the Data Spaces for Manufacturing are encouraged to cooperate with the European Digital Innovation Hubs for a broad uptake by the industry as well as the Testing and Experimentation Facility for Manufacturing (see section 2.3.2.1) to define European test and training data sets and to provide support in their establishment.

Outcomes and deliverables

The two selected actions will deploy two data spaces for the manufacturing industry at scale, continuing to be available after the end of the project, that will build on and be integrated with the data space technical infrastructure, delivering industrial data sharing among manufacturing companies and with (service) providers, thanks to agreements on common rules for access to data and fair compensation. The solutions must be characterized by a high degree of user-orientation in terms of trustworthiness, data sovereignty of the companies and manageability. Particularly SMEs will benefit from larger sets of industrial data to broaden their offers in terms of products and services, with the support of the European Digital Innovation Hubs.

Actions will address one of the following expected outcomes:

- Supply chain operations are more flexible, circular, effective and efficient, with reduced inventory levels, more timely deliveries between organisations, better resilience to interruptions of delivery channels, and reduced costs.
- Maintenance operations are better timed, with reduced overall downtimes and maintenance costs, extended machine usage periods, new service models, and improved future machine designs.

As part of the actions addressing one of the expected outcomes above, the organisation(s) operating the data spaces will deliver good practices for data sharing agreements such as code of conduct and contract

template enabling such a degree of trust that brings together a sizeable number of manufacturing companies.

Furthermore, stakeholders in these actions have to agree on approaches and ideas for circularity, on how to improve design, reuse, repair, remanufacturing, recycling, and environmental impact by data sharing and demonstrate benefits of the first generation of the product passports for all involved stakeholders as well as for sustainability. Interoperability of data within this data space will be designed such that cross-sectoral interoperability can be easily achieved in the future.

Type of action	SME support grant (75% co-funding rate for SMEs and 50% for all the other beneficiaries)
Indicative Budget	EUR 16 million
Indicative time of call opening	Third call
Indicative duration of the action	24 months
Indicative budget per Grant (EU contribution)	EUR 7-8 million
Implementation	European Commission
Security	Call restricted on the basis of article 12(6) of the Digital Europe Programme Regulation

The data space for manufacturing will be subject to article 12(6) for the reasons already provided in section 2.2. The data space will provide information of the entire manufacturing and distribution chain. Such data can reveal sensitive information about critical manufacturing sectors in the EU, such as aerospace or automotive. This data could also expose dependencies and potential vulnerabilities in the production and supply chain which could be used for malicious attacks impacting EU security of the production and supply chains and more broadly public order.

2.2.1.5 Preparatory actions for the data space for agriculture

Objective

The main objective is to develop a secure and trusted data space to enable the agriculture sector to transparently share and access data allowing for an increase in its economic and environmental performance. The space may also serve common good purposes.[59]The data space is expected to facilitate the sharing, processing and analysis of *production data, open data* and possibly other public data (e.g. soil data). Production data supplemented by publicly held data will present new opportunities for monitoring and optimising the use of natural resources and will contribute to achieve the objectives of the Green Deal[60] and the Common Agricultural Policy.

Scope

The project will explore possible options and conceptual approaches for the future deployment of this data space. Provisions for transparent control of data access and use, development of governance and business

[59] For more information on the scope of the data space, please see "A European Strategy for Data" (COM/2020/66 final).

[60] Including the Farm-to-Fork-Strategy; Biodiversity Strategy 2030 and the EU Strategy on Adaptation to Climate Change.

models for the data space are to be developed considering, among others, the evolving regulatory environment, cross-data-space elements, and experiences with the EU Code of Conduct on sharing agriculture data by contractual agreement[61]. The development of the data space is expected to have a strong end-user orientation and to consider potential users, including farmers currently less using data-based solutions.

The action will engage the community of stakeholders involving at least associations acting at EU/multi-country level representing relevant stakeholders, and public administration and/or governmental bodies.[62] In particular, the project will:

- Undertake an inventory of existing platforms sharing agricultural data,
- Take stock of experience gained with the above-mentioned Code of Conduct,
- Take stock of experiences gained with other types of data sharing as well as with data (set) generation in the private and public domains,
- Explore different possible design approaches for the data space(e.g. serving private data sharing and interests, serving private data sharing interests complemented by public data, serving private and public interests), and elaborate the advantages and disadvantages,
- Propose design/conceptual approaches, for the set-up of the data space, identify common essential elements and develop corresponding business models,
- Develop a multi-stakeholder governance scheme of the data space,
- Get broad consensus on the approach, governance, and business models.
- Develop a roadmap for the step-wise deployment of data space, including the identification of public and private data sets which are expected to particularly contribute to the objectives of the data space.

The action will have to work in partnership with the Data Spaces Support Centre (see topic 2.2.2.1) in order to ensure alignment with the European Data Spaces Technical Framework and the rest of the ecosystem of data spaces in section 2.2.1 thereof. The joint work will target the definition of:

- the data space reference architecture, building blocks and common toolboxes to be used;
- the common standards, including semantic standards and interoperability protocols, both domain-specific and crosscutting;
- The data governance models, business models and strategies for running data spaces.

Furthermore, the project is encouraged to cooperate with Testing and Experimentation Facility for Agri-food (see section 2.3.2.3), to define European test and training data sets and to provide support in their establishment.

Outcomes and deliverables

The coordination and support action will provide:

[61] https://copa-cogeca.eu/img/user/files/EU%20CODE/EU_Code_2018_web_version.pdf

[62] The community of stakeholders is to involve farmers, machinery suppliers, and possibly other agri-business branches and farms advisors, and representatives from the ICT industry. Ideally, representatives of all Member States are involved.

- An inventory of existing platforms sharing data relevant for agriculture (public and private)
- A proposed design approach based on scenarios with corresponding business models
- A multi-stakeholder governance scheme specific to the sector
- A blueprint for the data space including an architecture considering common building blocks
- Interim results in due time to inform the development of the implementation action to be supported under the next Work Programme
- Input to the work of the Data Spaces Support Centre.

Type of action	Coordination and Support Action
Indicative Budget	EUR 2 million
Indicative time of call opening	First call
Indicative duration of the action	18 months
Implementation	European Commission

2.2.1.6 Data space for cultural heritage (deployment)

This action will create the European common data space for cultural heritage, a new flagship initiative to provide support to the digital transformation of Europe's cultural sector, and foster the creation and reuse of content in cultural and creative sectors. It will build on the current Europeana platform[63] and will vastly expand the current functionalities, in particular in relation to 3D digitisation, re-use of digitised cultural resources as well as cross-sector and cross-border cooperation. The project will also build on the current Europeana Strategy 2020-2025.

The objective is the creation of a technical infrastructure combined with governance mechanisms that will secure easy, cross-border access to key datasets in the targeted area. The projects will have to deploy trust mechanisms (security and privacy by design), data services which ensure the identity of source and receiver of data and which ensure the access and usage rights towards the data.

Scope

The work will be implemented through two main work strands.

The **first work strand**, implemented through procurement will focus on setting up and running the first European common data space for cultural heritage. It will provide citizens and professionals with efficient, trusted, easy-to-use and attractive access to European digital cultural content. The project will build on the current Europeana platform and link to relevant European, national and regional initiatives and platforms to provide interoperable access to cultural heritage databases all over Europe. The scope will progressively increase to also cover other types of cultural content. In particular, the project will:

[63] https://www.europeana.eu/en

- significantly strengthen the Europeana platform's technical capabilities, improve findability and interconnectivity of content, including 3D content, multilingualism and links to other infrastructures;
- link existing initiatives, cloud facilities and storage facilities in the field of cultural heritage at European level;
- develop a mobile, 5G-ready, version of the platform, or alternate access channels with full access to a maximum of the platform services;
- improve the quality of service for data providers and aggregators collaborating with the platform (aggregation infrastructure and services, statistical dashboard, Application Programming Interfaces (APIs));
- supporting the creation and integration of high-value datasets (HVDS) of digital cultural content of any kind, size and nature. These will support the research and development of innovative applications and re-use in the cultural and creative sectors as well as in other areas such as tourism, or education. Particular attention will be given to 3D models, their creation, archiving process and access;
- further enlarge, coordinate and engage with the network of data partners (museums, galleries, libraries, archives, and other cultural institutions across Europe), accredited aggregators (participating in the Europeana Aggregator Forum), and experts working in the field of digital cultural heritage (participating in the Europeana Network Association);
- strengthen links with potential re-users of the data such as the creative and content industries (in particular SMEs);
- promote high quality content overall on Europeana Collections[64];
- improve the quality of the curatorial thematic approach in order to reinforce storytelling, building narratives with a European perspective across cultural sectors, regional and national borders and thus give visibility to the shared history and identity of European citizens. Special attention will also be given to tourism, in the post COVID-19 crisis context, as well as to the New European Bauhaus initiative[65]
- lead the work on standards for the provision of datasets, including the Europeana Data Model, and on standardised interfaces for data provision, expanding to 3D data; continue setting best practices and guidelines for digital cultural heritage, and their wider take up.

The project selected for the deployment of this data space will have to make provisions for gradually becoming fully compliant with the European Data Spaces Technical Framework. It will also have to coordinate and collaborate with other projects participating in the deployment of the data space and the Data Spaces Support Centre in order to allow integration of existing standards and to ensure interoperability and portability across infrastructure, applications and data.

[64] https://www.europeana.eu/en/collections

[65] https://europa.eu/new-european-bauhaus/index_en

The **second work-strand** will be implemented through grants and will focus on the digital capacity building in the cultural sector for its digital transformation and re-use of data, particularly at national level across Member States. Projects will cover one of the following activities:

- enriching the offer of services available on the data space, such as access to high quality and high value datasets, technological tools, technical know-how references, tools for knowledge sharing, consultancy and other services, to support digitisation, preservation and online sharing of digital cultural heritage assets.
- using existing Artificial Intelligence and machine-learning systems to improve user-engagement and experience, such as for the automatic translation of content or automatic metadata enrichment, improving multilingual aspects, providing adaptive filtering of cultural heritage assets or personalised recommendations;
- fostering the potential of re-use of, in particular, 3D digitised cultural heritage assets in important domains such as education, social sciences and humanities, tourism and the wider cultural and creative sector.

Outcomes and deliverables

- Facilitate the digital transformation of the cultural sector and capacity building, enabling a pan-European innovative data platform infrastructure[66] with easy online access to European cultural content.
- High-value datasets available for re-use, in particular 3D datasets, including for conducting scientific research, preservation and restoration purposes, re-use by the cultural and creative sector
- Allow stakeholders of the wider cultural sector to further enlarge, use and benefit from this data space.
- Numerous digital opportunities for the public, ranging from virtual visits to museums, libraries, galleries and heritage sites to history reconstruction and education;

First work strand

Type of action	Procurement
Indicative Budget	EUR 15 million
Indicative time of call opening	2021
Indicative duration of the action	24 months
Implementation	European Commission

Second work strand

Type of action	SME support grant (75% co-funding rate for SMEs and 50% for all the other beneficiaries)
Indicative Budget	EUR 4 million
Indicative time of call opening	Second call

[66] E.g. viewers for all types of content, storage, handling/management of content, re-use, interlinking and interoperability with other platforms, types of computing services provided such as access to cloud computing resources including AI capabilities

Indicative duration of the action	24 months
Indicative budget per Grant (EU contribution)	EUR 1-1.3 million
Implementation	Executive Agency

2.2.1.7 Health data space

Actions aim to achieve sustainable cross-border linkage of and access to a multitude of interoperable health datasets across Europe. Activities funded from Digital Europe aim to ensure their integration with HPC services and AI testing facilities, alongside support to deploy the necessary cybersecurity and interoperability measures in full compliance with the applicable data protection requirements. The two actions below support the deployment of digital infrastructures for secure cross border access and federated/distributed analysis of specific health data (i.e. cancer imaging and genomic data) for more precise and faster clinical decision-making, diagnostics, treatments and predictive medicine. They are complementary to projects implemented at the initiative of the Member States and projects to be funded under the Horizon Europe and EU4Health programmes. The actions should take into account the assets developed by the relevant Horizon 2020 projects and the work of the relevant Research Infrastructures. The actions on the genomic and cancer imaging data will form two interoperable components of the European health data space, whose creation will be supported also by the EU4Health Programme.

2.2.1.7.1 Federated European infrastructure for genomics data

Objective

The objective is the creation of a technical infrastructure combined with governance mechanisms that will secure easy, cross-border access to key datasets in the targeted area. In particular, the aim of this topic is to achieve sustainable cross-border linkage of and access to a multitude of genomic and related phenotypic, clinical and other datasets across Europe based on the progress achieved in the context of the 1+ Million Genomes initiative (1+MG).[67] Authorised data users, such as clinicians, researchers and innovators, will be able to advance our understanding of genomics for more precise and faster clinical decision-making, diagnostics, treatments and predictive medicine, and for improved public health measures that will benefit citizens, healthcare systems and the overall economy. The resulting genomic data infrastructure will be aligned with the developments under the European health data space, including relevant projects supported under the EU4Health Programme. In order to maximise the societal benefits of health data use, the genomic data infrastructure should be supported by advanced IT tools and capacities, e.g. AI, HPC, cloud, blockchain and trust solutions, as appropriate for enabling secure access to and distributed analysis of complex datasets. Moreover, the measure will support the creation, extension and adaptation (e.g. FAIRification) of genomic datasets.

Scope

This action will support the deployment of the infrastructure needed to make harmonised European genomic data resources and linked clinical, phenotypic and other information, where available and relevant, securely findable and accessible across national borders. The data infrastructure may combine existing data platforms via FAIR-compliant interfaces and should facilitate the extension or upgrade of existing datasets

[67] https://ec.europa.eu/digital-single-market/en/european-1-million-genomes-initiative

and the creation of new ones. To ensure maximum data protection, the data will be in principle analysed using distributed data analysis and AI learning techniques, while fully taking into account the applicable data protection requirements and the EU's international obligations.

The infrastructure is expected to provide a federated network of connected genomic databases deploying trust mechanisms (security and privacy by design), enabling data discovery, querying and use of appropriate computing capacities for distributed data analysis and providing a minimum of core services to facilitate the operation of the federated network. The federated system will comprise nodes with datasets, a common platform offering a (meta)-data catalogue, a single entry point for data queries and output delivery, links to high performance computing capacities and data access control, secure authorisation and authentication services, and access to other relevant services. Data transfer across national borders and/or central storage, if and when needed, may take place (only on a voluntary basis) in accordance with applicable EU and national legal requirements.

The system connecting harmonised data sources should provide at least the following functionalities: data discoverability, data reception/access, secure interfaces (APIs), data access management, and data processing (analysis). It should be based on FAIR principles, including common interoperability standards and mechanisms. Therefore, the implementation of the genomic data infrastructure should build on the progress achieved and agreements made within the 1+ Million Genomes initiative[68] (and outcomes of the Horizon 2020 CSA project 'Beyond 1 Million Genomes'). It should also take into account, link to and use the outcomes of other relevant H2020 projects, in particular exploring specific use cases/disease areas, and also collaborate and synergise with the related projects and partnerships supported under Horizon Europe.

The project shall, throughout its lifetime, inform and consult the representatives of Member States. It shall lead to defining a sustainable business model and setting up a coordination entity that will supervise the activities, run and maintain the system and its services, ensure the necessary agreements within the project and with Member States, and monitor the implementation of such agreements. The governance structures shall ensure that the rights and duties of both public and private participants are duly respected.

The action should support the coordination of the multi-country project 'Genome of Europe' launched in the context of the 1+MG initiative towards the creation of a European network of harmonised national genomic reference cohorts representative for the European population.

The project is expected to engage with patients, health professionals, the public and other stakeholders to explain that data is used transparently and responsibly, and raise awareness of the expected benefits for European patients and citizens. To this end, it should design and implement a comprehensive communication strategy covering the relevant stakeholders and communication channels.

The project selected for the deployment of this data infrastructure will have to make provisions for gradually becoming fully compliant with the European Data Spaces Technical Framework. It will also have to coordinate and collaborate with other projects participating in the deployment of the data space and the Data Spaces Support Centre in order to allow integration of existing standards and to ensure interoperability and portability across infrastructure, applications and data.

Furthermore, the project implementing the genomic data infrastructure is encouraged to cooperate with Testing and Experimentation Facility for Health (see section 2.3.2.2), to define European test and training data sets and to provide support in their establishment.

[68] https://ec.europa.eu/digital-single-market/en/european-1-million-genomes-initiative

Outcomes and deliverables

The following elements shall be delivered by the selected project:

- Deployment of an interoperable, FAIR-compliant and secure federated infrastructure and data governance needed to enable sustainable cross-border linkage of genomic data sets in compliance with the relevant legal, ethical, quality and interoperability requirements and agreed standards.
- Platform enabling the application of appropriate high-end computing, AI and simulation resources to analyse the data.
- Support for the establishment or upgrade of the necessary local infrastructure, and for the creation, extension and adaptation (e.g. FAIRification) of genomic datasets.
- Business model including an uptake strategy explaining the motivation and incentives for all stakeholders at the different levels (national, European, global) to support the data infrastructure towards its sustainability, including data controllers (biobanks, hospitals/municipalities, research institutes, patients), data users (clinicians, researchers, policymakers, companies), service providers (e.g. IT industry, biotech industry), healthcare systems and public authorities at large.
- Coordination support for the multi-country project 'Genome of Europe'.
- Comprehensive communication strategy.

Type of action	Simple grant (50% co-funding rate)
Indicative Budget	EUR 20 million
Indicative time of call opening	First call
Indicative duration of the action	48 months
Indicative budget per grant (EU contribution)	EUR 20 million
Implementation	European Commission
Security	Call restricted on the basis of article 12(6) of the Digital Europe Programme Regulation

The data space for health will be subject to article 12(6) for the reasons already provided in section 2.2. In addition, the data space will cover sensitive personal health data (such as individual sequenced genomes) which in conjunction with AI-based applications could potentially reveal sensitive information and impact on medical treatments that can be critical for the EU's security and public health.

2.2.1.7.2 Federated European infrastructure for cancer images data

Objective

The aim is to establish and deploy a pan-European digital infrastructure facilitating access to cancer images and related patient data in full compliance with the applicable data protection requirements. It will be used by clinicians, researchers and innovators with the ultimate aim of more precise and faster clinical decision-making, diagnostics, treatments and predictive medicine that will benefit citizens, patients, healthcare systems and the overall economy. The resulting data infrastructure will be inter-operable with the other components of the European health data space, in particular the genomic data infrastructure (see topic 2.2.1.7.1). It contributes to the Europe's Beating Cancer Plan and to the cancer mission under Horizon Europe, while building on relevant research projects under Horizon 2020. In order to maximise the societal

benefits of health data use, the data space should be supported by advanced IT tools and capacities, e.g. AI and HPC. Moreover, the measure will support creation of new cancer image datasets and further extension of the existing ones.

Scope

This action will support the deployment of the infrastructure needed to link and explore fragmented European databases of medical images of different types of cancer, with a solid governance and clear business model for ingestion of data and its exploitation by public and private organisations in Member States and associated countries (controllers of data), industry and innovators. The infrastructure should consist of a central coordination entity, a federated network of FAIR-conform connected data sources, a platform enabling data discovery, querying and capability to access appropriate computing capacities for distributed data analysis. The action may combine existing data sources and support creation of new data sets. To ensure maximum data protection, identifiable data will in principle be analysed using distributed data analysis and AI learning techniques, while fully taking into account the applicable data protection requirements and the EU's international obligations. Central storage may take place if the data are anonymised and in accordance with applicable legal requirements. The project will be in full compliance with the relevant legal, ethical, quality and interoperability requirements and standards.

The infrastructure comprising different data sources must be based on common interoperability mechanisms. Therefore, the implementation of the data infrastructure should build on the progress achieved and broad agreements made in the relevant research projects (under Horizon 2020) regarding the relevant interoperability mechanisms such as system architecture, specifications on reference APIs, meta-data, data structure and quality, legal requirements etc. The project should also enable linking and analysing cancer image data together with other types of health data (in particular electronic health records, repositories of molecular and clinical information and genomic-phenotypic data).

The project is expected to engage with patients, citizens, health professionals and other stakeholders to explain that data is used transparently and responsibly, and raise awareness of the expected benefits for European patients and citizens.

The project selected for the deployment of this data infrastructure will have to make provisions for gradually becoming fully compliant with the European Data Spaces Technical Framework. It will also have to coordinate and collaborate with other projects participating in the deployment of the data space and the Data Spaces Support Centre in order to allow integration of existing standards and to ensure interoperability and portability across infrastructure, applications and data.

Furthermore, the project implementing the data infrastructure for cancer images is encouraged to cooperate with Testing and Experimentation Facilities for Health (see topic 2.3.2.2), to define European test and training data sets and to provide support in their establishment.

Outcomes and deliverables

The following elements shall be delivered by the selected project:

- Deployment of interoperable, FAIR compliant and secure infrastructure and data governance enabling a sustainable cross-border connection of cancer image data sources. The infrastructure will serve clinicians, researchers and innovators in combination with technologies and tools necessary for data analysis.

- Support for actions aiming to create or extend cancer image data sources (including image annotation) and/or to adapt existing (legacy) data data.
- Clinical validation and use of high-end computing and simulation resources for data analysis, and a federated AI learning system, as well as deployment of a secure authentication system.
- Business model including uptake strategy explaining the motivation and incentives for all stakeholders at the different levels (national, European, global) to support the data infrastructure towards its sustainability, including data controllers (hospitals/municipalities, research institutes, patients), data users (clinicians, researchers, policy makers, companies), service providers (e.g. IT industry, medical imaging companies), healthcare systems and public authorities at large.

Type of action	Simple grant (50% co-funding rate)
Indicative Budget	EUR 18 million
Indicative time of call opening	Second call
Indicative duration of the action	36 months
Indicative budget per Grant (EU contribution)	EUR 18 million
Implementation	European Commission
Security	Call restricted on the basis of article 12(6) of the Digital Europe Programme Regulation

The data space for health will be subject to article 12(6) for the reasons already provided in section 2.2. In addition, the data space will cover sensitive personal health data (such as individual medical images) which in conjunction with AI-based applications could potentially reveal sensitive information and impact on medical treatments that can be critical for the EU's security and public health.

2.2.1.8 Data space for media (deployment)

Objective

The Media and Audiovisual Action Plan[69] is developed around three areas: recovery, transformation, and enabling and empowerment. Its Action 4 aims to foster innovation through the creation of a media data space to encourage and support media companies in sharing data and developing innovative solutions and encouraging new business models.

The objective is to respond to the challenge of boosting innovation and mobilize the media industry and provide a strong support for the creation of a European data space able to foster the competitiveness of the European media sector. Such a data infrastructure will be used to boost the use of data for innovative content (entertainment, education and news), and for innovative production and distribution.

That data should be available to both public service media and commercial media operators, whether large or small, start-ups or established players. In this context, establishing European media data spaces can change the way in which creators, producers and distributors can collaborate.

[69] Europe's Media in the Digital Decade: An Action Plan to Support Recovery and Transformation COM(2020) 784 final

The data space will be open to companies from other sectors for mutually advantageous data based cooperation which could open new opportunities for the media sector. This will enable media companies to join forces and regain competitiveness in the face of online platforms.

As for all the data spaces, the objective is the creation of a technical infrastructure combined with governance mechanisms that will ensure easy, cross-border access to key datasets in the targeted area.

Scope

The data space will provide the whole media value chain with an advanced and shared data infrastructure. This data infrastructure will be tested by means of the creation of innovative solutions for the production, curation, circulation and distribution of media content, and in particular through new platforms for quality content, across the Union.

The key elements for data spaces are the sharing of a wide variety of data such as content, user consumption and audience data, 3D animation models, or production meta-data. The data spaces will also facilitate access to computing resources for creative SMEs. Furthermore, data can provide valuable insight to services aiming at increasing the findability of media content (news and entertainment content) across borders. Such services can play a pivotal role in providing new resources for the media industry and supporting the creation of a European public sphere. Likewise, further creative industries and other industrial sectors (such as retail or automotive) could potentially make use of the media data space to generate additional value and open new markets for the media.

Synergies with the work done by the European Digital Media Observatory and its national hubs for online content distribution and findability will also be established. The data space will provide a sandbox environment and interface services to foster pilots for and host innovative media services developed through initiatives other than Digital Europe such as Horizon 2020 and Horizon Europe.

The project selected for the deployment of this data space will have to make use and be in full compliance with the European Data Spaces Technical Framework. It will also have to coordinate and collaborate with other projects participating in the deployment of the data space and the Data Spaces Support Centre in order to allow integration of existing standards and to ensure interoperability and portability across infrastructure, applications and data.

Outcomes and deliverables

The project will deliver an infrastructure hosted in cloud spaces where data are securely stored. Tools for media data transaction preserving data ownership, tools for data analytics and services for financial transactions based on the data usage (e.g. using blockchain) and services for Mixed, Augmented and Virtual Reality content creation (including AI elements) should also be included as well as tools enabling European citizens to find media content available online based on their preferences and interests and to better understand sentiments and perspective of other Europeans.

The data infrastructure for media will enhance Europe's digital autonomy and strengthen forms of citizens' participation in the public sphere. It will boost the use of data for innovative content (both entertainment and news), production and distribution.

Type of action	SME support grant (75% co-funding rate for SMEs and 50% for all the other beneficiaries)
Indicative Budget	EUR 8 million

Indicative time of call opening	Third call
Indicative duration of the action	36 months
Indicative budget per Grant (EU contribution)	EUR 8 million
Implementation	European Commission

2.2.1.9 Preparatory actions for the financial data space

Objective

The objective is to provide first steps towards the creation of a common European financial data space, which the Commission announced in its Digital Finance Strategy to boost the use of data for innovative technologies (Artificial Intelligence, Machine Learning) and new services for users of financial data.[70] The European financial data space will support the development of broad and liquid capital markets to finance the economy in the wake of the Covid-19 situation, including for smaller and medium-sized companies.[71] It will also support better information about the sustainability profile of financial instruments and thereby support mobilising sustainable finance.[72] In particular the objective of this action is to finance preparatory steps for the creation of a European Single Access Point for financial and non-financial reporting data, a key priority action announced in the Capital Markets Union Action Plan and the Digital Finance Strategy, and included as a legislative initiative for 2021.[73]

Scope

The European financial data space will provide an advanced and shared data infrastructure. This data infrastructure will support the set-up of the European Single Access Point and will interconnect several sources of financial information across the EU including Officially Appointed Mechanisms, National authorities, European authorities and possibly private entities.

This project will build on the lessons learned from the pilot[74] assessing the added value of using distributed ledger technologies as a back-end solution to implement the EU central access point (EEAP), which resulted in the European Financial Transparency Gateway (EFTG).

The financial data space should be available for both public and commercial use. Access to such a data space would lower the cost of data retrieval and processing and support the creation of a more competitive environment in the sector of data provider services.

The project selected for the deployment of this data space will have to make provisions for gradually becoming fully compliant with the European Data Spaces Technical Framework. It will also have to coordinate and collaborate with other projects participating in the deployment of the data space and the Data Spaces Support Centre in order to allow integration of existing standards and to ensure interoperability and portability across infrastructure, applications and data.

[70] See Digital Finance Strategy as part of the Digital Finance Package

[71] See CMU Action Plan

[72] See Sustainable Finance actions by the EU

[73] See Management plan 2021 – Financial stability, financial services and capital markets union

[74] https://eftg.eu/

Outcomes and deliverables

The expected outcome is the set-up of the European Single Access Point which demonstrates the technical feasibility and allows for the definition of a comprehensive governance model. The project will pave the way for a successful implementation of the "European Single Access Point (ESAP)" that will allow to overcome the fragmentation of data/information and provide a single access point to public financial and non-financial information.

At the end of the project, the main deliverable expected is a prototype (based on a limited scope of information) of an ESAP-like architecture. This will include:

- An initial technical infrastructure to interconnect selected European and national repositories, registers or databases to provide a single access point to the information these sources store.
- First steps towards a cloud-based common dataspace in which financial or non-financial data would be available and shared in a secure way.
- An elementary model of a multi-stakeholder governance that would support ESAP's viability and success.

Type of action	Procurement
Indicative Budget	EUR 2 million
Indicative time of call opening	2022
Indicative duration of the action	36 months
Implementation	European Commission
Security	Call restricted on the basis of article 12(6) of the Digital Europe Programme Regulation

The financial data space will be subject to article 12(6) for the reasons already provided in section 2.2. In addition, the data space will make available among others data related to the performance of EU economic players (public and private companies) and may include sensitive and confidential information related to financial and non-financial reporting data. Examples include financial information about companies, which in conjunction with AI-based applications could potentially reveal sensitive information and weaknesses in the financial processes, and aggregated with information coming from other data spaces, could be exploited by third country authorities in ways affecting Union security, in particular in respect of companies active in security-sensitive sectors (e.g. defence, aerospace, other critical infrastructures), or which could facilitate malicious financial practices, e.g. money laundering, market manipulation for strategic purposes or influence financial investments, affecting financial security.

2.2.1.10 Preparatory actions for the data space for skills

Objective

The objective is to deploy a secure and trusted data space to support sharing and accessing skills data for various purposes, from analytical and statistical purposes to policy development or re-use in innovative applications. The data space will provide easy, cross-border access to key datasets, deploying trust mechanisms (security and privacy by design) and develop data services matching European values, in particular of ethics, diversity and privacy.

The Digital Decade sets an ambitious target of 20 million digital technology specialists by 2030. Several important initiatives at the European level as well as national/regional level will contribute to this target, thus making important that data be shared across all initiatives.

Data is at the core of skills and education, offering enormous potential for innovative applications. Databases of job offers, lists of curricula and certifications, inventory of topics studied at all levels of education can help better defining human resource, training, business or educational policy strategies.

Schools, universities, learning organisations, businesses, students, HR organisations and employment agencies make daily use of data, from job and occupational profiles, vacancies and skills, to available trainings, degrees and graduate numbers. Many of the education and skills data are highly sensitive, involving personal information. They also have a huge potential to improve skills intelligence and HR planning, learning material and processes, through artificial intelligence, data analytics or advanced technologies.

The level of fragmentation at the European level is high, involving many private and public actors, from job search websites, online learning providers to school administrations, ministries, universities, etc.

Scope

The project will explore conceptual approaches and possible options and for the future deployment of this data space. Provisions for transparent and ethical data access and use, development of governance and business models for the data space are to be developed considering, among others, the evolving regulatory environment, cross-data-space elements, interoperability, equality, privacy and security issues.

The action will engage the community of stakeholders involving organisations at EU/multi-country level, public administrations and/or governmental bodies, private and public actors (Including IT developers and end-users), education and training providers. In particular, the project will:

- Undertake an inventory of existing platforms collecting, storing and sharing education and skills data, in particular related to the green and digital transformations.
- Explore different possible design approaches for the data space (e.g. serving private data sharing and interests, that are also complemented by public data, serving private and public interests), and elaborate the advantages and disadvantages,
- Propose design/conceptual approaches, for the set-up of the data space, for the possible categorization of skills and identify common essential elements and develop corresponding business models,
- Explore what services and applications could be envisaged in the future

- Develop a multi-stakeholder governance scheme of the data space,
- Get broad consensus on the approach, governance, and business models.

The action will have to work in partnership with the Data Spaces Support Centre (see topic 2.2.2.1) in order to ensure alignment with the European Data Spaces Technical Framework and the rest of the ecosystem of data spaces in section 2.2.1 thereof. The joint work will target the definition of:

- the data space reference architecture, building blocks and common toolboxes to be used;
- the common standards, including semantic standards and interoperability protocols, both domain-specific and crosscutting;
- The data governance models, business models and strategies for running data spaces.

Outcomes and deliverables

The coordination and support action will provide:

- An inventory of existing platforms collecting, storing and sharing data relevant for education and skills (public and private). A particular focus should be placed on the analysis of skills relevant for attaining the targets of the Digital Decade.
- A proposed design approach based on scenarios with corresponding business models.
- A multi-stakeholder governance scheme specific to the sector
- A blueprint for the data space including an architecture considering common building blocks.
- Interim results in due time to inform the development of the implementation action to be supported under the next Work Programme.
- Input to the work of the Data Spaces Support Centre.

Type of action	Coordination and Support Action
Indicative Budget	EUR 1 million
Indicative time of call opening	First call
Indicative duration of the action	12 months
Indicative budget per grant (EU contribution)	EUR 1 million
Implementation	European Commission

2.2.1.11 Language data space (deployment)

Objective

Text, audio and video represent a large part of the data produced every day. Processing and extracting relevant information from this wealth of data requires the availability of more and more complex AI-based language services that need, in their turn, larger quantities of training data. Europe creates large quantities of multimodal language data every day. This data, in order to be used for developing AI services, needs to be aggregated and organised in a comprehensive data ecosystem, whilst taking into account the European specificities such as the need to promote and support digital language equality.

The objective is to deploy a Language Data Space for the collection, creation, sharing and reuse of multimodal language data. This will support the deployment of large multimodal language models and a wide range of AI language technologies services to be offered through the AI platform.

Scope

The data space will be deployed into two work strands.

The first work strand will establish an institutional Centre of Excellence for Language Technologies (CELT) to coordinate across the Member States the creation and collection of multimodal language data and models. This will make use of existing EU initiatives of language data collections such as ELRC, EURAMIS, SCIC repositories, IATE, CLARIN, META-SHARE. The centre of excellence will:

- Develop in close collaboration with the Member States a multi-stakeholder data and services governance scheme, bringing together large industrial entities, public stakeholders and small-and-mid-size enterprise stakeholders.
- Identify and bring together existing European stakeholders and initiatives.
- Elaborate a blueprint for the language data ecosystem based on existing EU legislation and language data policies to build innovative business models across all stakeholders.
- Identify the large multimodal language models to be deployed.
- Identify datasets and data streams (public, private, citizen-collected….) relevant to the creation of large language models to be brought into conformity with the new blueprint standards and principles
- Establish a detailed roadmap on how to deploy the language data space.

Based on existing EU initiatives such as the European Language Grid and CEF Automated Translation (eTranslation and other language technologies), the second work strand, will support the deployment of the language data space, by

- deploying the necessary infrastructure for the collection and sharing of multimodal language data and models;
- implementing the data & services governance, business models and strategies as defined by CELT;
- supporting the increased uptake and usage of the language data space and its derived language technologies services among European private and public sectors, including various DIGITAL platforms and endeavours/initiatives, also through piloting and deployment projects;
- establishing Member States and industrial collaboration to bring the set of identified language datasets and data streams into conformity with the new blueprint standards and principles;
- establishing Member States and industrial collaboration to create and deploy the identified large multimodal language models;
- deploying advanced AI-based language processing services and tools to be made available through the AI-on-demand platform.

The deployment of this data space will have to make provisions for making use of the European Data Spaces Technical Framework. It will also have to coordinate and collaborate with other projects participating in the

deployment of the data space and the Data Spaces Support Centre in order to allow integration of existing standards and to ensure interoperability and portability across infrastructure, applications and data.

The project will liaise with the EDGES Common Services Platform (see topic 5.3.1.1) to ensure that the collected language data, models and services provided by the Member States administrations and private sector support the deployment of language technology within public administrations.

Furthermore, the project will cooperate with the Digital Innovation Hubs, the AI-on-demand platform (see section 2.3.1) and the Testing and Experimentation Facilities (see section 2.3.2), to define, establish and deploy European test and training language data sets, foster the creation, compatibility and deployment of multimodal language data models and services.

Outcomes and deliverables

Phase 1:

- An inventory of existing platforms sharing language data;
- A sustainable data governance scheme as well as a blueprint that connects existing local data ecosystems, foster the creation of large language models and enables public and private stakeholders to develop cross-sector AI-enabled language data services;
- A data lake, initially focusing on data from the EU;
- A priority list of datasets relevant to the creation of large language models;
- A detailed roadmap towards a full-fledged language data space in full compliance with the European Data Spaces Technical Framework.

Phase 2:

- A reference architecture, building blocks and common toolboxes;
- Common standards and interoperability protocols;
- An increased uptake and usage of the language data space and its derived language technologies services among European DIGITAL platforms, private and public sectors;
- Pilots and deployment of services;
- Standards/standard interfaces for data language models sharing, tools and services as well as baselines / best practices for service deployment in different sectors including the other data spaces;
- A wide range of advanced AI-based language processing services and tools to be made available through the AI-on-demand platform.

Type of action	Procurement
Indicative Budget	EUR 6 million
Indicative time of call opening	2021
Indicative duration of the action	24 months
Implementation	European Commission

2.2.1.12 Data spaces for public administrations

Building on priorities set out in the Data Strategy, the Public Administration data spaces aim at exploiting the major potential of data, while acknowledging the role of the Public Administrations to both produce and use considerable amounts of data. Two main actions will support to the creation of the European Data Spaces for Public Administrations.

The Public procurement data space (see topic 2.2.1.12.1) will connect and use European databases, including the comprehensive TED data on Public Procurement[75] and national procurement data sets available in national portals. This action will ultimately improve transparency and accountability of public spending and spending quality.

The data space for Security and law enforcement (see topic 2.2.1.12.2) will lay the foundations of a federated data infrastructure specific for the needs of the security and immigration stakeholders, including national authorities, EU agencies in charge of European security and justice representatives.

Other topics in this Work Programme will also contribute to the deployment of the data spaces for Public Administrations. In particular, topics under the European Digital Government Eco System (EDGES): cross-border services and interoperability (see section 5.3.1) will increase the efficiency of cross border interoperable public services including support to the digital transformation of Public Procurement. The support to the digitalization and deployment of interoperable public services will increase accessibility of Digital Government data through seamless and secure data flows. This will ultimately empower an innovative 'gov tech' ecosystem, legal interoperability as well as other services of public interest. In addition, the Pilots using AI for law enforcement (see topic 5.3.4) will enable the final validation and foster the uptake of AI systems for law enforcement by running large scale pilots in Law Enforcement Authorities (LEAs) premises.

2.2.1.12.1 Data space for public procurement (deployment)

Objective

This action is based on "A European strategy for data" from February 2020 which envisages the establishment of a data space that would cover both the EU dimension with EU datasets (such as Tenders Electronic Daily TED) and the national ones[76]. The objective of this action is to increase the interoperability and interconnection of existing open data sets, to facilitate a more comprehensive overview of public procurement in the EU, including many key policy areas. It will be based on an existing pilot project, which combines data sets on Public Procurement from different Member States and data from TED. The mapping will be done using the ontology on eProcurement funded under the previous Multiannual Financial Framework through the ISA^2 programme.

Scope

This action will lay the foundation of a federated data infrastructure needed to connect and use European databases, including the comprehensive TED data on public procurement and national procurement data

[75] TED (Tenders Electronic Daily) is the online version of the 'Supplement to the Official Journal' of the EU, dedicated to European public procurement. See https://ted.europa.eu/TED/misc/aboutTed.do

[76] Currently data on public procurement available at European level comes mainly from TED covering essentially procedures above EU thresholds. On the other hand, Member States invest in developing their own solutions to generate public procurement data in an open data format for below EU threshold procurement.

sets available in national portals. The semantic data model will be based on Core Vocabularies and the eProcurement Ontology, developed under the former ISA2 programme. The infrastructure will likely consist of a central coordination organisation, a federated network of connected data sources, a platform enabling data discovery, querying and capability to access appropriate computing capacities for distributed data analysis. Where relevant, it will re-use and integrate solutions available through the Common services Platform (see topic 5.3.1.1). Where necessary, data will be anonymised. A complimentary governance framework will define the management of the data space for public procurement.

The Commission will also engage with the Member States and associated countries to connect their trusted national databases to the infrastructure and to share best practices to enhance data quality. This is necessary to reap all the benefits of such a system.

The project selected for the deployment of this data space will have to make provisions for gradually becoming fully compliant with the European Data Spaces Technical Framework. It will also have to coordinate and collaborate with other projects participating in the deployment of the data space and the Data Spaces Support Centre in order to allow integration of existing standards and to ensure interoperability and portability across infrastructure, applications and data.

Outcomes and deliverables

The project will deliver an open data space developed with and intended for Public Administrations that connects European and national public procurement databases. This activity is closely followed by the Member States.

The project will close remaining gaps by gathering data from TED and from national solutions.

Type of action	Procurement
Indicative Budget	EUR 1 million
Indicative year	2021
Indicative duration of the action	24 months
Implementation	European Commission
Security	Call restricted on the basis of article 12(6) of the Digital Europe Programme Regulation

The Public procurement data space will be subject to article 12(6) for the reasons already provided in section 2.2. This entails, among others, that this data space will connect trusted national databases to the infrastructure, and thereby, procurement-related data either present in or accessible via these trusted national databases or the public procurement data space that would extend to tenders and contracts involving often a) critical infrastructures such as energy, transport, public buildings, telecommunications infrastructures; b) sensitive sectors (such as aerospace or defence) or/and c) essential public services.

2.2.1.12.2 Data space for security and law enforcement

Objective

The objective is to deploy a common European Security data space for innovation allowing research, development, testing, training and validation of algorithms for AI-based systems for security (law enforcement) based on various types of datasets, including operational pseudonymized and anonymized datasets, following the data minimisation principle (Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 – GDPR and Directive (EU) 2016/680 of the European Parliament and of the Council of 27 April 2016 - LED). Particular attention must be given to reducing potential bias in algorithms to be used by law enforcement.

Technological sovereignty of Member States and the EU in the field of fighting crime and terrorism in the digital age is a fundamental public interest as well as a matter of national security, and can be strengthened by creating high quality and trusted datasets that would enable Member States' Law Enforcement Agencies (LEAs) to develop and validate their own digital tools.

A dedicated common data space for security and law enforcement will satisfy both principles set in the "A European strategy for data"[77]: (1) that actions under data spaces for public administrations will also focus on data use for improving law enforcement in the EU in line with EU law, and (2) that data for the public good can serve to ensure more efficient fight against crime.

Namely, this data space would serve the interests of all stakeholders in charge of public or internal security, and in particular, the Member States' law enforcement authorities, authorities in charge of border security as well as the relevant European Agencies, such as Europol, the European Border and Coast Guard Agency, and eu-LISA (in accordance with the legal bases that apply to them). In such a way, the EU open strategic autonomy in the field of AI applications for law enforcement will be enhanced.

The objective of the data space for security and law enforcement is solely to facilitate innovation, it should not cover data sharing for investigative purposes.

Scope

This action will lay the economic, organisational and technical foundations of a federated data infrastructure. Specifically, it is expected that at the end of the project a system and a model of the data governance will be available, thus the project will include the following tasks:

- to develop a reference architecture, to define data standards and to determine criteria for certifications and product quality while addressing ethical concerns and complying with data protection requirements. Standardisation of data should be proposed and the framework may be defined based upon the UMF (uniform message format) project defining data models in a number of areas, such as data on persons, firearms and vehicles;
- to generate, collect, annotate and make interoperable data suitable to test, train and validate algorithms, which should be available for the training, validation and testing of tools using AI technologies, and, when possible, proportional and where provided for by law, shareable for security research purposes. There should be a monitoring process to ensure the quality of the data

[77] COM(2020) 66 final

and the validation of the results. It would focus in particular the technical standard and the content, i.e. that the data is not biased against ethnicity, gender, nationality or other social categories.

The projects will have to deploy trust mechanisms (security and privacy by design), data services which ensure the identity of the source and receiver of data and which ensure the access and usage rights towards the data. Projects are encouraged to perform the study and analysis of alternatives for data collection with maximum efficiency in order to provide interoperability within the domain. Through this concept of a federated data infrastructure, we enable European security stakeholders to develop their potential in a dynamic security ecosystem. Projects under this action should pay specific attention to fundamental rights challenges notably by proposing adequate bias mitigation and non-discrimination mechanisms as well as by providing enhanced data quality. They should also demonstrate strict compliance with the EU legal framework on data processing for police purposes as set out in Directive 2016/680 of the European Parliament and the Council of 27 April 2016 and the GDPR. The projects will ensure appropriate coordination with relevant projects funded under the research Framework Programmes and, when applicable, EU Space programmes operating security services (Copernicus, Galileo).

The projects selected for the deployment of this data space will have to make provisions for gradually becoming fully compliant with the European Data Spaces Technical Framework. They will also have to coordinate and collaborate with other projects participating in the deployment of the data space and the Data Spaces Support Centre in order to build on common standards.

Outcomes and deliverables

The creation of a common data platform, including the national components and a communication infrastructure, with trusted datasets to train, test and validate algorithms aims to create sufficient quantity of data to research, innovate and develop AI technologies, with the objective to gather and analyse automatically big number of various types of information (pictures, reports, video etc.). The data space for security and law enforcement will create a data ecosystem specific for the needs of the security and immigration stakeholders, including national authorities, EU agencies in charge of European security and justice representatives. Private sector representatives may benefit from a dedicated section of the data space for security and law enforcement containing anonymous datasets provided that they are carrying out security research under the European Framework Programmes for Research.

A common data space for security and law enforcement will substantially foster development of AI technologies, which will constitute a very important contribution to combat crime, enhance border security and facilitate legal migration.

It will also improve the European open strategic autonomy by allowing the national and European law enforcement authorities to develop and validate their own digital tools so to (i) eliminate the threat of malicious interference of third countries/parties; (ii) allow for setting quality standards at EU level and (iii) increase the technological capabilities of Member States LEAs. On this basis, foreign controlled entities participating in the action should only perform specific, clearly defined tasks and should not be involved in the design of the technical architecture or the security components of the product.

Type of action	Simple grant (50% co-funding rate)
Indicative Budget	EUR 8 million
Indicative time of call opening	Second call
Indicative duration of the action	36 months

Indicative budget per Grant (EU contribution)	EUR 8 million
Implementation	European Commission
Security	Call restricted on the basis of article 12(6) of the Digital Europe Programme Regulation

The data space for security and law enforcement will be subject to article 12(6) for the reasons already provided in section 2.2. In addition, the data space will serve the interests of all stakeholders in charge of public or internal security, and in particular, the Member States' law enforcement authorities, authorities in charge of border security as well as the relevant European Agencies, such as Europol, eu-LISA and Frontex.

2.2.1.13 Preparatory actions for the data space for tourism

Objective

Tourism is a major economic activity in the European Union with wide-ranging impact on economic growth, employment, and social development. It can be a powerful tool in fighting economic decline and unemployment. Nevertheless, the tourism sector, one of the hardest hit by the pandemic, needs support to face sectoral challenges exacerbated by the recent developments.

A tourism data space, through its connection to other sectoral data spaces (e.g. cultural heritage) will provide access to information to the ecosystem, with an impact on productivity, greening and sustainability, innovative business models and upskilling. It will give the possibility of align offer to tourists expectations, adapting service proposals to new tourists groups, predict a high influx of tourists, and thus plan resources more efficiently, and even creating new business opportunities

The preparatory action will establish a multi-stakeholder data governance, an inventory of existing data platforms for tourism and a blueprint for tourism-specific building blocks which could contribute to the long-term convergence of existing and new data-related initiatives in tourism by making use of the data space technical infrastructure. The preparatory actions will support the deployment of these data spaces for tourism, and propose sustainable business models and incentives schemes to motivate participants to share data.

Scope

The funding will enable the establishment of a data sharing governance mechanism, with a detailed roadmap on how the data space for tourism will connect local data ecosystems at EU level that could be interconnected with other data spaces. The project will grow organically, building on different EU and national initiatives and public data ecosystems, and strengthening EU the connection between existing and future repositories of data. The project will:

- Engage the community of stakeholders involving associations acting at EU/multi-country level representing relevant stakeholders, national entities involved in tourism and public administration and/or governmental bodies
- Develop a multi-stakeholder data sharing governance scheme, bringing together local data ecosystem stakeholders, to jointly identify the data infrastructures to federate in order to enable a data space for tourism at EU level.
- Elaborate a blueprint for the data space for tourism based on existing EU legislation and data policies, as well as on common principles agreed at sector or local levels[78].

[78] The blueprint should propose an appropriate conceptual architecture and when appropriate, refer to existing building blocks. Particularly relevant in this context are solutions such as eID (digital identity), eDelivery (secure data exchange), the Context Broker

- Bring an agreed set of priority datasets and data themes[79], including real-time data into conformity with the new blueprint standards and principles.

The awarded consortium will work in liaison with the Data Spaces Support Centre (see 2.2.2.1) and the Alliance for Industrial Data, Cloud and Edge, to ensure alignment with the European Data Spaces Technical Framework with and the rest of the ecosystem in section 2.2.1 thereof, notably concerning common tools such as:

- a data space reference architecture, building blocks, common toolboxes and cloud services;
- common standards, including semantic standards and interoperability protocols, both domain-specific and crosscutting;
- data governance models, business models and strategies for running data spaces, with the aim to recommend possible common tools, building on existing data ecosystems.

Outcomes and deliverables

- Inventory of existing platforms sharing data relevant for tourism
- An analysis regarding gaps and overlaps of data, and identifying potential common building blocks with other data spaces created in the EU together with a priority list of data sets relevant for the tourism data space
- A sustainable data sharing governance as well as a blue print that interconnects existing local data ecosystems and enables public and private stakeholders to develop tourism related data-driven services, including AI-enabled data services, on the basis of many types of data.
- A detailed roadmap towards a sustainable data space for tourism, building on national initiatives and interconnecting with other data spaces
- A set of technical specifications for interoperability with the European Data Spaces Technical Framework and other sectorial data spaces.

Type of action	Coordination and Support Action
Indicative Budget	EUR 1 million
Indicative time of call opening	First call
Indicative duration of the action	12 months
Implementation	European Commission

2.2.2 Support for Data for EU

The programme will support the deployment of the underlying technologies, processes, standards and tools for the operationalization of the data spaces through the creation of a **Common Support Centre**. The support centre will offer: (i) technical specifications for the necessary IT systems (digital industrial platforms, non-personal and personal data platforms, based on competitive and seamless access to cloud-to-edge infrastructures and services referred to in section 2.1); (ii) data governance frameworks establishing enabling

and the Big Data Test Infrastructure and others, already widely used by EU-wide cross-border systems, should be considered to facilitate interoperability among the actors. The blueprint should also comply with commonly agreed standards and principles and ensure interoperability. Particularly relevant in this context are the Minimal Interoperability Mechanisms (MIMs) Plus, work of SEMIC, the reference community for semantic interoperability, the INSPIRE and location interoperability data models, SAREF as well as the forthcoming interoperability framework for smart cities and communities (EIF4SCC).

[79] In addition to the relevant High Value Datasets.

schemata (consisting of a definition of actors and their roles, of standards and interoperability protocols) both at sector or domain level and for cross-sector data use; and (iii) incubating activities for data use by SMEs and start-ups. The Centre will ensure a close interface with the projects stemming from the cloud-to-edge infrastructure and services topics in section 2.1. In addition, the programme will also increase the availability, quality and usability of public sector information and **open data** in compliance with the requirement of the Open Data Directive.

2.2.2.1 Data Spaces Support Centre

Objective

The objective of this action is to set up and operate a Support Centre, which coordinates all relevant actions on sectorial data spaces and makes available (blueprint) architectures and data infrastructure requirements for the data spaces, including possible technologies, processes, standard and tools that will allow reuse of data across sectors by the public sector and European businesses, notably SMEs.

It will also support the work of the envisaged Data Innovation Board[80] in view of enhancing the interoperability of data as well as data sharing services between different sectors and domains. In particular, it will identify cross-sector standards to be used and developed for data use and cross-sector data sharing, it will carry out cross-sectoral comparisons and identify best practices with regards to sectoral requirements for security, access procedures, while taking into account sector-specific standardisations activities.

Scope

The creation of the Support Centre will have three main work strands.

1. The first work strand will support the creation of a network of stakeholders that will have the following main tasks:
    - Support the creation of a community of practice in the field of data sharing. The community will have to include and engage in the discussion also the participants to the projects supported under Data for EU (see section 2.2).
    - Liaise with the actions under section 2.1 and to promote the competitive and seamless access and use of cloud infrastructures and services.
2. The second work strand in collaboration with the network of stakeholders will have the following main tasks:
    - Identify the common requirements for data infrastructure across sectoral data spaces (e.g. technical design, functionality, operation and governance, legal and ethical aspects).
    - Define the guiding design principles for the creation of data spaces.
    - Identify architecture and technical data governance frameworks establishing enabling schemata both at sector or domain level and for cross-sector data use.

[80] The Data Innovation Borad and its tasks have been defined in the Commission proposal for A data Governace Act regulation https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0767. If established, the Support centre will be requested to provide technical support to the DIB.

- Identify the common building blocks essential for the creation of the sectoral data spaces and define technical specifications. These will include: identification & authentication of parties, access rights management and access control, mechanisms for recording consent including portability of such consent, standards and interoperability protocols, data analytics technologies including natural language processing technologies, metadata and data models for sharing data across sectors and data exchange mechanisms.
- Identify common standards, including semantic standards and interoperability protocols – both domain-specific and crosscutting.
- Identify the potential for synergies between data spaces and coordinate related cross-cutting exchanges between data spaces.
- Identify and promote data governance models, business models and strategies for running data spaces.
- Identify and address legal issues and other market-relevant barriers.
- Identify common toolboxes that could be used across data spaces.

3. The third strand will aim to create a platform to support the knowledge exchange between all actors in the data economy and provide support for the deployment of the common building blocks necessary for implementation of sectoral common data spaces. The platform will have the following main tasks:
    - Offer and promote the use of common architecture and technical data governance especially those identified by the network of stakeholders.
    - Identify missing solutions by using the guiding design principles and develop the necessary technical specifications to be procured under topic 2.1.1. All solutions should be open source software, should be possible to use for cross-data space, cross-domain synergies and fertilisation.
    - Test and approve the solutions and make them available to the data spaces.
    - Publish good practices for standards, technical tools such as APIs, and provide advice on other practical and legal questions.
    - Give access to model contract clauses tested in previous data transactions and backed by public authorities.
    - Liaise with all relevant activities in the programme including concurrent data space initiatives, to facilitate access to data for AI, with Advanced Digital Skills actions and with European Digital Innovation Hubs, especially, but not exclusively to support the participation of SMEs.
    - Liaise with relevant related initiatives at European and international level including those funded under the research programmes Horizon 2020 and Horizon Europe.
    - Provide support to the preparation of new data spaces as indicated in the Data Strategy.

Outcomes and deliverables

The outcome of this action will be the creation of a Support Centre, which will promote and coordinate all relevant actions on sectorial data spaces and will make available technologies, processes, standard and tools that will support the deployment of common data spaces and will allow reuse of data across sectors.

Type of action	Coordination and Support Action
Indicative Budget	EUR 14 million
Indicative time of call opening	First call
Indicative duration of the action	42 months
Implementation	European Commission
Security	Call restricted on the basis of article 12(6) of the Digital Europe Programme Regulation

This topic will be subject to article 12(6) for the reasons already provided in section 2.2.

2.2.2.2 Public Sector Open Data for AI and Open Data Platform

Objective

The objective is to increase the easy availability, quality and usability of public sector information in compliance with the requirement of the Open Data Directive[81], in order to boost the re-use and combination of open public data across the EU for the development of information products and services, including AI applications.

Scope

This topic will have two work strands:

1. Public Open Data for AI: Grants will support public administrations at local, regional and national level in increasing semantic, technical and legal interoperability and data portability of the High Value Datasets (HVDs) identified by the forthcoming corresponding implementing act and selected in specific categories indicated in Annex 1 to the Open Data Directive namely: Geospatial, Earth observation and environment, Meteorological, Statistics, Companies and company ownership, Mobility. In addition, the applicable data sharing rules for selected HVDs belonging to Geospatial, Earth observation and environment, Meteorological domains will complement the provisions of the Directive on Infrastructure for Spatial Information in the European Community (INSPIRE) and further support Green Deal related initiatives.
2. Open Data Platform: service contracts will maintain and further expand the Open Data infrastructure deployed since 2015 under the Connecting Europe Facility programme. Funding will be provided for:

[81] https://eur-lex.europa.eu/eli/dir/2019/1024/oj

- Consolidation and expansion of the data.europa.eu Data Portal[82] , including the integration with the EU and Member States Open data and INSPIRE geoportals
- Maintenance and further expansion of the Big Data Test Infrastructure (BDTI) Building Block, including the possibility for the public sector to use it for testing Business-to-Government (B2G) data sharing collaborations for the public good.

These tools[83] will contribute to Green deal applications and other common data spaces where relevant, in providing a test platform and tools for accessing multiple sources of data, data which the data.europa.eu Portal, extended to include the High Value Datasets, will provide a harmonised single entry point.

Outcomes and deliverables

High Value Datasets held by the public sector will be available via APIs in a machine-readable format for the creation of data products and services and for their use by the participants in the common European data spaces. This will help more companies, in particular SMEs, start-ups, as well as public organisations to use cross-EU data to scale up and offer EU-wide services, benefiting from the size of the EU's digital market. The easy availability of machine-readable data in bulk or via APIs will also greatly facilitate machine learning based on public data, especially in the data-demanding areas such as climate change, pollution or weather predictions.

The Open Data infrastructure will continue to facilitate and improve access and re-use by the private and public sectors of the datasets generated by European public administrations.

Public Sector Open Data for AI:

Type of action	Simple grant (50% co-funding rate)
Indicative Budget	EUR 20 million
Indicative time of call opening	Second call
Indicative duration of the action	24-36 months
Indicative budget per Grant (EU contribution)	EUR 5-6 million
Implementation	European Commission
Security	Call restricted on the basis of article 12(6) of the Digital Europe Programme Regulation

This topic will be subject to article 12(6) for the reasons already provided in section 2.2. In addition, the platform will provide access to a variety of data including sensitive Geospatial, Earth observation and mobility data potentially exposing critical infrastructures, as well as other sensitive data on Companies and company ownership. The information that can be extracted from this data, but also the risk related to abuse, increases exponentially because data from different sources could be combined and may be used for malicious attack against public order.

Open Data Platform:

[82] data.europa.eu gives access to open data from European national, regional, and local open data portals, as well as EU institutions, bodies and agencies open data.

[83] The Context Broker (a former CEF Building Block no longer funded in the Digital Europe Programme due to its maturity) will be recommended as part of the standardised tools supporting the Data Spaces.

Type of action	Procurement
Indicative Budget	EUR 5 million
Indicative time of procurement	2021 and 2022
Indicative duration of the action	30 months
Implementation	European Commission
Security	Call restricted on the basis of article 12(6) of the Digital Europe Programme Regulation

This topic will be subject to article 12(6) for the reasons already provided in section 2.2. In addition, the platform will provide access to a variety of data including sensitive Geospatial, Earth observation and mobility data potentially exposing critical infrastructures, as well as other sensitive data on Companies and company ownership. The information that can be extracted from this data, but also the risk related to abuse, increases exponentially because data from different sources could be combined and may be used for malicious attack against public order.

2.3 Artificial Intelligence

In the White Paper on Artificial Intelligence[84], the European Commission presented its twin objective of promoting the uptake of AI and of addressing the risks associated with certain uses of this new technology.

To achieve a greater uptake of AI, the Commission seeks to build an 'ecosystem of excellence' along the entire value chain[85]. The European Commission will also build an 'ecosystem of trust' with the help of a regulatory framework[86]. It should give citizens the confidence to take up AI applications and give companies and public organisations the legal certainty to innovate using AI.

The Digital Europe Programme contributes towards a greater AI uptake in Europe by, among others, supporting the deployment of Testing and Experimentation Facilities, AI resources and AI-based solutions. First, the **AI on demand platform** (see section 2.3.1) will be consolidated as a central toolbox and marketplace of AI resources needed for industry and public sector use. Second, the deployment of reference **testing and experimentation facilities in four prioritized sectors**: manufacturing, health, agri-food and smart cities and communities, (see section 2.3.2) will provide common, highly specialised resources to be shared at European level. An additional reference **Testing and Experimentation Facility for Edge AI** will be deployed in the context of the cloud-to-edge infrastructure and services (see topic 2.1.5). Additional actions in this Work Programme will support the deployment of AI based solutions including the **Destination Earth Digital Twins** (see topic 5.1.1.2), and AI based solutions for **Smart Communities** (see topic 2.2.1.2.2), **AI based pilots for law enforcement** (see topic 5.3.4) or preparatory actions for the deployment of an ecosystem of **digital twins in healthcare** (see topic 5.3.3.1).

[84] COM(2020) 65 final

[85] Working together with the private and public sector, the policy framework seeks to align efforts and mobilise resources at European, national and regional level as well as to create the right incentives to accelerate the adoption of solutions based on AI, including by SMEs.

[86] Proposal for a Regulation laying down harmonised rules on artificial intelligence (COM(2021) 206 final)

The Digital Europe Programme complements the research and innovation activities under Horizon Europe and its predecessors: results from Horizon Europe, in particular under Cluster 4 ”Digital, industry and space”, and Horizon 2020 can receive the necessary help from Digital Europe to go to market, thereby filling an important gap of upscaling innovation. Furthermore, these AI activities will also provide significant support to the ‘ecosystem of trust’[86], in particular contributing to the development of certification schemes and providing regulatory sandboxes[86].

Sectorial AI Testing and Experimentation Facilities (TEFs) will be set up for the purpose of testing and validating advanced AI solutions and products to be deployed widely after such validation. This testing necessarily involves access to high quality data, which, for certain TEF users or TEFs scenarios, are critical for the EU’s security and public order. Examples of such data are: i) data about use of energy supply infrastructure (TEF on Smart cities and communities), which can reveal sensitive the critical infrastructure for energy supply, including its points of failure, hence essential for the Union’s security, ii) EU’s aerospace industry (e.g. TEF on manufacturing is open to any industry), potentially revealing important data about the EU’s aerospace projects, iii) European industrial automation applications (TEF on manufacturing), which can reveal data about production facilities critical for food security (TEF on Agri-food), mobility (TEF on Smart cities and communities), etc. iv) or EU’s communication or transport infrastructure (TEF on Smart cities and communities).

The AI initiatives under Digital Europe Programme will be linked to the EU data and cloud initiatives (smart middleware platforms, as part of cloud-to-edge services or as a part of EU cloud marketplaces) with the aim of training AI with those datasets. In particular, the TEFs will establish links with the relevant dataspaces and cloud actions so that these resources can be made available to the technology providers using the TEFs and interested in training and testing their AI solutions. TEFs and the AI-on-demand initiatives will become one point of access to data spaces and cloud activities, therefore the same restrictions should be in place. This includes TEFs in all the prioritized sectors, which have corresponding data spaces in Digital Europe Programme, namely agri-food, manufacturing, health, mobility, and smart communities.

Moreover, the technology itself, made available on the AI-on-demand platform and tested in TEFs, and the sectors chosen is sensitive from a security perspective. Artificial Intelligence and robotics qualify as critical technologies and dual use items under article 2(1) of Council Regulation (EC) No 428/2009 and as factors that may be taken into consideration by Member States or the Commission for screening foreign direct investment under EU foreign investment regulation (EU 2019/452).

In particular, the TEFs outputs, validated AI solutions, ready to be deployed, will be made available to any type of users, including public authorities, providing public services, or private sector, including those working in security sensitive areas (energy, mobility, some security sensitive manufacturing sectors), or areas with an impact on public order (e.g. healthcare, food supply chain) therefore the highest level of trust and security of the TEF process and output must be ensured.

Therefore, trust is an essential feature of the TEFs: organizations running the TEFs will have a big responsibility in validating the AI products and solutions, including their security features and protection of fundamental right and EU values, before their large diffusion. They will also have access to confidential information about the solutions tested in their facilities, some of which are likely to be related to the security or safety aspects of the solutions; therefore they will have to be trusted by third parties, and must ensure highest level of trust and security, which justifies the use of article 12(6). In addition, organisations running the TEFs will have access to sensitive public sector and private data, including from the sensitive

data spaces subject to the application of article 12(6), as well as to business related data and AI algorithms, before they are eventually deployed to the market.

Moreover, there are sector-specific reasons in line with EU foreign investment regulation (EU 2019/452) that article 12(6) of the Digital Europe Programme Regulation should be applied: for example, one of the objectives of the Agri-Food TEFs is to improve the food security and nutrition and improve the resilience of the sector through the use of AI. Security breaches of AI developed in agri-food TEFs and used by their end-users, such as farmers, could put Europe's food production and processing capabilities, and therefore food security, at risk. Similarly, health (healthcare TEFs) and real estate crucial for the use of critical infrastructure such as energy, water and transport (smart cities/communities TEFs) are factors likely to affect security or public order according to article 4 of the EU foreign investment regulation (EU 2019/452). In particular for healthcare and smart cities and communities TEFs the end-users of the AI tested at TEFs are likely to be public authorities in managing the provision of healthcare services and supplying water and energy. As a result, there are also sectorial reasons to apply article 12(6) to the agri-food, healthcare and smart cities and communities TEFs.

In addition, organisations running manufacturing and agricultural TEFs have access to TEF users, access to sensitive business (and confidential) data of manufacturing and agricultural companies. These are critical information and data sources relating to manufacturing and agricultural spaces/processes, information about which processes are critical, control systems in the manufacturing process etc. Part of this is particularly critical for manufacturing in defence and aerospace. The objective of the AI-on-demand platform is to provide a catalogue of AI-based resources and a marketplace, providing access to AI tools made in Europe that are 'trustworthy'. It interconnects with the cloud-to-edge infrastructure, HPC resources, the data spaces, and the TEFs, providing the TEFs with necessary AI and related resources, and hosting the results once validated in the TEFs. The platform will have a service layer providing support to users (incl. public administrations) for the integration of AI solutions.

It is necessary that the platform is delivered and operated by entities that conform, beyond suspicion, with EU security and data protection legislation in particular. This means that such entities cannot be subject to any foreign jurisdictional claims to the EU data or data on the EU users of such marketplaces. To prevent such claims, it is important that the entities providing the platform, solutions and services, in the event that they are controlled by third countries or entities in the third countries, are subject to guarantees in line with article 12(6) of the Digital Europe Programme Regulation, which practically makes the unsolicited access of the third countries authorities to the EU data impossible.

Overall, the topics under this section will create an ecosystem of trust aiming to facilitate the take up of the resulting AI-based solutions and thus economic growth. Having different and separate processes to address security sensitive use cases (e.g. are to be conducted for example only by part of the TEFs or they have to be conducted in a separate facility), this ecosystem of trust is damaged and so is the desired take up with its positive economic consequences. Furthermore, this could imply transaction costs (higher interoperability cost) and inefficiencies and discourage participation, in particular, SMEs.

Finally, the interrelation and linkages between AI-on-demand platform individual TEFs, which are necessary to their efficient and optimised development and functioning. Creating additional, separate TEFs for the applications with direct and significant security relevance would increase the costs and complexity of the infrastructure. This means that it would not be possible to apply article 12(6) selectively to only certain TEFs without creating security risks to the ecosystem as a whole.

All eligible entities should include in their proposal on actions subject to article 12(6) evidence on how they will address the underlying security issues and how they will deal with confidentiality of information and include evidence of their security expertise. All selected entities implementing such actions shall have the obligation to prevent access by non-eligible third countries or by non-eligible third country entities to classified and non-classified sensitive information. When applicable, the persons involved in the actions subject to article 12(6) will have national security clearance issued by a Member State.

2.3.1 AI-on-demand platform

The objective of the AI-on-demand platform is to provide a catalogue of AI-based resources and a marketplace, providing central, easy and simple access to AI tools that are made in Europe and are 'trustworthy'[87], a distinguishing character for businesses and public administrations.

2.3.1.1 Preparatory actions for the AI-on-demand platform

Objective

The objective of this support action is to prepare the development of the AI-on-demand platform described above, in order to optimise its design and maximise its impact.

Scope

The project will define the requirements and mechanisms for the AI-on-demand platform in order to:

- support the implementation of the Adopt AI programme which supports the procurement of AI systems for public administrations[88]
- serve the needs of both public administrations as well as the user industry, in particular SMEs, addressing the major industrial sectors in Europe, with high potential for large scale deployment
- best support the wide uptake of trustworthy AI "made in Europe", in line with AI regulatory framework on AI[89] for the benefit of the European economy, society and also addressing environmental challenges
- Interconnect with the cloud for computing requirements and with the data spaces
- Interconnect with the Testing and Experimentation Facilities, and the Digital Innovation Hubs

To this end, the funded activities will:

- Collect and consolidate the requirements and needs, mobilising a wide community of relevant stakeholders such as representatives of public administrations, businesses (in particular SMEs and start-ups) and technical experts, in key sectors, including through the European Digital Innovation Hubs. The requirements should be prioritised on the basis of their related impact in terms of potential for large scale deployment, social, economic and environmental impacts.

[87] The proposal for a regulation laying down harmonised rules on artificial intelligence (COM(2021) 206 final) and the Coordinated Plan on Artificial Intelligence 2021 review, aim to turn Europe into the global hub for trustworthy AI

[88] Proposed in the White Paper on AI.

[89] Proposal for a Regulation laying down harmonised rules on artificial intelligence (COM(2021) 206 final)

- Provide a mapping of existing AI tools, incl. AI solutions already procured by public administrations in Member States, and identify gaps and future needs. This work should build on the information provided by relevant analyses and projects[90].
- Define mechanisms to guarantee that the resources that would be made available and deployed on the AI platform under topic 2.3.1.2 are trustworthy and "made in Europe". This should take into account requirements stemming from the (future) AI regulatory framework, including the voluntary self-regulatory schemes. The platform to be deployed under 2.3.1.2 should then develop a service for the implementation of such mechanism.
- Propose and prepare an instrument for long-term sustainability of the platform; this may include the development of an underlying Foundation/association, a solid business and governance model.
- Define, in collaboration with the relevant actions funded under the Specific Objective 2 of the Digital Europe Programme, technical mechanisms and governance to ensure seamless interaction between the AI-on-demand platform with the underlying necessary resources, such as the data spaces and the Cloud-to–edge and HPC resources developed in this programme.
- Define mechanisms to engage with the Digital Innovation Hubs (DIHs), to connect to stakeholders, provide them with the AI resources, and implement a train-the-trainer programme about the use of AI for digital transformation.

Outcomes and deliverables

Requirements and mechanisms for the AI-on-demand platform, optimising its services on the basis of users' needs and strengthening the AI developers' community, to support wide uptake of trustworthy AI "made in Europe".

Type of action	Coordination and Support Action
Indicative Budget	EUR 1 million
Indicative time of call opening	First call
Indicative duration of the action	6-9 months
Indicative budget per grant (EU contribution)	EUR 1 million
Implementation	European Commission
Security	Call restricted on the basis of article 12(6) of the Digital Europe Programme Regulation

This topic will be subject to article 12(6) for the reasons already provided in section 2.3.

[90]Such as AI4EU and analyses of the use of AI in public administration.

2.3.1.2 Deployment of the AI-on-demand platform

Objective

The objective of this action is to develop and deploy the AI-on-demand platform, building on the results from the project implementing topic 2.3.1.1, providing the requirements and underlying mechanisms for such platform.

Scope

The awarded project will develop and deploy the AI-on-demand platform in close cooperation with the project implementing topic 2.3.1.1, taking into account the proposed requirements and mechanisms to optimise the impact of the AI-on-demand platform.

The platform will gather all the AI resources (algorithms and tools), and make them available to the potential users, businesses and public administration, with the necessary services to facilitate their integration. Activities shall build on results from the preparatory action (see topic 2.3.1.1), as well as previous relevant projects such as the AI-on-demand platform and the European Language Grid initiated under Horizon 2020. In addition, the platform should mobilise the European innovators to provide their products and services on the platform. The platform should become the reference for any user (industry or public service), a one-stop-shop to access AI tools to integrate into solutions, products, and services: a common good and market place for AI resources.

It will implement mechanisms defined in the preparatory action and further cooperate with the corresponding actions running in parallel to interconnect with the cloud-to-edge infrastructure, HPC resources, the data spaces, and the Testing and Experimentation Facilities (TEFs) – providing the TEFs with relevant AI and related resources, and hosting the results once validated in the TEFs, as applicable.

The platform will play the role of a central marketplace for AI tools, and a service layer providing support to users (incl. public administrations) for integration of AI solutions. In addition, it will bring the latest AI tools and solutions to the level of industrial standard requirements (code validation, quality check), connect to computing resources (e.g. HPC, cloud from this programme), data resources (e.g. data spaces from this programme, also datasets for training and validation), promote trustworthy AI development and deployment, facilitate the implementation of public procurement in AI, as well as raise awareness about best practices and success stories of AI applications in various domains. The AI-on-demand platform will also develop use-cases factory/library to support its activity. Specific attention will be given on guaranteeing that the resources on the platform respect the ethics guidelines issued by the High Level Expert Group on AI and the European AI Alliance and support the regulatory framework.

Outcomes and deliverables

Deliverables

- The European AI-on-demand platform, including:
    - A visible catalogue of AI resources that are made in Europe and trustworthy
    - A one-stop shop to access AI tools for the European industry and for public administrations
    - A reference and trusted marketplace for trustworthy AI resources

- Services in support of the public procurement of AI solutions[91]
- Interconnections to computing resources, data spaces and Testing and experimentation facilities developed under this programme
- Established links with the network of European Digital Innovation Hubs to provide access of AI tools to SMEs and the public administration throughout Europe.

- A governance mechanism in view of the future sustainability of the AI on demand platform.

Outcomes

- Increased visibility to trustworthy innovations, in particular those made in Europe.
- Easy access to AI tools by public administrations and European industry (in particular SMEs).

Type of action	Coordination and Support Action
Indicative Budget	EUR 28 million
Indicative time of call opening	Third call
Indicative duration of the action	48 months
Indicative budget per Grant (EU contribution)	EUR 28 million
Implementation	European Commission
Security	Call restricted on the basis of article 12(6) of the Digital Europe Programme Regulation

This topic will be subject to article 12(6) for the reasons already provided in section 2.3.

2.3.2 AI Testing and Experimentation Facilities

Experimenting and testing state-of-the-art technology in real-world environments is an important step in bringing technology to market and it is the part of the innovation chain where Europe's AI ecosystem needs significant support to remain globally competitive. The crucial role of the Testing and Experimentation Facilities (TEF) has been confirmed by the current Covid-19 crisis. In fact, many solutions prototyped or tested in labs have the potential to address the current needs for AI-based solutions. However, they often cannot be deployed due to the lack of testing in real (or representative) environment as opposed to just virtual for proving the capability to efficiently address the needs of the users, or due to the lack of certification against relevant existing standards such as safety[92]. The Testing and Experimentation Facilities are expected to address those issues and to play a key role in the implementation of the proposed regulatory framework for AI[93].

The facilities should be easy to use, work under real-life conditions, and closely involve end-users. TEFs should be used by technology developers, in particular SMEs. While open standards, open data, and open

[91] Supporting the implementation of the Adopt AI programme

[92] AI standardisation is still on-going, which also raises issues for the deployment for AI.

93 COM(2021) 206 final. Under negotiation in the ordinary legislative procedure.

software platforms are encouraged, as they are important to boost sharing of resources, progress and innovation, TEFs are not limited to open-source tools and developments.

An efficient interplay between TEFs and data spaces is fundamental for creating a level playing field and ensuring market access. This would be achieved by teaming up the data spaces and TEFs in mutual areas of interests, e.g. dealing with technical capacities and regulatory requirements, as much as possible already given the different timeline of the different initiatives. Furthermore, as work on data spaces and TEFs could start at the same time, both could benefit from exchanges of data and AI applications. Therefore the TEF projects will be required to define ways to interact with parallel initiatives on the European AI-on-demand platform where relevant[94]. For instance: AI-based applications that have been tested and validated in TEFs can be used in sector-specific data spaces to process and analyse the data made available through the data space. Data voluntarily shared, and exchanged via sector-specific data spaces can be used to train and validate AI technologies in TEFs.

The TEFs, in particular on Manufacturing, Agri-Food, Smart Cities and Communities are expected to contribute to the Green Deal, as AI is a tool for resource optimisation and minimisation of any kind of waste (energy or any resources in general), Robotics and AI can be used for circular economy, recycling, and precision farming for instance. The potential contribution of AI to environmental sustainability is high[95] and the TEFs are expected to greatly boost such potential.

2.3.2.1 Testing and Experimentation Facility for Manufacturing

Objective

The world-class large-scale reference site for testing and experimentation of AI-powered solutions will enable integrating state-of-the-art AI and robotics technologies in the manufacturing domain, and will foster the deployment of trustworthy, transferable and scalable Industrial AI in Europe. A transition towards a more AI-driven manufacturing industry will improve the quality and sustainability of production.

Scope

The manufacturing TEF will provide physical and virtual access to real-life manufacturing resources that can be used for testing and experimenting with AI solutions. Examples of such manufacturing resources are model factories that combine different technologies such as additive manufacturing, machine tools, intelligent conveyor systems, automated warehousing, trusted and secured access to data, IoT infrastructure and more, covering multiple industrial processes.

The manufacturing TEF will address the manufacturing sector's needs for Industrial AI, taking into account domain-specific requirements in terms of time criticality, safety, security and effective interaction and collaboration between robots, AI solutions, and humans who are in control, as well as resource efficiency and environmental performance. The TEF site will offer support and best practices in AI solution implementation, testing and training of algorithms including: full integration, industrial validation and demonstration up to pilot manufacturing in dedicated assembly lines and production cells. The TEF needs to support testing and experimentation of main AI-related services, which cover areas of machine learning,

[94] Where relevant make also use of Earth Observation data from Copernicus or location and navigation data collected by the Galileo and EGNOS services

95 The role of artificial intelligence in achieving the Sustainable Development Goals: https://www.nature.com/articles/s41467-019-14108-y

robotics, planning and scheduling, optimisation, self-configuration, computer vision, formal methods, natural language processing, automated reasoning, game theory, multi-agent systems, complex systems, system verification, bioinformatics and others.

The TEF site will define and establish European test and training data sets in cooperation with manufacturing data spaces. The project is encouraged to collaborate with other relevant Digital Europe Programme projects, in particular the edge AI and other sectorial Testing and Experimentation Facilities, to ensure appropriate synergies.

The scope and resources of the manufacturing TEF will be driven by use cases of significant economic value and will provide adequate coverage of activities allowing the deployment of the latest AI-based technologies in real manufacturing environments. The TEF has to be relevant to all kinds of AI innovators, allowing them to test and demonstrate their new AI solutions and support business development, standardization, certification and benchmarking. Aspects such as ethics, cybersecurity and data protection are taken into account, where appropriate. The manufacturing TEF may include regulatory sandboxes, i.e. areas where regulation is limited or favourable to testing new products and services.

When required by the use cases, the manufacturing TEF also needs to cater for edge computing. In manufacturing context, this means that AI tools are brought to sensors and devices, i.e. there where data is produced. These AI tools need to deal with manufacturing requirements related to latency, throughput, stream processing, etc. High-performance computing should be also offered where needed.

The manufacturing TEF will address the following key areas in an agile setup:

- Factory-level optimization (flexible production in high-throughput and high variety environments, rapid prototyping); testing and assessment of AI technology for autonomous decision making within the real world, i.e. interaction with and decision for humans and other machines; supporting e.g. to rearrange the manufacturing process dynamically (incl. choice of manufacturing techniques and logistics);
- Collaborative robotics (mobile, intelligent AI-powered robots enabling safe human-robot collaboration, also in teams; also in sectors like textiles, tourism or construction);
- Circular economy: minimise resource consumption, optimize supply chains in uncertain environments, use of substitute material, collection, sorting and treatment of products that have become waste (making available secondary raw materials and maximum extraction of value), reverse logistics, remanufacturing.

Outcomes and deliverables

The Testing and experimentation Facility for manufacturing will be set up and deployed. The project will focus on factory-level optimisation, collaborative robots, and circular economy. It will give innovators the possibility to test and validate their new AI solutions in real-life manufacturing environments before deploying their solutions to the market.

As a result, new AI and data ecosystems, that are compatible with open frameworks that support data sharing, can be used for the improvement of quality and sustainability of the production.

Pressing technological challenges and effects of an aging workforce can be addressed through the deployment of AI and robotics technologies across the manufacturing domain.

This will contribute to the innovation capacity and competitiveness of the European manufacturing sector.

Furthermore, the training, testing and validation of AI applications that respect European values can become a focal point for certification.

Contribution to AI innovation:

- Boosting the competitiveness of the European industry, including SMEs in AI, a technology of high strategic relevance;
- Contributing to boost European IP and products based on European technology;
- Creation of world-class experimentation facilities in Europe, offering a comprehensive support combining the necessary expertise, meeting the needs of European innovators. The organisations running the TEFs and their process will ensure the highest level of trust and security for the users of the TEFs, and the highest quality of the testing and validation to guarantee trust and security in the tested solutions, key for their broad diffusion
- Contributing to European technology sovereignty and open strategic autonomy in AI, and AI-enabled solutions.

Type of action	Simple grant (50% co-funding rate)
Indicative Budget	EUR 30 million
Indicative time of call opening	Second call
Indicative duration of the action	60 months
Indicative budget per Grant (EU contribution)	EUR 30 million
Implementation	European Commission
Security	Call restricted on the basis of article 12(6) of the Digital Europe Programme Regulation

This topic will be subject to article 12(6) for the reasons already provided in section 2.3.

2.3.2.2 Testing and Experimentation Facility for Health

Objective

The demand for high-quality health and care by European citizens is increasing. At the same time, there is an urgent need for cost-effectiveness in the context of an ageing society and growing numbers of chronically ill patients. Technologies based on Artificial Intelligence (AI) and robotics have the potential to improve the efficiency, security, and quality of the prevention, detection, diagnosis, treatment, care, rehabilitation and monitoring of European citizens' health, as well as to promote a healthy lifestyle. The awarded project will develop the Testing and Experimentation Facility (TEF) with a focus on full integration, testing and validation of advanced AI-based technologies (e.g. IoT, MedIoT, Active and Assisted Living Technologies) and robotics technologies for health and care. The crucial need for a such facility was made obvious during the COVID-19 crisis, as many potential solutions to address the current needs were already prototyped or tested in labs but could not be deployed in emergency situations because of the lack of testing in real-life environments and the lack of certification. The objectives of the TEF are to accelerate the testing by mutualising the infrastructures as well the administrative, medical and ethical procedures and certifications as well as to

advance personalised medicine and person-centred care, with the aim to increase the effectiveness, resilience and sustainability of European health and care systems and reduce healthcare delivery inequalities in Europe, while ensuring compliance with relevant legal, ethical, quality and interoperability requirements.

Scope

The TEF will operate as a multidisciplinary setting having a common collaboration framework. It will provide physical and digital access to large resources and will offer support, research partners, clinical expertise, expertise in AI and robotics, data, training and access to high-performance computing. It should be close to where health and care services are provided but also cover multiple health and care processes within the realm of research, innovation and regulation (hospitals, health and care centres, universities, RTOs, innovation ecosystems - like incubators, clusters, accelerators, public health or certification agencies, healthcare companies of any sizes when relevant). The TEF will gather researchers, medical and clinical professionals, patients, industrial developers, innovators and end-users, and they may include regulatory sandboxes. This facility could be centralised or distributed across several locations around a central node in order to reflect the sector diversity, and possibly support some remote operations.

Activities supported by this scheme will cover the demonstration, testing and validation in real-life application environment, possibly with real patients, but also ethical and data protection reviews, certification, market analysis, IP protection, incubation and business development, as well as the contribution to the regulation and standardization effort, when relevant. The infrastructure established within this facility will include both the hardware (e.g. robots, high-performance computers, 3D printing, IoT) and the software, including trusted and secured access to data, necessary to provide the different services. Links to the data space for health should be established, when necessary. The project is encouraged to collaborate with other relevant Digital Europe Programme projects, in particular the edge AI and other sectorial Testing and Experimentation Facilities, to ensure appropriate synergies. The project should allow for large-scale in-silico, in vitro, ex-vivo and in vivo testing, when relevant. Links should be made to existing structures and networks as appropriate.

The facility may include a range of use cases in different fields such as:

- Treatments in various fields including cancer and paediatrics;
- Monitoring the progress of long-term conditions in function of treatment (e.g. diabetes mellitus, neurodegenerative diseases etc.)
- Support to doctors' decision-making, including personalised, predictive and gender-sensitive treatments;
- Detection of tumours from imaging;
- Robotics surgery;
- Robotics assistance and rehabilitation;
- Active and Assisted Living technologies for elderly or disabled persons, including digital solutions in support of the creation of multi-generation living spaces in line with the New European Bauhaus approach[96]
- Logistics, management of flows and process efficiency in hospitals.

[96] https://europa.eu/new-european-bauhaus/index_en

Outcomes and deliverables

The TEF will foster the integration of state-of-the-art AI and robotics technologies in the healthcare domain. It will boost European healthcare industry by focusing on the applicability and facilitate the complex and lengthy process of AI innovation. The project will contribute to positioning the EU as a leader in AI and robotics for healthcare by promoting the generation of new companies, retaining talent, and creating new jobs. Expected outcomes include:

- Validation in real conditions of innovative AI and robotics technologies in healthcare applications,
- Efficiency and safety of treatments,
- Improved operational and clinical workflows,
- Better clinical outcomes,
- Enhanced patient experience,
- Enhanced professional experiences, including education and training opportunities,
- Acceleration of the adoption of AI and robotics technologies in the healthcare sector,
- Innovation capacity and competitiveness improvement in the European healthcare sector,
- Better compliance with relevant regulations that govern the marketing authorisation of healthcare products,
- Improved ageing environment.

Contribution to AI innovation:

- Boosting the competitiveness of the European industry, including SMEs in AI, a technology of high strategic relevance;
- Contributing to boost European IP and products based on European technology;
- Creation of world-class experimentation facilities in Europe, offering a comprehensive support combining the necessary expertise, meeting the needs of European innovators. The organisations running the TEFs and their process will ensure the highest level of trust and security for the users of the TEFs, and highest quality of the testing and validation to guarantee trust and security in the tested solutions, key for their broad diffusion
- Contributing to European digital sovereignty and open strategic autonomy in AI, and AI-enabled solutions

Type of action	Simple grant (50% co-funding rate)
Indicative Budget	EUR 30 million
Indicative time of call opening	Second call
Indicative duration of the action	48-60 months
Indicative budget per grant (EU contribution)	EUR 30 million
Implementation	European Commission
Security	Call restricted on the basis of article 12(6) of the Digital Europe Programme Regulation

This topic will be subject to article 12(6) for the reasons already provided in section 2.3.

2.3.2.3 Testing and Experimentation Facility for Agri-Food

Objective

The principal objective of this measure is to further the development of the agri-food sector by enabling the full benefit of the digital transformation with AI and AI-powered robotics technologies and the move to a Circular Economy for a more sustainable, affordable, efficient and competitive production under high standards.

Scope

The selected project will develop reference testing and experimentation facilities with a focus on full integration, testing, validation, demonstration, and where appropriate certification, of advanced AI-based and AI-powered robotics technologies for the agri-food sector. Fields of applications may include, for instance, precision farming solutions, but also other applications from mid- and down-stream such as food processing, wholesale, retail, hospitality and food services. The project may cover the whole value chain of the agri-food sector, but should only cover at least agriculture. Where appropriate demonstration can be done in connection with a specialised demonstration facility, several sub-sector and production types can be considered as well as various variables as it regards crop-livestock types/soils/climatic and environmental conditions/farm structure. The facilities may include a range of use cases in different fields such as – but not limited to - precision weeding/fertilisation/seeding, sensor data management, multifunctional autonomous robotics applications (and its long-time continuous use), and/or in different sub-sectors, such as arable farming, greenhouses, livestock/chicken management. Use cases may also be developed along different topics, such as collaborative robotics, circular economy or reduced food loss/waste. The use-cases offered should be end-user driven. This will be ensured by closely involving the end-users, e.g. farmers. Smaller farms[97] and businesses should be involved in particular to ensure affordability of AI solutions. The project may conduct an analysis of bottlenecks and drivers of uptake of AI-based solutions by end users for its specific use cases, if appropriate in combination with the European Digital Innovation Hubs.

The infrastructure established within this activity will set-up or build on physical and digital resources, which will be available to the facilities users for the testing and experimentation of their hardware and software solutions. These physical and digital resources include high-power-computing, labs, cloud computing, connectivity technologies such as 5G, trusted and secured access to sets of (labelled) high quality data, and AI toolkit solutions. Professional services support in areas such as business, compliance and verification/certification, including for a possible requirement from the future regulatory framework for AI, is also provided directly or via the EDIHs. Regulatory sandboxes may be provided where relevant. The facilities are linked to relevant Digital Europe Programme projects such as other Testing and Experimentation Facilities, EDIHs and data-spaces, especially for agriculture. Facilities are also encouraged to establish links to relevant projects funded by Horizon 2020 or Horizon Europe, whenever feasible and meaningful. Supported activities will also cover validation and demonstration in real application environment, prototyping, pilot manufacturing, business development, standardization, certification, ethics, cybersecurity and data protection where relevant.

[97] Small both in physical and economical size.

The work of the TEF for the agri-food sector will follow the approach to bring AI and AI-powered robotics technology from the lab to the market, described in the European Commission's Communication Coordinated Plan on AI with the Member States, as well as with the declaration "a smart and sustainable digital future for European agriculture and rural areas", signed on 9th of April 2019.

Outcomes and deliverables

Expected outcomes would include increased higher agri-food sector resilience, mitigation of the environmental impact of agricultural activity to soil, water and biodiversity, greater resource and cost efficiency and competitiveness in agricultural production, helping to optimise the use of natural resources for instance through supporting a decrease in input and the impact of the use of e.g. water, fertilizer or pesticides to the environment. Depending on the final scope of the project, it may contribute to climate mitigation and adaptation of the sector as well as to increased food and nutrition security and/ or optimised application of the approaches of the circular economy.

On the technological solutions side outcomes include reaching long time robotics autonomy levels at a faster pace, boosting the adaption of digital technologies in agriculture, increasing awareness of new digital farming technologies, validation in real conditions of next-generation AI-powered agricultural robotics and AI-based decision-making tools and enabling large-scale data collections. The AI solutions developed should also aim to be tailored to the needs of and affordable for smaller farms[98].

The selected project will develop and, if necessary, adapt over time, a long-term plan over 60+ months 1) to build up or upgrade facilities with resources and services, 2) offer and extend the use of facilities to promising future AI and robotics solutions providers, and 3) to achieve long-term financial sustainability after EU funding stops.

Contribution to AI innovation:

- Boosting the competitiveness of the European industry, including SMEs in AI, a technology of high strategic relevance;
- Contributing to boost European IP and products based on European technology;
- Creation of world-class experimentation facilities in Europe, offering a comprehensive support combining the necessary expertise, meeting the needs of European innovators. The organisations running the TEFs and their process will ensure the highest level of trust and security for the users of the TEFs, and the highest quality of the testing and validation to guarantee trust and security in the tested solutions, key for their broad diffusion
- Contributing to European technology sovereignty and open strategic autonomy in AI, and AI-enabled solutions;

Type of action	Simple grant (50% co-funding rate)
Indicative Budget	EUR 30 million
Indicative time of call opening	Second call
Indicative duration of the action	60 months

[98] Small refers to the economical and physical size of farms.

Indicative budget per Grant (EU contribution)	EUR 30 million
Implementation	European Commission
Security	Call restricted on the basis of article 12(6) of the Digital Europe Programme Regulation

This topic will be subject to article 12(6) for the reasons already provided in section 2.3.

2.3.2.4 Testing and experimentation Facility for smart cities and communities[99]

Objective

To provide a testing and experimentation facility for AI and robotics in cities and communities and make their resources accessible to EU cities, communities and innovative academia and industry stakeholders (including SMEs) that would enable them to validate novel AI-driven services in close-to-real-life environments before their further massive deployment.

The Testing and Experimentation Facility will actively collaborate with the project validating the blueprint for a common European data space for smart cities and communities (see section 2.2.1.2) by making any infrastructure created by the pilots widely accessible on a longer-term basis to other stakeholders in line with the Testing and Experimentation Facility context.

Scope

As described in the Coordinated Plan on Artificial Intelligence[100] and in the White Paper on Artificial Intelligence[101], technology infrastructure is needed to ensure specific expertise and experience of testing mature technology in the smart cities and communities sector, under real or close to real conditions. The Testing and Experimentation Facility may combine European, national and private investments.

The participating communities and cities will create and make physical and digital facilities for testing and experimentation of innovative AI-enabled and robotics-based services and solutions (such as optimisation of traffic flows) widely accessible on a longer-term basis to other stakeholders (and particularly the consortium running the validation pilots below) in close-to-real-life environment. The TEF will offer digital twins of some of the use-case environments, exploiting to the extent possible the LDT (local digital twin) toolbox and, vice-versa, contributing to the LDT toolbox, to the extent possible.

Within the context of smart cities and communities, this facility will be focused on the transport, energy, -construction and environmental protection sectors linked to the action areas of the European Green Deal, and support cross-sector services and applications. The facility will offer both the infrastructure and personnel support to the users of the facility to run the tests and experiments, including access to high-performance computing.

The TEF could also be used for validation and demonstration of AI-based automation and robotisation of physical and administrative processes (such as automated city transport, automated waste collection, inspection and maintenance of infrastructures, etc.), decision-support and decision-making tools; business

[99] 'Communities' captures both rural and urban communities.

[100] COM(2018) 795 final

[101] COM(2020) 65 final

development; standardisation; certification of products (e.g. for compliance to the MIMPlus specifications), solutions and services; and, compliance to ethical, cybersecurity and data protection norms, as well as to advance through experimentation and sandboxing the EU regulatory framework for AI and robotics.

The project is encouraged to collaborate with other relevant Digital Europe Programme projects, in particular the edge AI and other sectorial Testing and Experimentation Facilities, to ensure appropriate synergies.

Outcomes and deliverables

The Testing and Experimentation Facility for smart cities and communities is part of the strategy to bring technology from the lab to the market. The action should mobilise the necessary actors of the ecosystem, to ensure the readiness of both the supply and demand sides in the area of AI-enabled services and deliver the main elements needed to scale up the adoption of AI-based services by EU cities and communities. The action will result in one facility to be deployed for an extended period of time to be used in pilots, testing, experimentation, as well as for sandboxing and to support standardisation and the implementation of the AI regulatory framework.[102]

Expected outcomes include increased and faster integration of various AI and robotics systems in smart cities and communities, which will contribute to environmental goals such as carbon neutrality, increased robustness, security, and agility of smart community infrastructure, further increases in efficiency, as well as increased competitiveness of service providers in these communities.

Technological benefits will include validation in real conditions of next-generation AI-powered robotics and AI-based automation, decision-support and decision-making tools, benefitting from large-scale data access, sharing and integration, bringing them to a higher technology readiness level, as well as increased competitiveness of European developers of AI solutions, in particular SMEs, through the support provided by the TEF, to bring their products to market.

Contribution to AI innovation:

- Boosting the competitiveness of the European industry, including SMEs in AI, a technology of high strategic relevance;
- Contributing to boost European IP and products based on European technology;
- Creation of world-class experimentation facilities in Europe, offering a comprehensive support combining the necessary expertise, meeting the needs of European innovators. The organisations running the TEFs and their process will ensure the highest level of trust and security for the users of the TEFs, and highest quality of the testing and validation to guarantee trust and security in the tested solutions, key for their broad diffusion
- Contributing to European technology sovereignty and open strategic autonomy in AI, and AI-enabled solutions;
- Contributing to the implementation of the New European Bauhaus[103] initiative

[102] COM(2021) 206 final

[103] https://europa.eu/new-european-bauhaus/index_en

Type of action	Simple grant (50% co-funding rate)
Indicative Budget	EUR 20 million
Indicative time of call opening	Second call
Indicative duration of the action	48-60 months
Indicative budget per Grant (EU contribution)	EUR 20 million
Implementation	European Commission
Security	Call restricted on the basis of article 12(6) of the Digital Europe Programme Regulation

This topic will be subject to article 12(6) for the reasons already provided in section 2.3.

3 Cybersecurity

Cybersecurity is at the heart of the digital transformation of the European Union. The Digital Europe Programme will strengthen the capabilities of the Union to protect its citizens and organisations aiming – amongst others- to improve the security of digital products and services. The European Cybersecurity Industrial, Technology and Research Competence Centre and the Network of National Coordination Centres (ECCC), as soon as the Regulations establishing them will enter into force, will take care of the implementation of relevant actions.

This Work Programme includes activities addressing a European quantum communication infrastructure which will be implemented in direct management by the European Commission.

The other supported Cybersecurity activities are specified in a dedicated Work Programme which will be later implemented by the Cybersecurity Industrial, Technology and Research Competence Centre and the Network of National Coordination Centres (ECCC) as soon as operational, as specified in the ECCC legislation and in article 6(2) of the Digital Europe Regulation. In accordance with the Annex 1 of the Digital Europe Regulation, for first two years of implementation, the activities will focus on following three main work strands:

- support the deployment of cybersecurity infrastructure;
- strengthen cybersecurity uptake, specifically in sectors affected by the Covid-19 pandemic and the ensuing economic crisis.
- support the implementation of relevant EU legislation and political initiatives: in particular the cybersecurity strategy, NIS Directive, the Cybersecurity Act, the Regulation on the European Cybersecurity Competence Centre (ECCC) and the Network of National Coordination Centres, the cybersecurity Blueprint and Joint Cybersecurity Unit, the 5G security toolbox.

The participation in this section is open to all eligible entities as established by Article 18 of the Digital Europe programme, in particular public sector as well as private sector organisations including SMEs and international organisations.

All topics under this section are subject to the provisions of article 12(5) of the Digital Europe Programme Regulation. Those topics cover EU capacities in quantum communication, an emerging field that will be of high strategic value in the development and deployment of secure communication and secure data, applications and services, and which will enable the EU and its Member States to safeguard sensitive governmental data and critical infrastructures against potential interference.

Indicative budget envelope

The indicative budget for the topics implementing the EuroQCI included in this chapter is EUR 170 million. The budget to be implemented via the dedicated Cybersecurity Work Programme is EUR 269 million.

3.1 A secure quantum communication infrastructure for the EU (the EuroQCI)

The security of current encryption technologies relies on computational hardness assumptions. In the near future advances in computing-enabled, combined with ever more sophisticated attacks from different

sources, could put at risk the security of telecom and data communication networks. As a result, Europe's communications networks and the sensitive data that they transmit could become extremely vulnerable.

In order to find solutions to these issues, the Commission is working with Member States as well as the European Space Agency, towards the deployment of a secure quantum communication infrastructure (EuroQCI) spanning the whole of the EU, including its overseas territories through its potential to contribute to the security requirements of the GOVSATCOM initiative[104].

The EuroQCI will provide an unprecedented way of securing communications and data, supplementing current software-based security systems with physical security that makes use of the latest developments in quantum communication technologies. Its aim will be to secure the EU's public communication assets, in particular critical infrastructure and encryption systems, against cyber threats.

In several EU Member States, initiatives to build local/national quantum communications infrastructures are already underway. However, there is a strong case for EU-level coordination: joint efforts by Member States are needed to match the significant advances in quantum communication being made elsewhere in the world. Not all EU Member States have strong know-how and industrial capability in quantum communication technology. The first service to take advantage of the EuroQCI will be quantum key distribution (QKD), a highly secure form of communication that makes use of the principles of quantum mechanics in order to exchange a key which will be used with any selected symmetric encryption algorithm to encrypt and decrypt a message. The EuroQCI will allow Europe's research excellence to form a base for industrial and commercial use, providing a strong supply- and demand-side stimulus for European industry. It will encourage the EU's industrial ecosystem development, creating a large market pull and helping the EU's quantum industry develop new, innovative systems, technologies and processes critical for European open strategic autonomy and digital sovereignty.

The EuroQCI infrastructure will consist of a terrestrial component building on new and/or existing fibre communication networks linking strategic sites at national and cross-border level (possibly interconnected with TESTA[105] infrastructure), complemented by a space component to cross-link and cover the whole EU including its overseas territories. In order to further the EU's efforts to develop and deploy its strategic digital capacities and infrastructure, it will be built with EU technologies. The EuroQCI will be interoperable with or integrated in the secure space connectivity initiative that the Commission is also planning.

The actions supported by the Digital Europe Programme are complemented by those developed through other EU programmes such as Horizon Europe and the Connecting Europe Facility, and by activities carried out by the ESA, complemented by actions supported with national, regional and private funds, and funding from the Recovery and Resilience Facility.

In the first two years of the EuroQCI's implementation, the activities funded by the Digital Europe Programme will focus on the following four main areas:

- preparation for industrialisation of European QKD systems with improved performance, and contributing to the development of Europe's industrial ecosystem for quantum communication technologies and systems;

[104] https://www.euspa.europa.eu/european-space/govsatcom

[105] Trans European Services for Telematics between Administrations (https://ec.europa.eu/isa2/solutions/testa_en and https://portal.testa.eu/)

- early deployment of advanced quantum networks supporting national quantum communication initiatives and their integration with existing communication networks;
- deployment of a pan-European "testing and certification" infrastructure to assess the compliance of different European technologies, accelerating solution development, and ensuring trust in the EuroQCI;
- preparation and coordination of the large-scale deployment of the EuroQCI infrastructure.

Subsequent activities will focus on the full deployment of the terrestrial network infrastructure, the full deployment of the space network infrastructure, and the operationalisation and support of the full EuroQCI network infrastructure.

The EuroQCI will play a major role in securing Europe's critical infrastructures and sensitive communications and data. It is also part of an ambitious and long-term vision for Europe, brought together by the work of the EU-funded Quantum Technologies Flagship. The ultimate goal is for the EuroQCI to become the backbone of a future "quantum internet", which would connect quantum computers, simulators and sensors to radically enhance their performance and enable a new technological revolution.

3.1.1 Create a European Industrial Ecosystem for Secure QCI technologies and systems

Objective

To prepare for the industrialisation and deployment of quantum communication infrastructure (QCI) technological and operational capabilities and advanced QCI networks essential for European cybersecurity, and contribute to the development of a European industrial QCI ecosystem, including a thriving SME sector. This support is needed to contribute to European technological autonomy in the highly strategic field of quantum communication technologies.

Scope

The action will focus on the following two priorities:

- Industrialisation of EU QKD devices, technologies and systems: prepare for industrialisation and for deployment (i.e. reaching TRL 8-9) quantum technology components for quantum key distribution that are stable, miniaturised and have competitive performance (e.g. cost-effective, exhibiting higher key exchange rates, link distances) that can be demonstrated over both short and long distances. QKD systems should enable scalability to multi-user network architectures and upgradability to future quantum information networks. Examples of such core technology components include quantum random number generators, photon sources, application and control software, etc. Work should also cover the integration of individual components and devices to larger, standalone QKD systems and their full testing and thus compliance to EU (ETSI/CENELEC) standards (including independent device protocols) and to EAL level 4 or above[106], in view of their potential deployment in the EuroQCI initiative[107]. Work should also include an exploitation plan covering all the industrialisation and fabrication aspects of such devices, technologies, systems and processes underpinning the creation of an EU QKD supply chain.

[106] Evaluation Assurance Level of the Common Criteria for Information Technology Security Evaluation (ISO/IEC 15408)

[107] https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=60090

- QKD-based Telecom Network System production: Develop the full run system integration from EU QKD system (level 1) to Telecom network systems (level 2), key management (level 3) until cyber security system level (level 4). The level 4 quantum cybersecurity systems will then be integrated in traditional communication networks, assuring interoperability in a full multi-user end-to-end architecture. Upgradability to quantum information networks should be considered. Work should also cover the testing and certification/standards compliance of the complete QKD-based Telecom System in view of its deployment in the EuroQCI initiative.

Individual proposals should cover at least one of the above priorities. The final proposals selection for EU funding will ensure appropriate coverage of both priorities. At least 60% of the budget will be allocated to proposals addressing the first priority.

Outcomes and deliverables

- Mature QKD-based systems ready for integration and deployment in an operational telecom infrastructure, over short and long distances;
- First fully functional telecom network systems managing quantum keys and assuring the interoperability between quantum and traditional cybersecurity systems, that ensure the secrecy and integrity of sensitive digital data in Europe;

Type of action	SME support grant (75% co-funding rate for SMEs and 50% for all the other beneficiaries)
Indicative Budget	EUR 44 million
Indicative time of call opening	First call
Indicative duration of the action	24-30 months
Indicative budget per grant (EU contribution)	EUR 5-15 million
Implementation	European Commission
Security	Call restricted on the basis of article 12(5) of the Digital Europe Programme Regulation

3.1.2 Deploying advanced national QCI systems and networks

Objective

The objective of this topic is twofold. On one hand to deploy advanced national quantum systems and networks for testing quantum communication technologies and for integrating them with existing communication networks. On the other hand to use these quantum systems and networks for developing and testing use cases in support of national QCI initiatives in the context of the EuroQCI initiative. This support is needed to contribute to European technological autonomy in the highly strategic field of quantum communication technologies.

Scope

In each participating Member State, the project should include the following activities:

- Deploying advanced experimental quantum systems and networks combining the best of quantum and classical security technologies. Where possible, using pilot devices, technologies and systems developed and manufactured in the EU, in order to support their further development towards maturity and their compliance with the EuroQCI's security needs. Making these systems and networks widely available for undertaking and testing (in a number of real use cases) the functioning and the provision of very high security QKD components and systems, their interoperability and the end-to-end secure functioning of the system architecture.

  The aim is to prepare the large-scale uptake and use of such systems and technologies, operating in traditional telecommunications networks[108], by national stakeholders and their first use in advanced use cases in different application scenarios:

  - targeting firstly public use cases by linking public authorities within the country;
  - making these quantum networks available to industries operating the network's different layers contributing to developing national-based production chains for supplying critical quantum communication components and systems. This includes the integration of quantum and traditional cybersecurity systems in communication systems and networks (possibly also supported by post-quantum algorithms), which will be used to prepare for the future large-scale deployment of EuroQCI;
  - making these quantum systems and networks available for educational purposes providing a training environment for technical and research staff as well as national users from public authorities or other organisations.
- Demonstrating first long-distance quantum communication networks (including, for example, quantum internet demonstrators) compatible with the overall EuroQCI system architecture, in order to prepare the large-scale deployment of a QCI spanning the EU;
- Where relevant, testing the interface between the EuroQCI's space and terrestrial systems.
- Cooperating and participating with other Member States in the deployment plan and strategic efforts towards designing and building an overall EuroQCI system architecture, including by exchanging lessons learned and experiences in building robust and fully secure QKD systems and networks.

Outcomes and deliverables

- First deployed QKD experimental networks integrated and operating with existing communication networks in several Member States and addressing different advanced use cases, stimulating the emergence of a fully-fledged and technologically autonomous European quantum communication industry and contributing to preparations for the full deployment of the EuroQCI;
- A large number of trained users in quantum communication technologies and Member States ready for the design and deployment of next generation highly secure communication and data networks.

Type of action	Simple grant (50% co-funding rate)

[108] Including, where relevant, existing TESTA infrastructure.

Indicative Budget	EUR 108 million
Indicative time of call opening	First call
Indicative duration of the action	24 to 30 months
Indicative budget per grant (EU contribution)	EUR 5 million
Implementation	European Commission
Security	Call restricted on the basis of article 12(5) of the Digital Europe Programme Regulation

3.1.3 Coordinate the first deployment of national EuroQCI projects and prepare the large-scale QKD testing and certification infrastructure

Objective

To coordinate the developments and findings of the national QCI projects; to prepare for the deployment of a flexible large-scale testing and certification QKD infrastructure that is in the service of all relevant actors of the participating Member States; and to assess the full-scale compliance of different EU technologies with a view to their later integration in EuroQCI. This support is needed to contribute to European technological autonomy in the highly strategic field of quantum communication technologies.

Scope

- Prepare to deploy a large-scale testing and certification infrastructure for QKD devices, technologies and systems, facilitating their standardisation and accreditation at EU level. The infrastructure will define the requirements for a fully operational QKD infrastructure facility covering EU needs in terms of testing, experimentation, and validation of QKD devices, technologies and systems, with a view to their accreditation; (including the definition of mutual recognition criteria in security).
- Coordinate national QCI projects: support discussions on user requirements and use cases, and return of experience from the deployment of advanced national quantum systems and networks including on EU QKD components and systems; coordinate the activities for developing an EU QKD ecosystem and the industrialisation of QKD devices in the EU; support the discussions on the further development of the national deployment plans and strategic efforts, for achieving an overall EuroQCI system (spatial and terrestrial segments).

Expected outcomes and deliverables

- A full set of requirements for an operational QKD infrastructure facility covering EU needs in terms of testing, experimentation, and validation of QKD devices, technologies and systems, with a view to their standardisation and accreditation [within the first six months of the action];
- consolidated feedback from the national deployments at real scale, identifying the complementary activities (including technology developments) required to establish a complete the EU QKD ecosystem;
- a well-coordinated assessment of the first deployments of EuroQCI networks and systems for preparing the full deployment phase of the EuroQCI.

Type of action	Coordination and Support Action
Indicative Budget	EUR 2 million
Indicative time of call opening	First call
Indicative duration of the action	30 months
Implementation	European Commission
Security	Call restricted on the basis of article 12(5) of the Digital Europe Programme Regulation

3.1.4 Deploy a large-scale testing and certification infrastructure for QKD devices, technologies and systems enabling their accreditation and rollout in EuroQCI

Objective

The objective of this topic is to deploy a flexible large-scale testing and certification infrastructure for QKD devices, technologies, systems and operational processes, in the service of all relevant actors of the Member States. The aim is to assess the full-scale compliance of different EU technologies, i.e. compliance with standards (architectures, protocols, etc.), compliance with security specifications (certification); and compliance with product specifications (features, performance, reliability, etc.) with a view to their accreditation at European level and to ensure later interoperability with EuroQCI and GOVSATCOM services. This support is needed to contribute to European technological autonomy in the highly strategic field of quantum communication technologies.

Scope

- provide a large-scale testing and certification infrastructure facility that is used for thorough testing of different QKD technologies and system aspects, including the integration of quantum and traditional cybersecurity systems in communication networks and their interoperability with QKD networks (in terms of suppliers, application level, and at the key management layer, possibly also supported by post-quantum algorithms). It will also be used for testing compliance with user and security requirements (including cyber penetration attempts). These activities will be used to prepare for the large-scale deployment of EuroQCI;
- develop a testbed to simulate the EuroQCI architecture based on the existing EuroQCI system studies and service portfolio with the flexibility to be enhanced according to future EuroQCI developments and needs;
- test the interface between the EuroQCI's space and terrestrial components, including support for the validation of systems and components, and test the technology in ground and lower-altitude experiments.

Expected outcomes and deliverables

- A fully operational QKD infrastructure facility covering EU needs in terms of testing, experimentation, validation and support for the accreditation of QKD devices, technologies and systems. The facility will be interoperable and integrated with traditional communication networks, and open to service operators and cybersecurity business actors, enabling them to develop standardised and certified EU technology solutions.

- Fully interoperable quantum-based technologies between ground stations, (simulated or real) satellite systems and terrestrial systems.

Type of action	Procurement
Indicative Budget	EUR 16 million
Indicative year of procurement	2022
Indicative duration of the action	48 months
Implementation	European Commission
Security	Call restricted on the basis of article 12(5) of the Digital Europe Programme Regulation

4 Advanced Digital Skills

The actions under Strategic Objective 4 aim at supporting the excellence of EU education and training institutions in digital areas, including by encouraging their cooperation with research and businesses. In the same way as the EU joins forces to invest in digital infrastructure, through the EuroHPC, or the European Alliance for Industrial Data and Cloud, it needs to build on the strength of its best education and training institutions to improve the related specialised education offer needed to become world-leader. The goal is to improve the capacity to nurture and attract digital talents, whilst fostering an ecosystem that will help drive innovation and digital breakthroughs.

Strategic Objective 4 will focus on the following main work strands in the first two years of implementation:

- it will provide education and training opportunities for the future experts in key capacity areas like data and ethical AI, cybersecurity, quantum and HPC. The support will be provided for networks of education and training institutions, research centres and businesses for the design and delivery of specialised education programmes (such as Master degrees) as well as traineeships to acquire advanced digital skills needed for specific technologies. A detailed analysis will be conducted in order to ensure relevance and detect emerging trends.
- the investments will also target the reskilling and upskilling of the existing workforce through short-term trainings reflecting the latest developments in key capacity areas, through the sustainability of the EU digital platform for skills and jobs, as well as a coordination action for the digital transformation of the education sector at European level, ensuring that all EU citizens can benefit from these upskilling opportunities.

The topics will contribute to implement actions such as the Digital Crash Courses for SMEs announced in the 2020 Skills Agenda and SME strategy. They will be complementary with actions for digital skills development implemented by Erasmus+ and European Institute on Technology (EIT)[109]. The Coordinated plan on artificial intelligence also has a specific section on skills and education, including a dedicated list of actions.

Notwithstanding the main focus on the Advanced Digital Skills Strategic Objective, the programme will also address the digital transformation of the education sector in line with the strategic priorities of the Digital Education Action Plan 2021-2027, namely the development of high-performing digital education ecosystem and enhancing digital skills and competences for the digital transformation.

The participation is open to all eligible entities as established by Article 18 of the Digital Europe programme, in particular public sector as well as private sector organizations including SMEs, higher education establishments and NGOs.

Indicative budget

The budget for the topics included in this chapter is EUR 166 million[110] distributed as follows:

[109] Calls for proposals will include references to the ongoing actions financed by other EU funds and possible synergies for applicants.

[110] The amounts drawn from the 2022 budget are subject to the availability of the appropriations provided for in the draft budget for 2022 after the adoption of the budget 2022 by the budgetary authority or, if the budget is not adopted, as provided for in the system of provisional twelfths.

- EUR 122 million for to the specialised education and training programmes in key capacity areas;
- EUR 44 million for all other topics under Strategic Objective 4 (upskilling, short term training, digital transformation of education etc.).

4.1 Specialised education programmes in key capacity areas

Objective

The action aims at increasing and improving the offer of education programmes and the number of students specialised in key capacity areas. The offer will be expanded in terms of geographical distribution (including outermost regions and other disadvantaged regions), number of opportunities and relevance to latest technological developments. The actions also aim at supporting more inter-disciplinary courses that can equip professionals with relevant advanced digital skills and increase diversity among students and future digital experts[111]. The action will support cooperation between higher education institutions and the private sector, together with research and excellence centres in digital technologies, including those funded in the other actions of the programme. The goal is to encourage organisations to work together and develop ecosystems of excellence able to train, attract and retain the best digital talents, including by contributing to closing the gender gap in these fields[112],. This action will contribute to the implementation of the Digital Education Action Plan 2021-2027.

Scope

The chosen projects shall design and deliver a tertiary degree education programme of 60, 90 or 120 academic credits (The European Credit Transfer and Accumulation System - ECTS). The calls in the first two years will address the following topics: Data, Internet of Things (IoT), AI, Blockchain, cybersecurity, HPC, quantum, among others and interdisciplinary courses, including the teaching of the above areas in a non-ICT education field (e.g. AI applications for agriculture or cybersecurity and law etc..). Proposals can address only one technological areas, or more, or only one inter-disciplinary programme, with a specific focus on one sector. Tertiary education institutions in consortia with relevant competence and excellence centres and industry will receive funding to set up and strengthen excellent courses in the above areas. Partners in these consortia will be encouraged to share expertise, facilities, staff and learning material Inter-sectorial mobility between Higher Education Institutions and the private sector is also encouraged. These courses need to reflect the latest state of the art of the technologies, provide opportunities to students to have access to laboratories and testing and experimentation facilities and making use-where appropriate- of the EU data spaces. They will also make use of digital technologies to provide learning experiences that are flexible in time, scope end place, as appropriate. Activities to exchange on good practices to involve and interact with external stakeholders will also be encouraged. Particular attention shall be given to aspects such as green application and environmental impact of these technologies. The projects should also aim at increasing diversity among participants to the courses and ensure that experts will be trained to detect and prevent bias in the future developments.

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[111] For example data analytics skills for professionals in different sectors.

[112] latest available data from ESTAT report that women represent only 18.5 % of ICT specialists in the EU, (https://ec.europa.eu/eurostat/statistics-explained/index.php?title=ICT_specialists_in_employment)

The following activities can be eligible for funding, among others:

- partnerships for higher education institution, research/excellence centres in digital technologies and innovative businesses. They will need to be sustainable over time and show a high degree of integration. Actors involved in the partnership will need to define a common education and training agenda that could result not only in an improved offer for students, with clear learning outcomes, but also increase their international attractiveness; adequate measures of quality assurance and quality monitoring, as well as activities leading to mutual learning and exchange of good practices, will be implemented.
- upgrading technical equipment, to ensure that students have access to the latest technologies available in the market and improve facilities, as well as explore innovative ways to use technology in teaching and learning;
- tackling the shortage of teaching staff and providing access to high quality teaching; incentives could be provided for professors, experts and top researchers in digital areas to contribute to the teaching activities;
- providing support to students, via scholarships or fee waivers in order to allow everyone to have access to high-quality education in digital areas and to increase diversity in education and research.

Outcomes and deliverables

Gains from Investment in key capacities can only materialise if there are enough people to design, deploy and use them. At present, all Member States face shortages of digital specialists[113] and the training opportunities in digital areas are missing in the EU, compared to other countries. Specialised courses, such as Master's courses in domains like Artificial Intelligence are not uniformly available in all Member States and concentrated in some regions.[114].

The action will contribute to expand the education offer across Europe, by increasing the number of courses, jointly designed by universities from different Member States and associated countries together with excellence centres and businesses active in the domain. The impact will be twofold: an increase of courses offer all over the EU and the development of dynamic digital ecosystems where academic excellence, research and innovative industries work together to attract and retain the best talents worldwide.

Type of action	Simple grant (50% co-funding rate)
Indicative Budget	EUR 122 million
Indicative time of call opening	First call and third call
Indicative duration of the action	48 months
Indicative budget per Grant (EU contribution)	EUR 5-10 million
Implementation	Executive Agency

[113] https://www.cedefop.europa.eu/files/3075_en.pdf

[114] Righi, R., López-Cobo, M., Alaveras, G., Samoili, S., Cardona, M.., Vázquez-Prada Baillet, M., Ziemba, L.W., and De Prato, G., Academic offer of advanced digital skills in 2019-20. International comparison. Focus on Artificial Intelligence, High Performance Computing, Cybersecurity and Data Science, EUR 30351 EN, Publications Office of the European Union, Luxembourg, 2020, ISBN 978-92-76-21451-9, doi:10.2760/225355, JRC121680.

4.2 Job placements in key capacity areas

Objective

The objective is to help young people to acquire the necessary advanced digital skills needed for the deployment of a specific technology, through a work experience in a competence centre or in a company and attract a diverse audience to careers in digital. This will be not only an opportunity for the trainee to acquire valuable work experience, but also to become proficient and put in practice the advanced digital skills acquired during the studies. This action is in line with the objectives of the Digital Education Action Plan 2021-2027 and more specifically the strategic priority to enhance digital skills and competences for the digital transformation, boosting advanced digital skills among young people.

Scope

The topic will provide people access to training and working experience in the competence centres and companies and being trained on-the-job.

This action 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 for the first two years.

The action will contribute to bridge the gap between education and labour market, providing people across the EU with the opportunity to work in excellence environments, having access to the latest technological developments and valuable know-how. The goal is that the person will be able to deploy technologies in the economy or continue working in the ecosystem of excellence.

Type of action	To be defined by EuroHPC JU Governing Board[115]
Indicative Budget	EUR 10 million
Indicative time of call opening	To be defined by EuroHPC JU Governing Board
Indicative duration of the action	To be defined by EuroHPC Governing Board
Indicative budget per Grant (EU contribution)	To be defined by EuroHPC Governing Board
Implementation	EuroHPC JU

4.3 Advanced digital skills analysis

Objective

The objective of this action is to support the rollout of initiatives for advanced digital skills development, by gathering inputs on the existing education offers in digital areas and the related needs of the labour market.

[115] For the purpose of this Work Programme the amount is factored in as a grant while reserving the discretion of the EuroHPC Governing Board to change the type of action.

Scope

The chosen project shall deliver an analysis of the labour market needs and recommend priority areas for investment and give indication son the most appropriate delivery modes for training. In particular, funding will cover:

- A market analysis on gaps in the education/training offer in selected areas, as well as ways to address them.
- Identifying the potential added value of EU actions in the Digital Europe Programme, compared to what is offered in the market and propose adequate formats and duration of courses.
- Disseminate information about the skills actions funded by this programme in the relevant stakeholder communities.
- Detecting emerging trends in the application of certain technologies and the relative skills needs advising on the interconnection between the Digital Europe Programme skills actions on advanced technologies.

Outcomes and deliverables

A refined knowledge of the market needs related to different digital technologies and insights to design relevant and high-quality learning opportunities, in line with the latest technological development.

Type of action	Coordination and Support Action
Indicative Budget	EUR 2 million
Indicative time of call opening	First call
Indicative duration of the action	18 months
Implementation	Executive Agency

4.4 Short term training courses in key capacity areas

Objective

The aim of this action is to give the possibility to the current workforce to access trainings reflecting the latest developments in key capacity areas, such as HPC, Cybersecurity, AI and other emerging technologies. These technologies evolve at such a fast pace that requires a constant update of the digital skills, also of the people already in employment. This investment will increase the number of men and women able to design, develop and deploy digital solutions in the economy and across sectors.

The project aims at expanding the existing offer for training and retrain existing workforce, with a particular focus that enables to meet the needs of SMEs.

Scope

The selected project shall design the content of these courses will be based on the companies, in particular SMEs needs in certain technologies together and provide the adequate degree of flexibility that is needed for the employees to attend. Training activities can take place at the SME premises, or remotely or at universities/training providers' premises. EDIHs will act as intermediaries between SMEs and

universities/training providers at the local level. Alternatively, if specific EDIHs are not available, then the member state can appoint an intermediary body instead. The use of digital technology to provide learning experiences that are flexible in time, scope end place should be encouraged.

In particular, the action will support the design and delivery of the short-term training courses in advanced technologies for both people already in employment and jobseekers. Particular attention shall be given to aspects such as green application and environmental impact of these technologies. Funding will also cover targeted trainings to develop digital skills in key professions handling sensitive data, such as health and care professionals and managers, as well as the provision of the Crash Courses announced in the SME-strategy.

Funding will be provided to consortia of education and training providers, working together with relevant stakeholders with expertise in the digital area covered.

European Digital Innovation Hubs will have a particular role in disseminating and, when possible, delivering these courses locally.

Adequate measures of quality assurance and quality monitoring, as well as activities leading to mutual learning and exchange of good practices, will be implemented.

Outcomes and deliverables

The EU has a significant and systemic gap between market needs and what is offered in terms of skills related to advanced digital technologies. The European Investment Bank (EIB) reports that the lack of staff with the right skills is the main obstacle to new investment for businesses. In addition, 53% of companies trying to recruit ICT specialists find it difficult. When looking at the digital skills of the current workforce, only 65% has digital skills which are “above basic”. This contributes to refrain from the uptake of advanced digital technologies. The action aims at increasing the training offer, responding to the needs of both people in the workforce and job seekers who need to upskill.

Type of action	SME support grant (75% co-funding rate for SMEs and 50% for all the other beneficiaries)
Indicative Budget	EUR 25 million
Indicative time of call opening	Second call
Indicative duration of the action	36 months
Indicative budget per Grant (EU contribution)	EUR 2-3 million
Implementation	Executive Agency

4.5 Digital Skills and Jobs Platform

Objective

The objective is to consolidate the Platform and the activities started under CEF Telecom, by further deploying smart functionalities of the single point of access and enabling collaboration among National Coalitions.

Scope

The project selected will populate and maintain the website in line with EU priorities and showcasing all opportunities available for digital skills development from different sources. It will also support creative suggestions from the National Coalitions to make the Platform grow and deliver new services; will support the growth and increase the impact of the Digital Skills and Jobs Coalition.

The funding will facilitate the access to information and resources about digital skills and jobs in Europe for all type of users in a unique spot. Services cover digital skills training offers/traineeship, good practices, skills intelligence/data, skills strategies, training resources, funding opportunities, news, and events. The strategic evolutions of the platform foresees the progressive addition of smart functionalities, based on user profiles, interoperable with external databases.

Outcomes and deliverables

The action will allow to overcome fragmentation and providing a single entry point for training in digital skills. This would help citizens, workers and businesses navigate through the wide offer of trainings, at different levels and in different areas, as well as having access to funding opportunities and national initiatives.

Type of action	Procurement
Indicative Budget	EUR 4 million
Indicative year of procurement	2022
Indicative duration of the action	24 months
Implementation	Executive Agency

4.6 Promoting European innovation in education

Objective

This action will support the digital transformation of the education sector at European level by boosting innovation in education in Europe by supporting EdTech start-ups and SMEs to accelerate their disruptive EdTech solutions. The project will support the strategic priority of the Digital Education Action Plan 2021-2027 and in full synergy with, and complementarity to, the objective of setting up a European Digital Education Hub and in line with the European Education Area framework.

Scope

The selected project will:

- Host a pan-European network to promote European excellence in educational innovation by bringing together European EdTech start-ups/SMEs, with other relevant actors such as technology providers, industry associations and investors, policy makers and ministries, schools, teachers, universities, research organisations, experts and NGOs, and linking this network to other existing pan-European networks/fora.
- Support cooperation between EdTech start-ups/SMEs and other stakeholders of a maximum number of Member States and Associated countries to exchange best practises, analyse successful

applications of digital technologies and potential market uptake, explore lessons learned during and after the Covid-19 crisis. This should be done in close cooperation with the development of the European Education Area.

- Support EdTech companies with business and educational mentoring and training services and by gaining insights and understanding market trends and needs by collecting comprehensive and high-value up-to-date data to better understand the EdTech start-ups/SMEs landscape in Europe.
- Develop guidelines aiming at fostering a wider European EdTech industry for the development of digital education content, solutions and tools, in light of technological needs (connectivity, platforms, interoperability, standardisation, security and privacy issues, use of emerging technologies such as AI or data) as well as pedagogical, societal and ethical aspects, based on relevant scientific evidence and in consultation with European Education area stakeholders.
- Propose a roadmap towards a European EdTech ecosystem promoting European excellence in educational innovation, including how local, regional, national and European efforts can be combined.

Outcomes and deliverables

The project will support closer collaboration in the digital education sector in Europe amongst European EdTech start-ups/SMEs and other relevant stakeholders and across Europe. It will foster the exchange of good practices at pan-European level, aiming at increased capacities of the national education systems and at distance, innovative, effective and inclusive learning. It will also foster increased opportunities for the European EdTech industry, while promoting European ethical values regarding the use of educational technologies and data shared in Europe. It will contribute to increasing synergies and complementarity between initiatives in digital education, in particular in view of the Erasmus programme and Horizon Europe. It will also help the education sector to be better prepared for possible future crisis such as additional lock-downs to due to the Covid-19 pandemic.

Type of action	Coordination and Support Action
Indicative Budget	EUR 3 million
Indicative time of call opening	Second call
Indicative duration of the action	36 months
Implementation	European Commission

5 Accelerating best use of technologies

The roll-out and best use of digital capacities will focus on priority areas such as the support to the Green Deal, to SMEs and public authorities in their digital transformation and will also provide resources to those activities started in previous programmes, for which the continuations of funding is essential not to disrupt the services provided.

In the first two years of implementation, the activities will be organised around five main strands:

- Deployment of a digital, multi-dimensional replica of the Earth (system), enabling different user groups to interact with vast amounts of natural and socio-economic information (Destination Earth) as well as other initiatives in support of the Green Deal data space.
- The deployment and enhancement of the European Blockchain Services Infrastructure (EBSI) set up in the context of CEF Telecommunications Programme (2014-2020), deployment of use cases as well as a regulatory sandbox for Blockchain standardization.
- The set up and enhancement of a European Digital Government EcoSystem for the digital transformation of public administrations building on projects funded through CEF Telecommunications Programme (2014-2020) and ISA2 Programme (2014-2020). This will be achieved by providing Member States and Associated Countries with a platform of common services for public administrations, by deploying an EU electronic identity system, by supporting the rollout of the 'once-only' principle in line with the Single Digital Gateway Regulation, and by deploying an interoperability incubator fostering the deployment of new digital services.
- Support will also be provided for the digitalization European judicial system and consumer protection, health and care and for piloting AI based law enforcement digital solutions.
- Building trust in the digital transformation by supporting the sustainability of the Better Internet for Kids (BIK) strategy[116] and the European Digital Media Observatory deployed through the CEF Telecommunications programme (2014-2020).

Participation is open to all eligible entities as established by Article 18 of the Digital Europe programme, in particular public sector as well as private sector organisations, including SMEs, NGOs and international organisations.

Indicative budget

The budget for the topics included in this chapter is EUR 419.65 million[117] distributed as follows:

- EUR 155 million for topics in support of the Green Deal, such as the Destination Earth initiative including Digital Twins and other support actions;

116 Communication COM(2012) 196 of 2.5.2012 from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on 'European Strategy for a Better Internet for Children' (BIK strategy)

117 The amounts drawn from the 2022 budget are subject to the availability of the appropriations provided for in the draft budget for 2022 after the adoption of the budget 2022 by the budgetary authority or, if the budget is not adopted, as provided for in the system of provisional twelfths.

- EUR 38 million for topics deploying Blockchain;
- EUR 158.15 million for actions implementing, maintaining and operating the European Digital Government Eco System (EDGES);
- EUR 28 million for actions with additional support for public services in specific policy areas (i.e. judiciary and consumer protection, health and security);
- EUR 40.5 million for actions to enhance confidence in the Digital Transformation.

5.1 Initiatives in support to the European Green Deal

ICT has a crucial role to play in fulfilling the goals of the European Green Deal[118]. Recognising the transversal role played by digital technologies to achieve the EU's climate objectives, a set of initiatives have been identified to start tackling the challenges ahead. One will start in full within the first period (i.e. Destination Earth), while the three Coordination and support actions will prepare the ground for larger-scale deployments in the next phases (e.g. Digital Products Passport). Additional topics in this Work Programme are also contributing to the Green Deal objectives (see section 2).

5.1.1 Digital Twins and Destination Earth Initiative (DestinE)

The objective of Destination Earth initiative (DestinE) is to develop a very high precision digital model of the Earth to monitor and simulate natural and human activity, and to develop and test scenarios for more sustainable development and for achieving both the green (Green Deal) and digital (Digital Strategy) priorities of the EU. DestinE will be implemented gradually over the next 7 years. The activities under the Work Programme 2021-2022 will focus on the deployment of the core service platform, the data lake and the first two digital twins that will be integrated to the platform. The system will be further developed by additional digital twins, services and data, provided through the platform and the data lake, and the full digital twin of the Earth will be completed towards 2027-2030.

DestinE is initially aimed at professional public sector users, but it will evolve later to encompass a wider user base from scientific communities and private sector. Additional linked research funding will be available from Horizon Europe Programme. Synergies will be created with the Copernicus programme and its relevant resources, in particular regarding the data lake.

The two topics below are implemented in indirect management.

5.1.1.1 Destination Earth - Core Service Platform and Data Lake

Objective

The main objective of the action is to build an open and secure cloud-based core service platform that will provide public authorities and other users with an integrated toolset for evidence-based policy- and decision-making in order to better understand and tackle environmental challenges, for example, predict and manage environmental disasters or adapt to the climate change.

The platform, together with the data lake, will federate the use of Earth system simulation and observation data, other environmental data and socio-economic information for predicting and managing the impact of environmental challenges on European, national and regional levels. It will integrate an increasing number of

[118] COM(2019) 640 final

digital twins, as they become gradually available via related EU and national efforts, and key digital technologies, such as cloud-based supercomputing and AI, for providing extreme-scale modelling, simulation and prediction capabilities to users, allowing them to customise the platform, integrate their own data and develop their own applications.

Scope

Deliver a user-friendly core service platform and data lake providing a large number of - initially - public sector users, with evidence-based policy and decision-making tools, applications and services, based on an open, flexible, scalable, evolvable and secure cloud-based architecture. The design of the core platform will provide a fully interactive user environment and it will take into account the respective EU rules and guidelines on web accessibility.

The platform should follow an infrastructure-as-a-service (IaaS) approach and take advantage of existing and future High Performance Computing (HPC), storage and connectivity capacities. Existing key infrastructures in Europe will be enhanced and combined with new components for optimal efficiency and effectiveness. In parallel, the architectural and technical requirements of the digital twins will be incorporated into the overall system design of the core platform to ensure their effective integration.

Main features and characteristics:

- Federation of existing and future data infrastructures under an IaaS model, building a self-standing data lake, ensuring scalable on-demand processing capacity;
- Efficient compute-intensive workflow management, (federated) identity and access management, data access and sharing policies, quality of service (QoS) and optimisation management, respective audit trailing services and the application of state-of-the-art cybersecurity and ethical standards compliant policies and measures;
- User-driven service provisioning through (a) platform-as-a-service (PaaS) for access to resources for application and service development and to create users' own work environments and adding data, and (b) software-as-a-service (SaaS) for "consuming" the functionalities of the digital twins as dedicated services through well-defined interfaces and APIs, with a potential evolution into a digital-twin-as-a-service (DTaaS). In both PaaS and SaaS service provisioning approaches, graphic user interfaces (GUIs) of high usability and user-friendly tools should be provided, abstracting away the implementation details of the interfaces from the users while complying with their needs.

A first fully functioning core service platform should be available within maximum 30 months from the starting date of the action.

The main roles of each implementing entity include:

- ESA: The core developer, system integrator and operator of the core service platform, responsible for providing programmatic framework; design, implementation, integration of the platform with dedicated data infrastructure, supercomputing Infrastructure elements, digital twins and other enabling digital technologies; management of large industrial procurements, implementation of the "AI-everywhere" approach. It will coordinate the inputs from other implementing entities as described in the Joint Work Plan annexed to the Contribution Agreements.
- ECMWF: horizontal software layers enabling Earth-system modelling and data assimilation, digital twins and supporting digital technologies; extreme-scale computing and data handling; HPC and big-

data hardware infrastructures; tools and datasets for AI, federated cloud computing and data management; support interfaces;

- EUMETSAT: end-to-end development, implementation and operation of the DestinE Data Lake and dedicated Data Infrastructure, provision of high value data sets and data tailoring services; technical expertise in design, implementation and operation of state of the art cloud and data federations.

Outcomes and deliverables

- New, easily accessible and manageable software infrastructure linking models and data, and enabling scenario-driven risk assessments, adaptation and mitigation strategy development and testing via interactive workflow management and cloud-based services linked to the digital twins for evidence-based policy development;
- Operationalisation of the users' service through exploiting the data and computing capabilities made available through the core enabling platform;
- Digital core service cloud-based infrastructure built on essential digital technologies exploiting at the convergence of novel HPC capacities available in Europe, Earth observation data and Earth-system simulation models and data, and artificial intelligence methodologies.

Type of action	Contribution Agreements
Indicative Budget	EUR 90 million
Indicative year	2021
Indicative duration of the action	30 months
Implementation	Indirect management with ESA, ECMWF, EUMETSAT[119]
EU strategic autonomy	Participation restricted on the basis of art 18.4 of the Digital Europe Programme Regulation to Member States and Associated Countries.

5.1.1.2 Destination Earth - Digital Twins

Objectives

The objective of DestinE digital twins is to provide access to highly efficient and attractive knowledge discovery/organisation systems that deliver very high-precision and accurate modelling, simulation and prediction of environmental phenomena, supported by the Destination Earth core service platform. Digital twins - digital replicas of various aspects of the Earth system, such as weather and climate variability and related long-term changes, food and water security, biodiversity and ecosystem dynamics, or global ocean

119 Indirect management through Contribution Agreements with three global leaders in world-class Earth Observation systems, Earth-system modelling and data assimilation, data and services provision: 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). Through a joint work plan set out in the contribution agreements they will procure widely in the European market for the necessary components and technologies, complementing their existing capabilities.

circulation and the biogeochemistry and ecology of the oceans – will give users access to a whole range of natural and socio-economic information, services, models, scenarios, simulations, forecasts, and visualisations.

Scope

Two operational Digital Twins will be constructed and fully integrated in the Destination Earth core service platform from clusters of pre-defined and mature use cases related to EU's Green Deal policy priorities. They will provide functionalities of outstanding scientific and technical quality and link to added-value services. The same set of quality, maturity and dependability metrics apply for both digital twins:

1) Digital Twin on Weather-induced and Geophysical Extremes will provide capabilities and services for the assessment and prediction of environmental extremes at very high spatial resolution and close to real-time decision-making support at continental, country, coastline, river catchment areas and city scales in response to meteorological, hydrological and air quality extremes. The aim is to have simulations indistinguishable from observations at km-scale. The system aims to combine weather, hydrology and air-quality observation and simulation capabilities at levels that represents a real breakthrough in terms of accuracy, local detail, access-to-information speed and interactivity. In addition to weather-induced extremes, geophysical extremes (for example earthquakes and tsunamis, volcanic eruptions, geomagnetic storms) will be added.

2) Digital Twin on Climate Change Adaptation will be connected to the first digital twin and will provide capabilities and services in support of climate adaptation policies and mitigation scenario testing at decadal timescales aiming at a real breakthrough at the level of reliability at local, regional and national levels. Accurate monitoring of the changes over the past decades (through the entirety of historical Earth observation data) combined with advanced Earth-system modelling will form the basis for understanding the causes and explaining the feedback mechanisms of change, predicting possible evolution trajectories and identifying irreversible tipping points, in particular in highly sensitive regions such as the Arctic. The inclusion of socio-economic feedback (i.e. the extension from mapping of environmental pressures to full assessment of the vulnerabilities of people, ecosystems and assets) will allow leveraging the societal influence, which also extends to mitigation measures such as carbon capture and storage. Artificial Intelligence techniques will provide the means to fully exploit the vast amounts of data collected and simulated over decades and understand the complex interactions of processes between Earth system and human space (i.e. full impact assessment). As a starting point, this digital twin will focus on 1-2 clearly defined topics in relation to climate emergencies and related disasters, quantifying the impacts of adaptation options and enabling monitoring / early warning. Possible topics can include food security (global food baskets) and impact on living and water resources. Earth-system simulation/data fusion capability similar to the first digital twin is required also for this digital twin so that the common software and hardware infrastructure developments can benefit from economies of scale.

Both digital twins will be operational within 30 months, linked to data providers for continuous operation and to modelling institutions for continuous improvement through the Destination Earth core service platform and made available, in the first instance, for users in the public sector. From the outset, both digital twins should be global in their scope, add regional downscaling options and use similar simulation and data fusion methodologies. Rigorous handling of quality and confidence information will be secured, among others through machine learning, consistent mapping of the maturity of models and data, resulting in overall

metrics on the actionability of the predictions for expert and non-expert type of end-users, including policy services and the general public.

ECMWF leads the Digital Twin development. The Digital Twin on Climate Change Adaptation will build on the Digital Twin on Weather-induced and Geophysical Extremes.

Outcomes and deliverables

- Two fully operational digital twins, fully integrated and operating as part of the core service platform, providing the EU with a real breakthrough in the level of prediction capability, accuracy and accountability of corresponding crisis management tools to significantly contribute to the EU's ability to anticipate and make decisions in natural disaster and climate-related domains and help address crisis situations related to weather, natural disasters and other hazards;
- New AI-based methodologies to extract application sector specific information from exascale data volumes;
- New observation and simulation capability embracing the entire digital loop from smart sensors, IoT, big data, data analytics and cognitive computing, HPC and cloud computing, to intelligent physical systems in socio-economic impact sectors.

Type of action	Contribution Agreements
Indicative Budget	EUR 60 million
Indicative year	2021
Indicative duration of the action	30 months
Implementation	Indirect management with ESA, ECMWF, EUMETSAT [120]
EU strategic autonomy	Participation restricted on the basis of art 18.4 of the Digital Europe Programme Regulation to Member States and Associated Countries.

5.1.2 Governance of the Living-in.eu community

Objective

The aim is to support the governance of the Living-in.eu[121] community by coordinating the broad range of activities and stakeholders with various expertise (legal, financial, technical, education and capacity building, impact measuring).

Scope

The project should define the processes of interaction and decision-making among the actors involved in the Living-in.eu community. The activities should comprise:

[120] Indirect management through Contribution Agreements with three global leaders in world-class Earth Observation systems, Earth-system modelling and data assimilation, data and services provision: 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). Through a joint work plan set out in the contribution agreements they will procure widely in the European market for the necessary components and technologies, complementing their existing capabilities.

[121] https://www.living-in.eu/

- Co-creation of the processes, actors, roles, rights, associated timeframes of the various sub-groups and to ensure the development and scaling up of digital smart and green solutions by the community;
- Running the coordination of all activities, including, but not limited to, community building and management, on boarding of new members, communication and exploitation of results, in the context of the Living-in.eu movement for the benefit of all the parties;
- Monitoring and supporting the relevant actions undertaken by the community that contribute to the establishment of interoperable digital platforms in cities and communities and measuring their impact to achieve their smart and sustainability goals.
- Organise the supply side around a joint vision compatible with Living-in.EU principles for the provision of Local Digital Twins solutions in Europe.

The action is encouraged to cooperate and promote synergies with the data space for smart communities (see section 2.2.1.2), EDGES (see section 5.3.1), the AI TEF for smart communities (see topic 2.3.2.4), the New European Bauhaus initiative[122], those Horizon Europe missions that work with communities and cities as key implementing partners (e.g. Mission on Climate Neutral and Smart Cities and Mission on Adaptation to Climate Change), the Zero Pollution Stakeholder Platform, and other relevant EU initiatives.

Outcomes and deliverables

- A well-managed and living community of Living-in.eu stakeholders (including a growing number of signatories).
- Creation of a Community Management Toolkit that enables the management and fosters the growth of the community in a sustainable manner, in collaboration with the EU data space for smart communities (see section 2.2.1.2) and taking into account the European Data Spaces Technical Framework developed by the Data Spaces Support Centre (see topic 2.2.2.1).
- Increased uptake of cross-domain interoperable digital solutions, including local data platforms, and AI-powered local digital twins across EU cities and communities for improved service delivery and to address societal challenges, in particular the objectives of the European Green Deal objectives and the Zero Pollution Action Plan.[123]
- Close collaboration with EU initiatives such as the New European Bauhaus initiative, the Mission on Climate Neutral and Smart Cities and Mission on Adaptation to Climate Change, and others as relevant, in order to promote synergies and alignment with the Living-in.eu principles.

Type of action	Coordination and Support Action
Indicative Budget	EUR 2 million
Indicative time of call opening	First call
Indicative duration of the action	48 months

[122] https://europa.eu/new-european-bauhaus/index_en

[123] COM(2021) 400

Indicative budget per Grant (EU contribution)	EUR 2 million
Implementation	European Commission

5.1.3 Digital Product Passport: sustainable and circular systems

Objective

The Sustainable Products Initiative foreseen in the new Circular Economy Action Plan[124] (CEAP) should establish a Digital Product Passport (DPP) that gathers data on a product and its value chain. The objective of the DPP is to support sustainable production, to enable the transition to circular economy, to provide new business opportunities to economic actors, to support consumers in making sustainable choices and to allow authorities to verify compliance with legal obligations.

The objective of this Coordination and Support Action as is to prepare the ground for a gradual deployment as of 2023 of digital product passport in minimum 3 key value chains: electronics (at least consumer electronics), batteries as defined in and considered in the proposal for a Regulation on batteries[125]and at least another one of the key value chains identified in CEAP. [126]

Scope

Specific contribution is expected on identifying the key DPP data in consultation with private and public stakeholders, as well as establishing protocols for secure and tailored access for relevant stakeholders. The work will also contribute to the development of standardized and open digital solutions for identification, tracking, mapping and sharing of product information along its life-cycle ensuring interoperability across borders and a well-functioning EU Internal Market.

Particular emphasis should be given to balanced and inclusive engagement of all relevant stakeholders throughout the value chain and to optimal use of digital technologies such as Artificial Intelligence, Internet of Things and blockchain.

Deliverables should include a roadmap with milestones for a gradual deployment of DPP and delivery of DPP prototypes in electronics, batteries and another one or more key value chains of the CEAP, based on analysis of existing and upcoming legislation, existing standards, past and ongoing activities related to dataspaces and product passport in these sectors. While different product groups will have different information requirements, a common data set to enable cross-sectoral use, interoperable and consistent standards, systems and classifications should also be proposed. The business model to ensure the continuity of the product passport development and use has to be addressed.

This CSA will support the establishment of an interoperable data space building on and linking to manufacturing dataspaces (see section 2.2.1.4) and other available and relevant data sources. The awarded consortium will work in partnership with the Data Spaces Support Centre (see topic 2.2.2.1) in order to

[124] Circular Economy Action Plan (CEAP), COM(2020) 98 final

[125] Proposal for a Regulation of the European Parliament and of the Council concerning batteries and waste batteries, COM(2020) 798/3, https://ec.europa.eu/environment/pdf/waste/batteries/Proposal_for_a_Regulation_on_batteries_and_waste_batteries.pdf

[126] "Priority will be given to addressing product groups identified in the context of the value chains featuring in this Action Plan, such as electronics, ICT and textiles but also furniture and high impact intermediary products such as steel, cement and chemicals." (CEAP)

ensure alignment with the Smart Middleware Platform developed under topic 2.1.1 and actions in the context of section 2.2.1 of this Work Programme, and in particular:

- the data space reference architecture, building blocks and common toolboxes to be used;
- the common standards, including semantic standards and interoperability protocols, both domain-specific and crosscutting;
- The data governance models, business models and strategies for running data spaces.

Outcomes and deliverables

Delivery of at least 3 digital product passport prototypes, one in each of the 3 key value chains mentioned above, including agreement on data and system architectures. The work will support the goals of the Green Deal and in particular Circular Economy Action Plan's Sustainable Product Initiative, the EU Digital strategy's Circular Electronics Initiative and the EU Data strategy by improving product sustainability, boosting material and energy efficiency, enabling new business models and circular value extraction based on data sharing.

The work should also contribute to enhanced concertation of stakeholders, provision of a roadmap for open and standardised approaches for viable use of product passport based on digital innovations that is beneficial in terms of environmental sustainability and circular business opportunities. The results are also expected to support the EU Single Market providing consistent information about products, across the value chain and borders, to business, customers and authorities.

Type of action	Coordination and Support Action
Indicative Budget	EUR 2 million
Indicative time of call opening	First call
Indicative duration of the action	24 months
Indicative budget per Grant (EU contribution)	EUR 2 million
Implementation	Executive Agency

5.1.4 Digital solutions in support of the New European Bauhaus initiative

Objective

The project will identify digital solutions that could contribute to the implementation of the New European Bauhaus initiative and more broadly of the adoption of its values (sustainability, inclusiveness, and aesthetics) in living spaces for a better quality of life. This action will support better coordination of relevant New European Bauhaus stakeholders and digital stakeholders through the creation of a network to this purpose. The project will further accelerate the deployment of projects implementing the New European Bauhaus initiative, and identify best practices in relevant EU funded digital projects.

Scope

The Coordination and Support action will have three main work strands:

- Map relevant projects, policies, strategies and funding instruments supporting the uptake of digital solutions and services relevant for the implementation of the New European Bauhaus initiative.

Particular focus will be set on identifying and disseminating projects and outcomes supported by programmes such as Horizon 2020, CEF Telecom, Creative Europe, Structural Funds projects, etc. in particular by exploring specific use cases. The mapping will also refer to the use of the necessary data and information resources to be shared in the context of the data spaces in section 2.1 of this Work Programme.

- Creation of a pan-European network to promote European excellence in New European Bauhaus - related innovation by bringing together designers, architects, artists, managers, business actors including start-ups/SMEs in particular from the building, mobility and health sector, with other relevant actors such as technology providers, industry associations and investors, policymakers, experts and NGOs, and linking this network to other existing pan-European networks. The network will host a series of workshops, meetings and events building on the mapping referred to in the first work strand for a better coordination of their activities towards the achievement of the New European Bauhaus targets. The action will also identify and support cooperation activities between the New European Bauhaus communities to exchange best practises, analyse successful applications of digital technologies and potential market uptake of digital solutions in support of the initiative.
- Stimulate mutual learning and transfer of innovative practices between regions and Member States, with a view to encourage large scale deployment of digital solutions and services that are critical for the development of New European Bauhaus projects, facilitate benchmarking, impact assessment and knowledge sharing between stakeholders. In this endeavour, focus will be on giving valuable input for the future deployment of New European Bauhaus projects making use of European key digital capacities. To this purpose, the consortia will collaborate with the specific Digital Innovation Hubs (deployed in the context of the Digital Europe Programme) whose activities are relevant for the implementation of the New European Bauhaus initiative.

Outcomes and deliverables

A map of the European framework for the ecosystem of digital solutions and services relevant for projects implementing New European Bauhaus initiative, covering technological and organisational innovation and addressing the needs of the involved stakeholders, and including those of SMEs and start-ups.

Creation of a network that facilitates interactions between digital and New European Bauhaus stakeholders. The network will organise at least five workshops and meetings with a representative sample of New European Bauhaus stakeholders, digital stakeholders as well as representatives from projects identified in the first work strand of the action. The workshops, meetings and events will foster the exchange of good practices at pan-European level and identify how the digital transformation can contribute to the implementation of the new European Bauhaus initiative.

Type of action	Coordination and Support Action
Indicative Budget	EUR 1 million
Indicative time of call opening	First call
Indicative duration of the action	24 months
Implementation	European Commission

5.2 European Blockchain Services Infrastructure (EBSI) and Regulatory Sandbox

The European Blockchain Services Infrastructure (EBSI)[127] will accelerate the uptake of blockchain in Europe, in connection with other technologies. Publicly driven, it will deploy a distributed network of nodes all across Europe and will integrate solutions to improve services to citizens, organizations and public authorities. It will support cooperation with private actors and other blockchain initiatives and build capacities to reinforce the European blockchain ecosystem.

EBSI will have various work strands:

- The European Blockchain Partnership (EBP) and EBSI governance, including support for cooperation, specific actions and communication activities; addressing legal & liability aspects and the iterative actions concerning the development, deployment, operations and maintenance of EBSI;
- EBP priority use cases: every year the EBP selects a set of new cross border use cases to be developed and operated on top of EBSI;
- EBSI exploitation and cooperation with businesses and the public sector: This will support the development, integration and implementation of international, national and local applications running on EBSI by public authorities in Member States; stimulate the exploitation of EBSI by SMEs all across Europe; support specific cooperation with business projects. The implementation of the European Digital Identity Framework (see topic 5.3.1.2) will contribute to the implementation of EBSI use cases dealing with digital identity and credentials.
- EU regulatory sandbox activities: To be implemented with the support of EBP, this aims to provide more legal certainty to European start-ups and market players that innovate with blockchain based solutions. This includes blockchain related sandbox activities jointly set-up by Member States to test innovative solutions in a controlled and secure environment to improve the functionality, protection of personal data, security and interoperability of solutionsand inform future updates of technical references and legal requirements.

For all work strands, the Commission actively encourages proposers to use or promote open source solutions and to use Innovation Radar[128] intelligence when developing activities that reinforce Blockchain ecosystems.

5.2.1 EBSI and sandbox – Core activities

Objective

The objective is to support common actions for developing, deploying and implementing EBSI as well as other common actions such as the Regulatory Sandbox.

Scope

The funded activities will cover:

(i) The EBP and EBSI governance

[127] https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/EBSI

[128] https://www.innoradar.eu

- EBSI governance: This is provided through the Policy, Technical and other ad-hoc groups of the EBP working with the Commission. In relation to governance, activities will also address support to cooperation with other initiatives (e.g., in the context of international cooperation, of cooperation with INATBA[129], or other relevant initiatives);
- EBSI support services: These will include support to the uptake and operation of EBSI (including helpdesk type activities); support to standardisation activities; communication actions; support to acceptance and uptake by stakeholders and end users; and support to any other specific actions like ethics or economic aspects that are related to EBSI development and implementation;
- EBSI Legal & Liability assessment and facilities: This will support the provision of services to ensure that EBSI and its applications are designed and implemented in full compliance with the EU regulatory framework; and that liability aspects are clarified when exploiting EBSI. This work will be done in synergies with the EU regulatory sandbox activities; and
- Development and deployment of additional capacities, with higher performances, meeting high standards in terms of security, privacy and data protection, interoperability and sustainability.

(ii) EBSI cross border use cases are selected annually by the EBP. There are priority projects for EBSI, requiring coordination between all Member States and EC, with specific development and deployment activities. These use cases will exploit existing and future capacities of EBSI and they will be supported in combination with activities addressed under the above point (i).

(iii) The Regulatory sandbox at EU level (under the auspices of the EBP) aims to clarify the legal framework and provide for legal certainty to solution providers, in particular for start-ups and SMEs. It will facilitate cooperation between EU and national regulators and experts, with the view to develop harmonised interpretation of regulations with flexibility to allow for innovation. It will be implemented through a platform regrouping regulatory authorities and experts to advise the companies and projects. It will collect best practices and support the assessment of legal, as well as business, obstacles that arise in deploying such solutions.

Outcomes and deliverables

EBSI will reach a level of performances, of robustness and of security that will position it as (being amongst) the most advanced blockchain infrastructure for public services in the world.

EBSI will be enriched with additional network capacities to support additional use cases that will be exploited by public authorities in all Member States, as well as by organisations and citizens as end users. Some of those use cases, may concern millions of potential individual users all across Europe.

The joint work between EC and Member States for clarifying EBSI legal and liability aspects will serve as trail-blazer for other blockchain projects in Europe.

A regulatory sandbox at EU level will be established and operational as the main reference body for clarifying legal issues related to blockchain and EBSI implementation. It will support tens of start-ups per year.

[129] International Association for Trusted Blockchain Association (https://inatba.org/)

Type of action	Procurement
Indicative Budget	EUR 22 million
Indicative year of procurement	2021 and 2022
Indicative duration of the action	12 to 36 months
Implementation	European Commission and Executive Agency

5.2.2 EBSI– Deployment of services

Objective

The objective is to support through grants actions that reinforce the EBSI infrastructure and the EBP use cases. This will engage a large range of European actors in actions related to EBSI and EBP priorities.

Actions contributing to the European Digital Identity framework leveraging the work of the EBSI's European Self Sovereign Identity Framework (eSSIF) will be supported under the topic 5.3.1.2.

Scope

This part concern all the EBSI actions for 2021-22, that are implemented through call for proposals. It will support the roll out of the EBSI by contributing to the deployment of nodes in all Member States enhancing the performance and robustness of EBSI, and to the implementation of local support services (help desk, information and training activities for local authorities, citizens etc.). It will support as well as the deployment of the cross-border use cases already selected by EBP.

Outcomes and deliverables

EBSI is already developing 7 use cases in cooperation with Member States and other Commission Services where significant resources have been invested and will need continued support until deployment for business continuity reasons. EBSI will support these cross border services and applications leveraging the EBP priorities. .

It will reinforce the catalytic role of EBSI for providing better services to citizens and opportunities for businesses.

Type of action	Simple grant (50% co-funding rate)
Indicative Budget	EUR 15 million
Indicative time of call opening	Second call
Indicative duration of the action	18-24 months
Indicative budget per Grant (EU contribution)	EUR 0.5 to 3 million
Implementation	Executive Agency

5.2.3 Blockchain standardisation

Objective

The objective is to reinforce the European presence in blockchain standardisation efforts.

Scope

Support to blockchain standardisation in line with the Rolling Plan for ICT Standardisation, reinforcing the presence of European players and the links with EBP initiatives such as EBSI and the sandbox, in standardisation activities undertaken by International and European Standardisation Bodies, such as the International Organization for Standardization (ISO), the International Telecommunication Union (ITU), the European Committee for Standardization and the European Committee for Electro technical Standardization (CEN/CENELEC), the European Telecommunications Standards Institute (ETSI) and other relevant, as well as liaising with and contributing to activities of the International Association for Trusted Blockchain Applications (INATBA).

Outcomes and deliverables

Strengthened presence of European players and EBSI in activities of International and European blockchain standardisation, implementing the Rolling Plan for ICT Standardisation.

Type of action	Coordination and Support Action
Indicative Budget	EUR 1 million
Indicative time of call opening	Second call
Indicative duration of the action	24 months
Indicative budget per Grant (EU contribution)	EUR 1 million
Implementation	Executive Agency

5.3 Deployment of Public Services

Support will also be provided for the digitalization of government and public administrations, piloting of AI applications in law enforcement domain, as well as the digital transformation of justice, health and consumer protection.

5.3.1 European Digital Government EcoSystem (EDGES)

The digital transformation of public administrations will enable their interoperability, will improve the service delivery and smart enforcement of rules, the convenience of services for European businesses and citizens and the accessibility of public data cross-border and across sectors. These actions will reduce digital administrative barriers to the free movement of goods, services, people and capital, support seamless and secure data flows, trust in online services through improved Digital Identity, and the digitalisation of economy and society. It will accelerate the digital transformation of public administrations across Europe and help upskill them. It will facilitate interoperability as a core enabler of Europe's digital autonomy,

and foster the uptake of interoperable cross-border and cross-sector public services in alignment with regulatory requirements.

The topics below will focus on five main work strands:

- The Common Services Platform (see topic 5.3.1.1) is the one stop shop for mature solutions serving digital government, providing frequently needed capabilities and services as of the shelf solutions, reducing implementation time in Member States and associated countries;
- The support for the to the implementation of the European Digital Identity Framework (see topic 5.3.1.2) universally available, and that can be widely used and protects personal data as called for by the Council Conclusions of 2 October 2020, as well as the implementation of the Once Only System under the Single Digital Gateway Regulation[130].
- The Interoperability Knowledge and Support Center (see topic 5.3.1.3) provides further support to Member States and associated countries in the implementation and evolution of EIF and the future interoperability strategy; develops and experiments with interoperability solutions and promotes digital innovation and interoperability across the EU Public Service;
- GovTech Incubator (see topic 5.3.1.4) provides a framework for collaboration between Commission and Member States and associated countries to experiment with selected use cases;
- The Trans-European Services for Telematics between Administrations – TESTA (see topic 5.3.1.5) will continue to provide European Public Administrations with a secure backbone network.

5.3.1.1 Common Services Platform

Objective

Interoperable solutions deployed in support to Digital Government need to be adapted to the changed legal, organisational and technological challenges[131]. The platform will make available a collection of mature services, in support of European cross border digital government. In particular, the platform will:

- Provide trusted data exchange mechanisms, semantic interoperability and multilingual, cross-border and cross-sector public services.
- Provide support for a harmonised architecture for interoperable public services.
- Assess and test interoperability of digital public services.
- Provide necessary functionality to support priority policy areas (currently Public Procurement, Application of EU Law and Competition Policy).
- Equip European Public administrations with cross-sector reusable tools.
- Support the capacity building of Language Technologies by European public sectors and its deployment in European public and private sectors, NGOs and academia.

[130] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2018.295.01.0001.01.ENG&toc=OJ:L:2018:295:TOC

[131] such as the combined use of several services in Digital Government applications, the shift of technological solutions to the cloud, the emerging need to provide government services on a mobile platform, upcoming obligations for algorithmic transparency, multilingualism, enhanced data protection or compliance with green computing standards.

- Support a harmonised monitoring, evaluation, communication and governance framework for services offered by the platform.
- Support the deployment of free, interoperable and international standards-based solutions for reusing data.

Scope

The platform will enable the broader uptake and use of the Common Services and frameworks, providing the following layers of support:

- Artefacts (i.e. standards, specifications, profiles, frameworks and guidelines) underpinning the services deployed through the platform;
- Sample software including evolutive maintenance, conformance and connectivity testing and operation of central components for common utilisation;
- Support to enhance customer experience (including stakeholder management and promotion).

The funded activities will cover the integration of selected cross border interoperable digital services deployed under the CEF Telecom programme[132] and selected actions and solutions deployed under ISA[2] programme[133]. In response to emerging needs, new features will be added to existing services.[134]

The platform will be prepared to accommodate new components deployed in the context of the Once-Only Principle implementation for the Single Digital Gateway and an EU-wide framework for secure public electronic identification (e-ID) as called for by the Council Conclusions of 2 October 2020 (see topic 5.3.1.2), as well as other solutions developed under the Knowledge and Support Centre (see topic 5.3.1.3) and the GovTech Incubator (see topic 5.3.1.4).

The support will also target the development of a reference architecture for the European Digital Government Eco System combining the solutions offered through the Common Services Platform and reusing the European Interoperability Reference Architecture (EIRA) in cooperation with Member States and associated countries.

The action will also cover outreach to all stakeholder communities among public and private sector organisations, European and International standardisation bodies as well as international partners. It will assist EDIHs to provide support services to a wider audience (Train the trainers).

Outcomes and deliverables

The platform will offer public administrations at all levels, businesses and citizens access to free or open source solutions. As a one-stop-shop, it will include a common repository of solutions, with catalogue, community features and support desk.[135] The solutions will ultimately enable basic Digital Government

[132] eID, eSignature, eDelivery, Automated Translation, eInvoicing, and eArchiving.

[133] i.e. CoreVocs (SEMIC) / CPSV-AP, Access to Base Registries, VocBench3, Re3gistry, ETF testing framework, Electronic Documents and Electronic Files, eTrustEx, Automatic Translation, European interoperability Architecture (EIA), IMAPS (Interoperability Assessment of Digital Public Services), CAMSS, Interoperability testbed, THEMIS, ABCDE, Electronic access to EC documents, eCertis for eProcurement, ESPD, Public Procurement Ontology, Circabc, EUSurvey, PM², LEOS, REF2LINK, European Legislation Identifier (ELI), Joinup.

[134] E.g. new state-of-the-art language technology (LT) tools and services will be added to the CEF Automated Translation services (eTranslation and other language technologies) deployed though CEF Telecom programme.

[135] Building on existing solutions such as JoinUp.

capabilities in the Member States and associated countries, by improving their technical, semantic, organisational and legal interoperability.

Type of action	Procurement
Indicative Budget	EUR 39 million
Indicative year of procurement	2021
Indicative duration of the action	24 months
Implementation	European Commission

5.3.1.2 Support to the implementation of the European Digital Identity Framework and the implementation of the Once Only System under the Single Digital Gateway Regulation

Objective

The objective of the topic is to develop, implement and scale up the European Digital Identity framework, based on the revised eIDAS regulatory framework as well as the exchange of evidence as set out in article 14 the Single Digital Gateway Regulation. The broader objective of European Digital Identity is to improve citizen's access to highly trusted and secure electronic identity means and trust services such as digital signatures, improve citizens' possibilities to use them and improve their ability to control over sharing their personal identity data. Reaching these aims requires technical implementation work procured by the Commission in particular in the development phase as well as by organisations providing public and private online services in Member States. The topic aims to develop and pilot tools supporting the implementation of the new European electronic identity for all relevant stakeholders. It also intends to develop and deploy use-cases, including innovative solutions, for the new EU-eID ecosystem leveraging and using synergies with decentralised technologies and the work for a self-sovereign identity framework undertaken at EBSI and developed in the context of the new trust service for electronic ledgers (see topic 5.2.1). It will support the implementation of the once-only principle and the sharing of data between public administrations in the EU under the control of the user.

Scope

The action will build on the requirements stemming from the revised eIDAS regulatory framework and the Single Digital Gateway Regulation.

The support will be provided via two separate work strands:

1. The first work strand will be implemented using procurement and will cover the technical infrastructure to support interoperability and implementation of the European Digital Identity Wallet and its ecosystem (e.g. technical references, standards, components and solutions) as well as cross-border exchange of evidence in line with article 14 of the Single Digital Gateway Regulation. This will include: supporting the creation of the common services required for mapping evidence and locating data providers as well as other common needs; supporting the standardisation of evidence and the development of tools and support services to Member States both in the development phase and during implementation; and, developing an application for the European Digital Identity

Wallet and other relevant components to offer them to Member States and other stakeholders for implementing the requirements of the Regulation on a Framework for a European Digital Identity.

Work under this work-strand will exploit available synergies with the work of the European Blockchain Partnership for exchanging verifiable credentials using electronic ledgers. The activities of this work-strand will also contribute to the work done in the context of the Data Spaces Support Centre (see topic 2.2.2.1).

2. The second work-strand will be implemented using grants and focus on:

   - Pilot implementations of the European Digital Identity Wallet and its ecosystem and piloting of use cases in priority areas as relevant for the once-only principle under the Single Digital Gateway regulation, as well as validating technical references, standards, components and solutions. Use-cases may build on decentralised technologies such as the exchange of credentials leveraging electronic ledgers.

   - Implementation activities by public and private sector service providers to integrate their systems with the European Digital Identity Wallet and its ecosystem, in particular for the purpose of exchanging digital attestations of attributes and identity credentials by means of a personalised digital wallet. These activities may also include innovative technical solutions based on electronic ledgers such as those developed by EBSI.

Outcomes and deliverables

First work strand:

- A set of technical references, standards, components and solutions including an application of the European Digital Identity Wallet enabling the new European Digital Identity framework to be made available to Member States.
- Relying on the availability of the European Digital Identity Wallet, the technical infrastructure required to facilitate the exchange of evidence mandated under the Single Digital Gateway Regulation.
- The provision of support to European public authorities at all levels of Government for meeting the once-only principle requirements in line with article 14 of the Single Digital Gateway Regulation.

Second work strand:

- At least 4 large scale pilots to test the deployment of the European Digital Identity Wallet in priority use cases and regarding the once-only principle under the Single Digital Gateway regulation. These pilots will deploy the European Digital Identity Wallet in national eID ecosystems by Member States.

  Successful implementation of the revised eIDAS regulatory framework by public and private sector service providers (i.e. SMEs) to exchange digital identity credentials in several Member States.

First work strand:

Type of action	Procurement
Indicative Budget	EUR 33 million
Indicative year of procurement	2021 and 2022
Indicative duration of the action	36 months

Implementation	European Commission

Second work strand:

Type of action	Simple grant (50% co-funding rate)
Indicative Budget	EUR 37 million
Indicative time of call opening	Second call
Indicative duration of the action	24 months
Indicative budget per Grant (EU contribution)	EUR 10-12 million
Implementation	Executive Agency

5.3.1.3 Interoperability Knowledge and Support Centre

Objective

This Centre aims to foster cross border and cross sector interoperability (technical, semantic, organisational and legal), supporting the implementation and evolution of the current European Interoperability Framework (EIF)[136]. It will also explore best practices in innovative digital government, initiate new services to be later integrated in the Common Services Platform and foster interoperability communities.

Scope

The activities that will support the implementation of this topic are:

- Monitoring and measuring activities on the implementation of interoperability goals in the scope of the EIF[137] .
- Testing, promoting and evolving further interoperability concepts, selected interoperability t standards and best practices around a strengthened European Interoperability Framework (EIF).
- Bringing interoperability solutions to the operational level[138] so they can be integrated in the Common Services Platform.
- Reinforcing the Interoperability Academy through workshops, summer and winter schools, as well as making available interoperability relevant training material and online courses.
- Anticipating needs, performing studies and piloting new initiatives in order to identify best practices in areas that relate to Interoperability in Digital Government.
- Supporting activities of horizontal nature for the GovTech Incubator, such as defining roadmaps for pilot projects, engaging with the GovTech sector, accelerating Innovative Public Services, collaborating with other players of the digitalisation (i.e. EDIHs) in joint community building and awareness raising activities.

[136] https://eur-lex.europa.eu/resource.html?uri=cellar:2c2f2554-0faf-11e7-8a35-01aa75ed71a1.0017.02/DOC_1&format=PDF

[137] Cf. National Interoperability Framework Observatory (NIFO)

[138] Such as the following solutions launched under the ISA² programme: ELITE, LEGIT, eGovERA or the Interoperability framework for EU legal information, PMKI

- It will also provide a data analytics toolset that can be used to analyse public procurement data provided through the data space for public procurement (see topic 2.2.1.12.1). The toolset will include the use of state of the art technologies like AI (Machine Learning, Natural Language Processing) for analytic purposes.

Outcomes and deliverables

The activities under this topic will:

- Improve implementation of the EIF and pave the way for the upcoming EU interoperability strategy[139] for public administrations.
- Contribute to establish a landscape of innovative public services across EU, identifying best practices, recommendations and guidelines.
- Increase the interoperability knowledge among the EU public sector while accelerating the digital transformation of public administrations across Europe.
- Foster the development of new interoperable and scalable solutions (i.e. in the field of data specification), and bring them to maturity so they can be integrated to the Common Services Platform.
- Increase the number of legislative acts compatible with principles of 'digital by default' and 'interoperability by design'.

Type of action	Procurement
Indicative Budget	EUR 27 million
Indicative year of procurement	2021 and 2022
Indicative duration of the action	24 months
Implementation	European Commission

5.3.1.4 GovTech Incubator

Objective

The GovTech incubator aims to ensure cross-border collaboration between digitalisation agencies in the different Member States and countries associated to the Programme, involving also GovTech actors from the private sector and academia.

The funded activities will make use of the Common Services Platform where applicable.

Scope

The long-term cooperation between the Commission and the selected consortium will be formalised within a Framework Partnership Agreement (FPA)[140] to provide an environment to ensure continuous support to experimentation for the Public Sector.

[139] https://ec.europa.eu/isa2/news/shaping-future-interoperability-policy-we-want-your-feedback_en

[140] This agreement shall specify the common objectives, the nature of actions planned and the general rights and obligations of each party. The Framework Partnership Agreement will involve Member States' Public Sector Digitalisation agencies in a joint GovTech

The GovTech Incubator should allow to identify after 2 years, at least 2 pilot projects testing new digital technologies supporting existing or new public services that could lead to reusable solutions, Large Scale Pilots or new components made available through the Common Service Platform.

Outcomes and deliverables

This topic will foster the deployment of new digital services, promoting innovative digital government solutions and putting in place the right mechanism to ensure Interoperability by default.

Lessons learnt from the resulting projects (i.e. solutions, training programmes and concepts developed) will be available for sharing and reuse across the EU, and may be scaled up through the Common Services Platform.

Type of action	Framework Partnership Agreement (FPA)
Indicative Budget	n/a
Indicative time of call opening	Second call
Indicative duration of the action	48 months
Implementation	European Commission

Within the Framework Partnership Agreement (FPA) awarded under this topic, the selected consortium will be invited to submit a proposal for a Specific Grant Agreement (SGA) addressing the objectives defined in the Framework Partnership Agreement (FPA) and action plan. The aim of the SGA will be to conduct two to four pilot projects on Innovative Public Services with possible involvement of the Govtech sector.

Type of action	Specific Grant Agreement (SGA)
Indicative Budget	EUR 3 million
Indicative time of SGA	2022
Indicative duration of the action	24 months
Implementation	European Commission

5.3.1.5 Trans European Services for Telematics between Administrations (TESTA)

Objective

The Trans European Services for Telematics between Administrations (TESTA) will continue to provide European Public Administrations with a highly available and secure underlying trans-EU interoperable communication infrastructure. The Commission centrally regulates TESTA. The network runs on a private infrastructure separated from the Internet and is meant for sensitive information exchange between public

experimentation mechanism. Within the FPA, the Commission intends to award Specific Grants to support the activities foreseen in the action plan and any additional activities the Commission might consider necessary. The GovTech Incubator should provide basic activities to engage with the GovTech Community beyond the Consortium.

authorities where the required network availability, performance and/or security (confidentiality, integrity, authentication, availability) cannot assured through the internet or where a network is called for that possesses an accreditation to allow the exchange of EU classified information.

Scope

The project will cover the maintenance of:

- the Eurodomain TESTA underlying trans-EU interoperable communication infrastructure;
- the Central Service Domain containing dedicated generic services such as DNS, Mail relay, (secured) FTP, NTP, Time stamping and a web portal;
- the Network Operation Centre (NOC) operating the network transport (Backbone services, local loop services and the monitoring thereof);
- the Security Operations Centre (SOC) managing the EuroDomain services (including crypto management, firewall management, management of all the services that are protected by the TESTA security environment);
- turnkey Access Points (TAPs) and the encrypted connections deployed at the Central level, in the 27 EU Member States, UK, 2 EFTA Countries and 2 acceding Countries as well 11 European Institutions and 14 European Agencies;
- additional assistance services to support the TESTA Stakeholders, EC officials and TESTA provider which may include:
    - consultancy services with regards to contract compliancy management;
    - on boarding and Stakeholder follow-up service;
    - communication and promotion.

Outcomes and deliverables

Access to a secure trans-European network service for data exchange with specific availability or security requirements.

Reduction and prevention of costly shadow network infrastructures.

Type of action	Procurement
Indicative Budget	EUR 19.15 million
Indicative year of procurement	2021 and 2022
Indicative duration of the action	18 months
Implementation	European Commission

5.3.2 Justice and consumer protection

Activities in this area will contribute to the implementation of the European e-Justice Strategy and Action Plan for 2019-2023[141], the Communication on the digitalisation of justice in the EU[142] with the objective of improving access to justice as well as to legal information and electronic communication in a pan-European context, as well as ensuring consumer protection in the digital transition.

For the 2021-2022 period, the priority goals under this chapter is to continue the activities started during the 2014-2020 MFF under the CEF programme but reorganising them in such a way to provide users with a more organic and coherent offer. Only the core services (e.g. platforms, standards, reference architectures) will be supported by the actions below, but the offer will be extended with the support for new actions towards the digitalisation of justice and the establishment of a Common platform for online investigations and enforcement in the consumers' area.

5.3.2.1 Core EU justice and consumers IT systems

Objective

For the 2021-2022 period, the objective under this topic is to continue ensuring the maintenance and evolutive development of the core IT systems in the justice and consumers area, started during the 2014-2020 MFF under the CEF programme.

In particular, the following IT system will be supported:

- e-Evidence Digital Exchange System (e-EDES) – e-EDES is a system providing for the digital exchange of evidence further to the European Investigation Order (Directive 2014/41/EU[143]). The first version of the system will start operating in 2021, but additional evolutions are foreseen – mainly with the objective to enable electronic interactions with relevant Service Providers (SPs) and with regard to support the digitalisation of further legal instruments on cross-border judicial cooperation in criminal matters;
- The European Central Platform (ECP) – Ensure the operation and evolutive maintenance of the ECP in the context of the Business Registers Interconnection System (BRIS)[144], and of the Beneficial Ownership Registers Interconnection (BORIS)[145]. Among the new functionalities that will be introduced for BRIS, those required by new Directives, e.g. on Company Law (Directive (EU) 2019/1151 and Directive (EU) 2019/2121) and on anti-money laundering (Directive (EU) 2015/849). Funding will also cover further communication and stakeholder engagement activities, where needed;

[141] 2019-2023 Strategy on e-Justice (2019/C 96/04) and 2019-2023 Action Plan European e-Justice (2019/C 96/05), 13 March 2019.

[142] https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=COM:2020:710:FIN

[143] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014L0041

[144] Directive 2012/17/EU, now codified in Directive 2017/1132, requires the Commission to operate BRIS. The system provides two main functionalities: the exchange of messages between business registers related to cross-border branches and cross-border mergers, and the provision of company information through BRIS for the users of the European e-Justice Portal. Directive (EU) 2019/1151 and Directive (EU) 2019/2121 require BRIS to provide additional company information free of charge (e.g. on legal representatives), and to allow further exchanges of information between registers, e.g. on cross-border branches.

[145] Directive (EU) 2015/849, as amended by Directive (EU) 2018/843, requires the Commission, by 10 March 2021 to ensure the EU-wide interconnection of national beneficial ownership registers for corporate and other legal entities; Central registers should be interconnected via the European Central Platform and certain types of information contained therein should be accessible to members of the general public. Due to unforeseeable delays the date for the interconnection of national beneficial ownership registers for corporate and other legal entities has been extended until 31 October 2021.

- Maintenance and modernisation of the European Online Dispute Resolution Platform[146] (ODR platform), the pan-European multilingual digital service infrastructure that facilitates out-of-court settlement of consumer disputes in the digital single market. Migration to the state-of-the art platform capable of supporting the digitalisation of the dispute resolution bodies, integrating advanced technologies and reusable building blocks. The current implementation should be maintained in corrective mode until the new version is fully operational;
- Maintenance and modernisation of a crypto-tool provided to Member States to enable the exchange of encrypted XML files between Member State authorities at every European Parliament election. The objective is that Member State authorities will be able to perform the envisaged encryption and decryption of XML files encoding the information foreseen in Directive 93/109/EC in a secure manner, timely and compliant with relevant standards. The tool was developed under the ISA^2 and its maintenance needs to be ensured until 2024.

Scope

Evolutive maintenance and operation of the core systems developed in the justice and consumer protection area. In particular, the funding will cover:

- Analytical and design activities;
- Deployment of software components;
- Operational management, corrective and evolutive maintenance;
- Stakeholder management and outreach activities.

Outcomes and deliverables

The funds of Digital Europe Programme financing will ensure the sustainability of the e-EDES, BRIS, BORIS, and ODR.

Type of action	Procurement
Indicative Budget	EUR 10 million
Indicative year of procurement	2021 and 2022
Indicative duration of the action	24 months
Implementation	European Commission

[146] Regulation (EU) No 524/2013 of the European Parliament and of the Council of 21 May 2013 on online dispute resolution for consumer disputes and amending Regulation (EC) No 2006/2004 and Directive 2009/22/EC (Regulation on consumer ODR).

5.3.2.2 e-Justice Communication via Online Data Exchange (e-CODEX)

Objective

The objective of this topic is to continue ensuring the operation and evolutive maintenance of e-CODEX started under previous programmes[147] and now in use, and to provide support to the stakeholders and users of the system until the planned hand-over to eu-LISA in 2023[148] in accordance with relevant legislation.

Scope

Evolutive maintenance and operation of e-CODEX. In particular, the funding will cover:

- Analytical and design activities;
- Deployment of software components;
- Operational management, corrective and evolutive maintenance;
- Stakeholder management and outreach activities.

Outcomes and deliverables

The e-CODEX system supports a number of cross-border electronic exchanges in the context of family law (iSupport), civil law (European Small Claims, European Payment Order) and criminal law (e-Evidence Digital Exchange System).

The funding will ensure its sustainability with operational support, as well as corrective and evolutive maintenance of e-CODEX until its transfer to eu-LISA in 2023, thus not endangering the use cases it supports.

Type of action	Coordination and Support Action
Indicative Budget	EUR 3 million
Indicative time of call opening	First call
Indicative duration of the action	24 months
Implementation	Executive Agency

5.3.2.3 Digitalisation of justice

Objective

The Regulations on Service of Documents[149] and Taking of evidence[150] in civil and commercial matters task the Commission with defining a decentralised IT system underpinning the foreseen digital data exchanges, and with establishing an interoperable Reference Implementation software implementation, which will be

[147] The e-CODEX project was developed under the ICT Policy Support Programme (ICT PSP), part of the Competitive and Innovation framework Programme (CIP) of the EU (ICT PSP CIP). It was further developed and maintained under the Connecting Europe Facility (CEF) programme of the EU.

[148] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020PC0712

[149] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32020R1784

[150] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32020R1783

used by most Member States. For the 2021-2022 period, the objective is to carry out the initial technical work towards the adoption of the implementing acts foreseen by the two Regulations.

Beyond 2021-2022, a recent study has identified the most urgent needs in digital criminal justice[151], and has recommended seven priority actions, with a phased implementation over the next five years. Furthermore, the Commission Work Programme for 2021[152] has identified several initiatives towards the digitalisation of cross-border civil and criminal law judicial cooperation. The European Commission's study on the use of innovative technologies in the justice field[153], which takes stock of the use of artificial intelligence and blockchain technologies by national authorities, recommends the strengthening of coordination at EU level in order to ensure synergies and interoperability.

Scope

The scope of the funded activities for the digitalisation of justice (including criminal justice) aims to ensure that the justice area will be equipped with the tools most urgently needed to properly perform functions while making use of digital technologies. In particular, the funding will target the digitalisation of the Regulations on Service of Documents and Taking of Evidence. The scope of the foreseen activities concerns the definition of the decentralised IT system's overall architecture, horizontal features, as well as the functional and non-functional requirements (including on security) of the Reference Implementation solution; initial prototyping.

Outcomes and deliverables

The impact of the financing of the first stage in the digitalisation of the procedures on Service of Documents and Taking of Evidence is that it will allow the definition of the necessary requirements, standards, and initial blueprint of the decentralised IT system and the reference software implementation, which many Member States will use once the system is developed. This phase will conclude with the adoption of the foreseen implementing acts, supplemented by the elaborated system architecture and requirements documentation.

Type of action	Procurement
Indicative Budget	EUR 2 million
Indicative year of procurement	2021 and 2022
Indicative duration of the action	24 months
Implementation	European Commission

5.3.2.4 Common platform for online investigations and law enforcement (EU eLab)

Objective

The Commission's New Consumer Agenda of 2020[154] includes setting up a common toolbox of innovative e-tools (among which an EU eLab) to assist consumer protection and market surveillance authorities in using

[151] https://op.europa.eu/en/publication-detail/-/publication/e38795b5-f633-11ea-991b-01aa75ed71a1/language-en

[152] https://ec.europa.eu/info/publications/2021-commission-work-programme-key-documents_en

[153] https://op.europa.eu/en/publication-detail/-/publication/4fb8e194-f634-11ea-991b-01aa75ed71a1/language-en

[154] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0696

digital technologies to perform their tasks as they see fit, for example, to address or prevent mass-scale breaches to EU consumer law by traders marketing and selling online, or safety concerns of the products using advanced or emerging technologies:

- A central platform with a repository of state-of-the-art investigative tools and analytical methods that national consumer protection authorities and authorities in charge of product safety market surveillance may use, for instance, to gather evidence, conduct online investigations and perform advanced testing;
- Preparatory actions necessary for reaching out to all consumer protection and product safety market surveillance authorities, as well as activities offering support to the national authorities to address the emerging consumer law and product safety concerns, notably cyber threats of connected products or safety challenges related to products incorporating AI.

Scope

Deployment, evaluative maintenance and operation of the EU eLab as a central access point to tools, resources, analytical methods with regard to monitoring and enforcing compliance with consumer law and product safety in digital markets and digital marketing. In particular, the funding will cover:

- A remote access point to the facility, including secure data collection and sharing, and a repository of the analytical, investigative and testing software for the national consumer protection and market surveillance authorities. This will build on the ongoing collaboration between the Commission and the national authorities (e.g. the Consumer Protection Cooperation network under Regulation (EU) 2017/2394[155]), notably those who are already using facilities for online investigations, as well as the recent study by the Commission on advanced digital tools for online enforcement;
- Optional methodological support for the national authorities to analyse the products, processes and practices. This will target the authorities who have no means to use forensic tools necessary to meet the consumer law or product safety challenges in modern markets;
- Follow-up to the monitoring and testing activities in eLab, aimed at raising awareness of businesses about the new risks posed by the innovative products and preventing placing the dangerous products on the market.

Outcomes and deliverables

The deployment and operation of eLab will deliver a tool that national authorities may use to address high-impact problems in the consumer segment of the digital market (including online marketing) and consumer safety. The eLab is foreseen as a key tool to implement the Single Market Enforcement Action Plan[156] and the Joint Communication on tackling COVID-19 disinformation.[157]

It will protect European consumers from illegal practices such as online consumer fraud, manipulative profiling (especially of vulnerable consumers), geo-blocking and from unsafe products. At the macroeconomic level, the eLab will contribute to the level-playing field in the single market and safe

[155] Regulation (EU) 2017/2394 of the European Parliament and of the Council of 12 December 2017 on cooperation between national authorities responsible for the enforcement of consumer protection laws and repealing Regulation (EC) No 2006/2004

[156] https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1594820816757&uri=CELEX:52020DC0094

[157] https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1594820907577&uri=CELEX:52020JC0008

consumer product innovation. It will also encourage national authorities to use advanced technologies, therefore increasing uptake of digital and AI tools in the public services.

Type of action	Procurement
Indicative Budget	EUR 2 million
Indicative year of procurement	2021 and 2022
Indicative duration of the action	24 months
Implementation	European Commission

5.3.3 Health and care

5.3.3.1 An ecosystem for digital twins in healthcare

Objective

The development of digital twins in healthcare (DTH) has progressed substantially, profiting from advances in science and technology. In order to exploit their benefits in view of better prevention approaches, faster and more accurate diagnoses, personalised treatments and care, a framework to structure cooperation and leverage on synergies between academia, private sector, regulators and end-users needs to be strengthened.

The objective is to support the roll-out of DTH by mapping and structuring the ecosystem within the EU Member States and associated countries to identify and pool existing resources, and foster collaboration and overall integration of the stakeholders, while ensuring adequate clinical representation. This will be facilitated through a roadmap, a federated repository connecting resources and a simulation platform.

Scope

The Coordination and Support action will:

- map and link the actors and initiatives on DTH, develop a blueprint of and foster an inclusive ecosystem to share knowledge and facilitate understanding between developers, users, and decision-makers throughout the relevant sectors. This will include support for designing a 'roadmap' in view of both the uptake of DTH, and their further integration towards a comprehensive digital twin of the entire human body, taking into consideration different stakeholder groups, identifying the needs of end-users, determining the necessary enabling infrastructure and considering a framework for the deployment of digital companions;
- coordinate the deployment of a federated, cloud-based repository of DTH, inter alia by pooling existing digital twins in healthcare (incl. models, methods, datasets), gathering and analysing best practices, and identifying relevant technological standards, recommendations and/or guidelines geared towards quality assessment;
- develop and employ technical specifications and operational prototypes for a simulation platform allowing practitioners to design, create, test and validate digital twins in healthcare, linked also to high performance computing infrastructures.

Outcomes and deliverables

Expected outcomes are:

- a consolidated European ecosystem around digital twins for healthcare that brings together, streamlines, bundles and fosters their use across stakeholders in a coordinated manner, thereby empowering patients and enabling health professionals, pharmaceutical and medical devices industries, SMEs, software developers, academia and regulatory agencies to make use of DTH in full compliance with applicable data protection requirements;
- a roadmap for the development of a strategic approach to accelerate the uptake of DTH-based solutions and for further integrating the resources towards a comprehensive virtual representation of the human body;
- a governance framework for a federated, cloud-based repository, combining DTH resources, as well as the subsequent use and deployment of the repository;
- the blueprint and technical specifications for a simulation platform for DTHs, and early prototypes.

Type of action	Coordination and Support Action
Indicative Budget	EUR 5 million
Indicative time of call opening	First call
Indicative duration of the action	24 months
Implementation	European Commission

5.3.3.2 Uptake of digital solutions in Health and Care

Objective

This action will support a coordinated multi-stakeholder approach for the uptake and integration of digital solutions along the continuum of health and care. It will take forward and consolidate achievements in terms of interoperability, common dataspaces, telemedicine and digital solutions for person-centred care by engaging with the ecosystem, and creating buy-in from key stakeholders. It will also build on existing initiatives to support swift actions for digital preparedness for pandemics. Synergies with the work in Member States and associated countries – and in the eHealth Network in particular – will ensure links with national and regional strategies on digital health. This action should also ensure synergies with relevant efforts supported under Horizon Europe cluster 1 “Health”, in particular with the Co-funded Partnership with Member States and Associated Countries aimed at Transforming Health and Care Systems.

Scope

The Coordination and Support action will facilitate the alignment, strengthening and coordination of policies, strategies, instruments and activities regarding the uptake of digital health solutions and services:

- Analyse and monitor the uptake of digital health solutions in regions (with particular focus on rural and remote areas), Member States and associated countries. This will include independent living and telemedicine, primary and secondary use of health data, related standards, certification and relevant exchange formats, interoperability (in compliance with EU and national legislation). The assessment

will also cover wider aspects such as their economic value to both patients and health and care systems, their impact on health and care efficiency and continuity of care, financing and reimbursement models and citizen empowerment.

- Stimulate mutual learning and transfer of innovative practices between regions, Member States and associated countries, and support large scale deployment of trusted digital health solutions and services, facilitate benchmarking, impact assessment and knowledge sharing between stakeholders.

Outcomes and deliverables

The consolidation of a European framework and ecosystem of digital health solutions and services, covering technological and organisational innovation and addressing the needs of the involved stakeholders, including those of SMEs and start-ups.

Type of action	Coordination and Support Action
Indicative Budget	EUR 1 million
Indicative time of call opening	First call
Indicative duration of the action	24 months
Implementation	European Commission

5.3.4 Security (law enforcement): AI-based pilots

Objective

Constantly growing digitalisation in all sectors and the rapidly changing technological landscape provide vast opportunities for criminals and terrorists. Law Enforcement Agencies (LEAs) often lack the necessary technical and financial means as well as digital skills when preventing, detecting, investigating or prosecuting criminal and terrorist activities supported by advanced technologies. In that context, supporting Member States law enforcement (LE) cyber capacity building is paramount, in particular in the field of AI applications that are key to address the data overload. Projects under this action should pay specific attention to fundamental rights challenges notably by proposing adequate bias mitigation[158] and non-discrimination mechanisms[159] as well as by providing enhanced data quality and protection. They should also demonstrate a strict compliance with the EU legal framework on data processing for police purposes as set out in Directive 2016/680 of the European Parliament and the Council of 27 April 2016 and the GDPR.

The activities supporting this policy are organised around two complementary actions: the data space for security and law enforcement (see topic 2.2.1.12.2) and the pilots, subject of this action.

The overall objective is to enable the final validation and foster the uptake of AI systems for LE by running large scale pilots in LEAs premises. This is necessary, as AI systems for LE need, in most cases, a final validation on real operational datasets[160] that can only be accessed in stand-alone secured environments.

[158] https://fra.europa.eu/sites/default/files/fra_uploads/fra-2019-data-quality-and-ai_en.pdf

[159] https://fra.europa.eu/sites/default/files/fra_uploads/fra-2018-focus-big-data_en.pdf

[160] In compliance with Directive 2016/680 of the European Parliament and the Council of 27 April 2016

This action will contribute to close the gap between prototypes that have been developed with the support of EU funded security research and innovation programmes (i.e. up to TRL 7) and systems proven in operational environment that bring clear added value to police practitioners (i.e. TRL 8/9).

Due to the sensitivity of data handled in investigations, this can only be done by LE, in their own premises and on real use cases. This is particularly true in the context of AI where the representativity of data sets plays an important role in avoiding inaccurate, biased or even discriminatory outcomes.

From a data perspective, this action complements the creation of a data space for security and law enforcement. The data space for security and law enforcement will gather pseudo operational data (or anonymized datasets) that will be used to train and test AI systems, while this action will make full use of real operational data in stand-alone environments to assess, validate and better train AI systems.

The involvement of the Europol Innovation Lab in a steering role e.g. to identify the most promising prototypes and to contribute to the assessment of the applications, and the participation of end-user driven networks such as the European Anti Cybercrime Technology Development Association (EACTDA) will ensure the European added value. The coordination of large-scale pilots across Member States will be done via the establishment of Core Groups in the framework of the Europol Innovation Lab in order to contribute to the emergence of European technological solutions in key areas.

Scope

To achieve the above mentioned objective, it is necessary to foster the testing, validation and optimisation of innovative digital forensic and investigation tools over sufficient periods of time (minimum 6 months) in real operational environment. It is also necessary to coordinate the pilots and to ensure that the validated solutions can benefit to EU LE at large and duly address fundamental rights challenges notably by enhancing data quality, mitigating bias, detecting errors and avoiding any form of discrimination in the decision making process.

This would be done by:

- setting up a validation methodology for innovative investigative tools that should be designed and validated by the Europol Innovation Lab with the involvement of its dedicated core groups of EU Member States.[161]
- running large scale pilots in LE premises for training, validating and adapting a limited number of best in class (selected among a set of tools proposed by the Europol Innovation Lab that comply to EU standards in terms of regulation and protections of fundamental rights) innovative AI tools in real environment,

[161] One of the objectives of the Europol Innovation Lab is to help EU Member States to work together in developing innovative solutions and to avoid duplication. To do so, the Innovation Lab creates Core Groups, composed of volunteering Member States, which work together on specific tools and key technologies within the framework of the Europol Innovation Lab. Core Groups combines two principles: 1) projects launched within the Europol Innovation Lab are Member State-driven to ensure the successful implementation of new tools in the national police context, based on genuine operational needs. 2) At the same time, it is necessary to ensure continuity, synergies and to avoid duplication of efforts, so the Core Groups are established within the Europol Innovation Lab and benefit from a set of standard products and services. The Core Groups are led by one or several EU Member States, which already have a strong background in the technology on which the core group focuses. Each group is led by a dedicated expert from the leading Member State. With the support of the Europol Innovation Lab team, the leader will steer the activities of the core group. Europol is part of all thematic core groups to ensure the overall coordination. Schengen Associated States (SAS) can join core groups but cannot lead them.

- creating when necessary a set of annotated data during the pilot projects that could be shared among LE and potentially Europol (and eventually feed the data space for security and law enforcement),
- ensuring that the solutions validated through pilots can benefit to a number of EU LEAs with the support of the Europol Innovation Lab, Networks of LE practitioners and the enforcement of appropriate IPR.

Outcomes and deliverables:

The project will have direct impact on the capability of LE to test and deploy AI based solutions and other emerging technologies thus to handle efficiently and in accordance with EU core values the abundance of digital evidence. In addition, it will contribute to foster the adoption and give visibility to best in class EU designed solutions for LE.

Possibilities of coordination with related activities in the Horizon 2020 and Horizon Europe Programme should be analysed too. Some activities, resulting from this topic, may involve using classified background and/or producing of security sensitive results.

Type of action	SME support grant (75% co-funding rate for SMEs and 50% for all the other beneficiaries)
Indicative Budget	EUR 5 million
Indicative time of call opening	Second call
Indicative duration of the action	12 months
Indicative budget per Grant (EU contribution)	EUR 1.2 million
Implementation	Executive Agency

5.4 Enhancing confidence in Digital Transformation

Digitisation is transforming the economy and society at an unprecedented pace, changing the way citizens engage in society, politics, and government. Online digital platforms reshape the way we socialise, access and share information. While offering unprecedented opportunities, the internet also gives rise to risks such as disinformation, cyberbullying, violence, incitement to hatred, or the spread of child sexual abuse material. Topics in this chapter will contribute to create a safer digital space in which the fundamental rights of all users of digital services are protected in line with the Commission proposal for a Regulation on a Single Market for Digital Services (the Digital Services Act - DSA)[162]. The topics below are focused on two main work strands:

- protecting and empowering children to become resilient digital citizens and well equipped for the digital economy;
- detecting and combatting intentional online disinformation spread through the use of new technologies and supporting and connecting stakeholders tackling this issue in the Member States in order to develop adequate responses.

[162] https://eur-lex.europa.eu/legal-content/en/TXT/?uri=COM:2020:825:FIN

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5.4.1 Safer Internet

Making the internet a safer environment for children and young people is a priority of the EU. While the internet offers many opportunities, it also opens up certain risks. Children and young people may be exposed to harmful and illegal content and behaviour (e.g., cyberbullying, hate speech, violence, self-harm, sexual harassment, grooming, pornography), which may have negative consequences on their development and well-being. The topics below will contribute to make the internet a more trusted environment for children to empower and protect them online, and to tackle the dissemination of online child sexual abuse material.

5.4.1.1 Better Internet for Kids (BIK) platform - EU coordination

Objective

The funded action will continue to coordinate and support at EU level the national child online safety activities of the Safer Internet Centres[163] through a central hub: the Better Internet for Kids platform[164]. The platform will continue to provide access to a set of online tools, resources and services for professionals dealing with child online safety and the general public.[165]

Scope

Evolutive maintenance and operation of the BIK platform as central access point to tools, resources, good practices, guidance, and awareness raising services on child online safety. This will include stakeholder management and outreach activities as well as support and coordination for the SICs. Actions will consider outcomes of relevant projects funded under Horizon 2020. In particular, the funding will cover:

- a single entry point to online tools, resources and services for SICs to: collaborate on research-based resource development; assess and exchange good practices, materials and services in support of raising awareness of and teaching child online safety; compile statistics at European level to measure the impact of SICs' activities; facilitate and support youth participation by incorporating a safe, dedicated space for youth engagement;
- a central point of access for the general public to information, guidance and resources, including referrals to quality online content dedicated to children;
- capacity-building, including the development of tutorials, mentoring schemes and training opportunities for practitioners, including the educational sector;
- broad outreach to stakeholders by organising pan-European events, campaigns and meetings involving private sector, researchers, and NGOs.

[163] 'SICs' - consisting of a) awareness centres of online opportunities and risks, b) helplines on the use of digital technologies and services, and c) hotlines for tackling online child sexual abuse material

- the upgrade of the IT system for hotlines' cooperation (see topic 5.4.1.3) in line with the "EU strategy for a more effective fight against child sexual abuse"[166] and subsequent legal framework stemming from this Communication.

Outcomes and deliverables

The investment will ensure the well-established and recognized EU hub on child online safety (i.e. www.betterinternetforkids.eu) stays up-to-date and adapts to the rapidly changing risks and opportunities of digital technology for the under 18s. This platform will continue to enable synergies between the different initiatives tackling online safety for children by the Safer Internet Centres in the Member States and countries associated to the Programme. It will also enhance the outreach of national activities, and create cross-fertilization by sharing knowledge and multilingual resources on trends and emerging risks. Moreover, it will bring together relevant stakeholders at national, European, and international level, for example at the annual Safer Internet Forum and Safer Internet Day.

Type of action	Procurement
Indicative Budget	EUR 4 million
Indicative year of procurement	2022
Indicative duration of the action	24 months
Implementation	European Commission

5.4.1.2 Safer Internet Centres (SICs)

Objective

The objective of the topic is to support national SICs (i.e., hubs gathering NGOs, government bodies/agencies, private sector organisations) in providing online safety information, educational resources, public awareness tools and counselling and reporting services (through dedicated helplines and hotlines) for young people, teachers, and parents. The activities performed by the SICs will help minors to tackle online risks and to become media literate, resilient digital citizens, and will allow citizens to anonymously report online child sexual abuse material (CSAM).

Scope

The funding will ensure the financial sustainability of the European SICs, by enabling the awarded consortiums to provide at least:

- A centre for raising awareness among children, parents, and teachers about online opportunities and risks. The focus will be to identify and address emerging risks (e.g., self-generated sexualised content) and challenges such as mental and physical health issues related to the use of technologies (self-harm, addiction, perception of self-identity and self-image);

[166] https://ec.europa.eu/home-affairs/sites/homeaffairs/files/what-we-do/policies/european-agenda-security/20200724_com-2020-607-commission-communication_en.pdf

- A helpline to give advice and support to parents and children on issues related to children's use of digital technologies and services;
- A hotline for tackling CSAM (i.e. receiving, analysing, and processing reports of such material). Closer cooperation with law enforcement and the private sector should be further explored.

Outcomes and deliverables

The investment will deliver a pan-European network of Safer Internet Centres (SICs) that will allow children and young people to become more resilient digital users through awareness-raising activities in informal and formal education (e.g., youth participation activities, workshops, classroom visits, competitions). Parents, carers, teachers, and other professionals working with children will gain a better understanding of the risks and opportunities of children accessing digital content and services, through information sessions, train the trainers programmes, and online and offline material. Local, national, and European actors will gain timely information on emerging risks through the helpline service. Public authorities including law enforcement agencies will have access to resources and services, and exchanges with hotline analysts to develop better preventive measures and to remove online child sexual abuse material (CSAM) in an effective manner. The private sector will benefit from increased market opportunities for high quality online content and will cooperate with the SICs through joint initiatives and awareness campaigns such as the Safer Internet Day.

Type of action	Simple grant (50% co-funding rate)
Indicative Budget	EUR 21 million
Indicative time of call opening	First call
Indicative duration of the action	24 months
Indicative budget per Grant (EU contribution)	EUR 0,7 million
Implementation	Executive Agency

5.4.1.3 IT system supporting the removal of online child sexual abuse material (CSAM)

Objective

The objective of this topic is to tackle the dissemination of online child sexual abuse material (CSAM) through the maintenance of an IT system that enables the cooperation of the network of INHOPE hotlines, thus contributing to the swift removal of such illegal material.

Scope

The funding will cover the maintenance of the IT tool (ICCAM) that supports the back-office reporting functionalities of the hotlines hosted by the SICs. The tool facilitates also the collaboration with law enforcement agencies and relevant private sector stakeholders (e.g., hosting digital services). The tool must enable a secure environment for gathering, checking, and sharing reports of potential CSAM to support the hotlines' capability and capacity to analyse, identify, and remove the illegal online content.

Outcomes and deliverables

The funding will deliver an operational IT tool supporting the INHOPE hotlines to identify, track, and remove CSAM.

Type of action	Coordination and Support Action (100% funding rate) to identified beneficiary according to Financial Regulation article 195 (f). INHOPE is the only organisation in the EU that has the competence to manage the IT tool ICCAM which is used by the national hotlines (supported by DIGITAL grants) to handle reports of potential online child sexual abuse material (CSAM). Legal name and address: "INHOPE – The International Association of Internet Hotlines", Spuistraat 139F, 1012 SV Amsterdam, The Netherlands
Indicative Budget	EUR 0,5 million
Indicative time of call opening	First call
Indicative duration of the action	24 months
Implementation	European Commission

5.4.2 European Digital Media Observatory (EDMO)

The European Digital Media Observatory (EDMO) supports the creation and the activities of the European multidisciplinary community composed of fact-checkers, academic researchers and other relevant stakeholders to address the disinformation phenomena in the EU.

It provides the necessary evidence and specific knowledge to public authorities in charge of monitoring and assessing platforms' policies under the Code of Practice on disinformation[167], while supporting media literacy practitioners to sharpen their initiatives aimed at enhancing critical thinking of digital media users.

EDMO has started its operation with the support of the CEF programme. Digital Europe will provide financial support to continues EDMO operations and extend the coverage of its hubs.

5.4.2.1 EDMO - central infrastructure and governance

Objective

This topic will finance the maintenance and further development of the technical platform supporting the operations of the European Digital Media Observatory (EDMO) as well as the functioning of the EDMO governance.

Scope

The funding will support:

- The deployment and operation of a set of tools and services made available through the platform. The tools will respond to the needs of the EDMO community composed of fact-checkers, academic researchers and other relevant stakeholder and will make use of the latest technological developments.

[167] https://ec.europa.eu/digital-single-market/en/news/code-practice-disinformation

- The coordination of fact-checking and media literacy activities at European level. EDMO will identify disinformation campaigns with the potential to spread across borders, and will facilitate the coordination of pan-European fact-checking activities across the research hubs. EDMO will continue expanding fact-checking and media literacy repositories and will organise events with relevant stakeholders.
- The coordination of academic research activities at EU level. EDMO will identify relevant research themes and support the coordination of research activities around such themes and across the national/multinational hubs. EDMO will also continue, with the support of the research community, to define the scope and conditions for access to online platforms data for research purposes.
- Public authorities and policy advice in coordination with the research hubs, for the monitoring of the implementation and impact of the Code of Practice on online disinformation and of other relevant policy initiatives. It will also cover recommendations to policy makers at national and European Level on potential improvements to a broad regulatory framework including self and co-regulation.
- Reporting activities to the European Commission about the main trends and other key research finding relating to online media trends and the disinformation phenomenon.

Outcomes and deliverables

At the end of the project, EDMO will be equipped with a platform providing state-of-the art tools for fact-checking and academic research activities to study the phenomenon of disinformation. EDMO will be coordinating several fact-checking and research activities in Europe and across the national/multinational research hubs. EDMO will have a key role in supporting the monitoring of the implementation of platforms policies to tackle disinformation.

Type of action	Procurement
Indicative Budget	EUR 4 million
Indicative year of procurement	2022
Indicative duration of the action	30 months
Implementation	European Commission

5.4.2.2 EDMO – national and multinational hubs

Objective

Following-up from the first round of hubs created under CEF, this topic aims to create new national or multinational hubs for analysis of digital media ecosystems in order to expand the geographical coverage of EDMO. A national/multinational hub is a network of organisations active in one or several Member State(s), that will provide specific knowledge of local information environments so as to strengthen the detection and analysis of disinformation campaigns, improve public awareness, and design effective responses relevant for national audiences. The activities of the hubs should be independent from any public authority.

These national/multinational centres will focus their activities around emerging digital media vulnerabilities and disinformation campaigns, which are of special relevance within the territory and/or linguistic area in

which they will operate. Multinational hubs will cover more than one Member State with similar media ecosystems within an EU region.

Scope

Support will be provided to:

- Increase the number of independent national or multinational hubs on digital media. Each hub must pull together a national/multinational multidisciplinary community composed of academic researchers, fact-checkers, media practitioners and other relevant stakeholders in order to create a network capable of quickly detecting and analysing disinformation campaigns, as well as producing content to support mainstream and local media and public authorities in exposing harmful disinformation campaigns. They will work in cooperation with EDMO and contribute to its repositories of fact-checks, media literacy materials and scientific articles, including surveys on disinformation trends, situational analyses and assessments of online platforms' policies to address disinformation-related harms.
- Detection, analysis and disclosure of harmful disinformation campaigns at regional, national, multinational and EU level, and analysis of their impact on society and democracy. They will analyse relevant actors, vectors, tools, methods, dissemination dynamics, and prioritised targets of disinformation campaigns by applying a common methodology, established in coordination with EDMO, to monitor the evolution of disinformation-related harms on relevant audiences. Each hub will indicate the type of collaborations intended with independent media outlets operating within its territory or linguistic area. The hubs will also monitor the financial viability of the news media sector within the territory or linguistic area covered, including the effectiveness of public support measures taken by Member States to address potential market failures affecting the plurality and diversity of the news media sector at national level. Funding will also support a regular assessment of the impact of relevant disinformation campaigns on society and democratic processes, as well as the effectiveness of the policies set out by online platforms to counter various disinformation phenomena. In addition, the hubs will actively participate to the EDMO joint research activities selected by the EDMO Governance Body and promptly react to EDMO requests linked to emerging disinformation issues.
- Media literacy. The centres will identify the needs and support tailor-made media literacy campaigns for the covered territory or linguistic area. They will also leverage on the exchange of good practices and materials stored on the EDMO platform and contribute to the EDMO repositories with newly created educational and training materials.
- Cooperation with national authorities for the monitoring of online platforms' policies and digital media ecosystem in the territory or linguistic area covered by the proposal. In particular, they will support the competent national authorities, including the audio-visual regulator(s) overseeing, and monitor the implementation of the Code of Practice on Disinformation by its signatories. They will respond to the above-mentioned national authorities' requests to carry out on-demand surveys on emerging online disinformation campaigns.

Outcomes and deliverables

At the end of the actions, a network of existing and newly established research hubs will be in place across the EU. Networks of expert and organisations linked to the hubs will be part of a European multidisciplinary community which will actively detect, analyse and expose disinformation campaigns in Europe. Each hub will have produced at least 10 investigations and reports on disinformation campaigns and shared them through EDMO. Hubs will have established at least 5 tailor-made media literacy programs in Member States and supported national authorities in producing reports (at least 1 per year) regarding the implementation and effectiveness of online platforms policies to tackle disinformation.

Type of action	SME support grant (75% co-funding rate for SMEs and 50% for all the other beneficiaries)
Indicative Budget	EUR 11 million
Indicative time of call opening	First call
Indicative duration of the action	30 months
Indicative budget per Grant (EU contribution)	EUR 1,5 million
Implementation	Executive Agency

6 Programme Support Actions

Programme support actions are aimed at maximising the impact of the EU intervention, and will be implemented through procurement. Horizontal actions will cover costs including preparation, evaluation, monitoring and studies. An amount of funding will be set aside to cover awareness and dissemination as it is crucial to effectively communicate about the value and benefits of the Digital Europe Programme. As an indicative list, programme support actions funded under this Work Programme might cover:

1. External expertise:

- The use of appointed independent experts for the evaluation of the project proposals and where appropriate, the monitoring of running projects.
- The use of individual independent experts to advise on, or support, the design and implementation of the underpinning policy.

2. Studies, Events and publications

- Events such as the Code Week 2022 and 2023, dissemination of Programme results etc.
- Publications
- Communication, e.g. about calls and Digital Europe Programme results
- Studies

3. Other support actions

- Support to the joint deployment and maintenance of the COVID Passport and of the Passenger Locator Form

Table 8: Categories of programme support actions

Category of expenditure	Indicative budget
Proposals evaluation and project reviews	EUR 5.3 million
Studies	EUR 11.4 million
Events, communication, publications	EUR 6 million
Other support measures including for e.g. COVID Passport, Passenger Locator Form	EUR 17.5 million
Total	EUR 40.2 million

7 Financial Instrument

7.1 Investment Platform for Strategic Digital Technologies

The objective is to initiate the set-up of an Investment Platform for Strategic Digital Technologies under the InvestEU program based on the experience of the existing EU-AI/blockchain investment pilot. The Investment Platform will provide improved dedicated financial support to innovative digital start-ups and SMEs at all stages of their development (early stage and scale-up phases) through equity and quasi-equity by combining funding from Digital Europe Programme with InvestEU guarantee. It will focus on providing improved financing to strategic digital technologies, including AI, blockchain, 5G/edge computing, microelectronics, quantum technologies, high performance computing, cybersecurity and IoT in line with the EU digital strategy. The use of these strategic digital technologies is expected to also be contributing to sustainability and the greening of the ICT sector.

The platform aims to (i) pool financial resources from the European Commission (through the Digital Europe Programme, InvestEU programme and other EU programmes), International Financial Institutions, including the European Investment Bank, the European Investment Fund, the EBRD and the Member States through financing from National Promotional Banks, as well as seek synergies, including exchange of good practises, and complementarity with the EIC Fund of the European Innovation Council; (ii) leverage EC funding to enable additional investments from private investors and; (iii) provide efficient risk sharing mechanisms between different investors.

The platform will include an Investment Support Programme: (i) to raise awareness among investors about companies and project promoters; (ii) carry out a series of market consultations with a broad range of stakeholders from the strategic digital technology ecosystem, governments and private investors; and (iii) facilitate the match-making between project promoters, innovative SMEs, start-ups and private investors.

Type of action	Financial instrument
Indicative Budget	EUR 35.13 million
Indicative duration of the action	2 years
Implementation	Indirect management with the European Investment Fund

7.2 Advisory services for the Investment Platform for Strategic Digital Technologies

Objective

The action will provide the targeted advisory services and investment support for the Investment Platform for Strategic Digital Technologies.

Scope

The funding will cover advisory services that:

(i) support the portfolio development and originate a deal flow of technically and financially viable projects;

(ii) carry out targeted market assessments about the existing investment gaps for strategic digital technologies and digital clean tech in Europe;

(iii) carry out extensive market consultations with innovative start-ups, SMEs, project promoters and financial intermediaries focused on strategic digital technology;

(iv) support the development of strategic partnership and co-investments with National Promotional Banks and other International Financial Institutions, including the EBRD and World Bank (IFC); and

(v) provide project advisory services to innovative companies and public sector project promoters to enhance the investment readiness of potential investment programmes.

Outcomes and deliverables

The action will ensure effective development, implementation and deployment of the financing to strategic digital technologies in Europe, improving the available financing innovative landscape of SMEs and start-ups in Europe in the area of strategic digital technologies (including AI, blockchain, 5G/edge computing, microelectronics, quantum technologies, high performance computing, cybersecurity and IoT) through attracting additional co-investments.

Type of action	Contribution agreement under InvestEU Advisory Hub Agreement with the European Investment Bank
Indicative Budget	EUR 3 million
Indicative year	2021
Indicative duration of the action	24 months
Implementation	European Commission

8 Implementation

This Work Programme uses two main implementation modes: direct management (procurement and grants), as well as indirect management.

The different nature and specificities of the actions indicated in the previous chapters require distinctive implementation measures. Each of these will therefore be achieved through various implementation modes.

Proposers are strongly encouraged to follow green public procurement principles and take account of life cycle costs[168].

The implementation of grants is articulated through different types of actions that are indicated for each topic. More details on each type of action are described in Annex 2.

8.1 Procurement

Procurement actions will be carried out in compliance with the applicable EU public procurement rules. The procedures will be implemented either through direct calls for tenders or by using existing framework contracts. IT development and procurement activities will be carried out in compliance with European Commission's applicable IT governance rules.

8.2 Grants

8.2.1 Evaluation process

The evaluation of proposals will be based on the principles of transparency and equal treatment. It will be carried out by the Commission services and an Executive Agency with the assistance of independent experts.

Admissibility conditions

Proposals must be submitted before the call deadline and only through the means specified in the call for proposals. The call deadline is a deadline for receipt of proposals.

Proposals must be complete and contain all parts and mandatory annexes and supporting documents specified in the call for proposals. Incomplete proposals may be considered as inadmissible.

Eligibility criteria

Proposals will be eligible if they are submitted by entities and/or consortiums compliant with the requirements set out in this Work Programme and the relevant call for proposals. Only proposals meeting the requirements of the eligibility criteria in the call for proposals will be evaluated further.

Exclusion criteria

Applicants which are subject to EU administrative sanctions (i.e. exclusion or financial penalty decision)[169] might be excluded from participation. Specific exclusion criteria will be listed in the call for proposals.

Financial and operational capacity

[168] http://ec.europa.eu/environment/gpp/index_en.htm

[169] See Article 136 of EU Financial Regulation 2018/1046·

Each individual applicant must have stable and sufficient resources as well as the know-how and qualification to successfully implement the projects and contribute their share. Organisations participating in several projects must have sufficient capacity to implement all these projects. Applicants must demonstrate their financial and operational capacity to carry out the proposed action.

Award criteria

The three sets of criteria are listed in Annex 1 of this Work Programme. Each of the eligible proposals will be evaluated against the award criteria. Proposals responding to a specific topic as defined in the previous chapters of this Work Programme will be evaluated both individually and comparatively. The comparative assessment of proposals will cover all proposals responding to the same topic.

Proposals that achieve a score greater than or equal to the threshold will be ranked within the objective. These rankings will determine the order of priority for funding. Following evaluation of award criteria, the Commission establishes a Selection Decision taking into account the scores and ranking of the proposals, the programme priorities and the available budget.

The coordinators of all submitted proposals will be informed in writing about the outcome of the evaluation for their proposal(s).

8.2.2 Selection of independent experts for evaluation and reviews

The Commission and the Executive Agency will select independent experts to assist with the evaluation of proposals and with the review of project results as well as for other purposes where specific expertise might be required for implementation of the Programme. Experts are invited to register themselves on the Funding & Tender Portal[170] or update their profile in the database with their expertise in the areas funded by the Digital Europe Programme. Experts will be selected from this list on the basis of their ability to perform the tasks assigned to them, taking into account the thematic requirements of the topic, and with consideration of geographical and gender balance as well as the requirement to prevent and manage (potential) conflicts of interest.

8.2.3 Indicative implementation calendar

The indicative calendar for the implementation of the Digital Europe calls for proposals in 2021 and 2022 is shown in the table below. Three major calls are planned which should include most of the topics of this Work Programme. The table below does not prevent the opening of additional calls if needed.

More information about these calls will be available on: https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/home.

Table 8: Call timeline for topics in this Work Programme

Milestones	First call	Second call	Third call
Call Opening[171]	Q4 - 2021	Q1 - 2022	Q3-2022

170http://ec.europa.eu/research/participants/portal/desktop/en/experts/index.html

171 The Director-General responsible for the call may delay the publication and opening of the call by up to three months.

Deadline for submission[172]	Q1 - 2022	Q2- 2022	Q4-2022
Evaluation	Q2- 2022	Q3 -2022	Q1-2023
Information to applicants on the outcome of the call	Q3 - 2022	Q4 -2022	Q2-2023
Signature of contracts	Q4- 2022	Q1- 2023	Q3-2023

172 The Director-General responsible for the call may delay this deadline by up to three months.

9 Annexes

9.1 Annex 1 – Award criteria for the calls for proposals

Proposals are evaluated and scored against award criteria set out for each topic in the call document. The general award criteria for the Digital Europe calls are as follows:

1. Relevance:

- Alignment with the objectives and activities as described in the call for proposals
- Contribution to long-term policy objectives, relevant policies and strategies, and synergies with activities at European and national level
- Extent to which the project would reinforce and secure the digital technology supply chain in the EU*
- Extent to which the project can overcome financial obstacles such as the lack of market finance*

* This might not be applicable to all topics

2. Implementation

- Maturity of the project
- Soundness of the implementation plan and efficient use of resources
- Capacity of the applicants, and when applicable the consortium as a whole, to carry out the proposed work

3. Impact

- Extent to which the project will achieve the expected outcomes and deliverables referred to in the call for proposals and, when relevant, the plans to disseminate and communicate project achievements
- Extent to which the project will strengthen competitiveness and bring important benefits for society
- Extent to which the project addresses environmental sustainability and the European Green Deal goals, in terms of direct effects and/or in awareness of environmental effects*

*This might not be applicable to all topics and in only exceptional occasions and for duly justified reasons may not be evaluated (see specific topic conditions in the call for proposals).

9.2 Annex 2 – Types of action to be implemented through grants

The descriptions below of the types of actions to be implemented through grants under the Digital Europe Programme is indicative and should help the (potential) applicants to understand the expectation in each type of action. The call for proposal will define the objectives and scope of the action in more detail.

Simple Grants

Description: The Simple Grants are a flexible type of action used by a large variety of topics and can cover most activities. The consortium will mostly use personnel costs to implement action tasks, activities with third parties (subcontracting, financial support, purchase) are possible but should be limited.
Funding rate: 50% of total eligible costs for all beneficiaries.

SME support actions

Description: Type of action primarily consisting of activities directly aiming at supporting SMEs involved in building up and the deployment of the digital capacities. This type of action can also be used if an SME needs to be in the consortium and make investments to access the digital capacities.
Funding rate: 50% of total eligible costs except for SMEs where a rate of 75% applies.

Coordination and support actions (CSA):

Description: Small type of action with the primary goal to promote cooperation and/or provide support to EU policies. Activities can include coordination between different actors for accompanying measures such as standardisation, dissemination, awareness-raising and communication, networking, coordination or support services, policy dialogues and mutual learning exercises and studies, including design studies for new infrastructure. CSA may also include complementary activities of strategic planning, networking and coordination between programmes in different countries.

Funding rate: 100% of eligible costs.

Grants for procurement

Description: Type of action for which the main goal of the action and thus most of of the costs consist of buying goods or services and/or subcontracting tasks. Contrary to the grants for procurement of advanced capacities (PAC grants) for procurement (see below) there are no specific procurement rules (i.e. usual rules for purchase apply), nor is there a limit to 'contracting authorities/entities'. Personnel costs should be limited in this type of action; they are used to manage the grant, coordinate between the beneficiaries and prepare the procurement.

Funding rate: 50% of total eligible costs for all beneficiaries.

Grants for procurement of advanced capacities (PAC)

Description: Specific type of action for procurement in grant agreements by "contracting authority/entity" as defined in the EU public procurement Directives (Directives 2014/24/EU, 2014/25/EU[173] and 2009/81/EC)

[173] Contracting authorities
1. For the purpose of this Directive 'contracting authorities' means State, regional or local authorities, bodies governed by public law or associations formed by one or more such authorities or one or more such bodies governed by public law.
2. 'Regional authorities' includes all authorities of the administrative units, listed non-exhaustively in NUTS 1 and 2, as referred to in Regulation (EC) No 1059/2003 of the European Parliament and of the Council.
3. Local authorities' includes all authorities of the administrative units falling under NUTS 3 and smaller administrative units, as referred to in Regulation (EC) No 1059/2003.

aiming at buying in innovative digital goods and services (i.e. novel technologies on the way to commercialisation but not yet broadly available).

Funding rate: 50% of total eligible costs.

Grant for financial support

Description: Actions with a particular focus on cascading grants. The majority of the grant will be distributed via financial support to third parties with special provisions in the grant agreement, maximum amounts to third parties, multiple pre-financing and reporting obligations.

Annex 5 of the model grant agreements foresees specific rules for this type of action regarding conflict of interest, the principles of transparency, non-discrimination and sound financial management as well as the selection procedure and criteria.

In order to assure the co-financing obligation in the programme, the support to third parties should only cover 50% of third party costs.

Funding rate: 100% of eligible costs for the consortium, co-financing of 50% of total eligible costs by the supported third party.

Framework Partnership Agreement (FPA) and Specific grant agreement (SGA):

FPAs:

Description: An FPA establishes a long-term cooperation mechanism between the granting authority and the beneficiaries of grants. The FPA specifies the common objectives (action plan), the procedure for awarding specific grants and the rights and obligations of each party under the specific agreements. The specific grants are awarded via identified beneficiary actions (with or without competition).

Funding rate: no funding for FPA.

SGAs:

Description: The SGAs are linked to an FPA and implement the action plan or part of the action plan. They are awarded via an invitation to submit a proposal (identified beneficiary action). The coordinator of the FPA has to be the coordinator of each SGA signed under the FPA and will always take to role of interlocutor with the granting authority. All the other partners of the FPA can participate in any SGA. There is no limit to the amount of SGAs signed under one FPA.
Funding rate: 50% of total eligible costs.

Lump sum grant

Description: Lump Sum Grants reimburse a general lump sum for the entire project and the consortium as a whole. The lump sum is fixed ex-ante (at the latest at grant signature). The granting authority defines a methodology for calculating the amount of the lump sum. There is an overall amount, i.e. the lump sum will cover the beneficiaries' direct and indirect eligible costs. The beneficiaries do not need to report actual costs,

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4. Bodies governed by public law' means bodies that have all of the following characteristics:
(a) they are established for the specific purpose of meeting needs in the general interest, not having an industrial or commercial character;
(b) they have legal personality; and
(c) they are financed, for the most part, by the State, regional or local authorities, or by other bodies governed by public law; or are subject to management supervision by those authorities or bodies; or which have an administrative, managerial or supervisory board, more than half of whose members are appointed by the State, regional or local authorities, or by other bodies governed by public law.

they just need to claim the lump sum once the work is done. If the action is not properly implemented only part of the lump sum will be paid.

Funding rate: 50% of total eligible costs.

9.3 Annex 3 – Implementation Of Article 12(5) and 12(6)

As indicated in this document and detailed in the call document, for duly justified security reason, the participation of legal entities controlled from a third country[174] (including those established in an eligible country territory but controlled by a third country or by a third country legal entity) can be excluded from actions falling under section 2 and 3 of this Work Programme.

The assessment of the foreign control will be addressed during the eligibility phase of the evaluation of proposals. For this, participants will be requested to fill in a self-assessment questionnaire to determine their control status during proposal submission. They will also be requested to submit supporting documents in order for the Commission to determine that the entities are not controlled by a third country.

Entities judged to be controlled by a third country can only participate in topics where article 12(6) applies, provided that they comply with certain conditions set out below. Those participants will be asked for guarantees approved by the eligible country in which they are established. The validity of these guarantees will be later assessed by the European Commission.

Conditions for foreign controlled entities

The foreign controlled applicant shall be required to provide information demonstrating that:

(a) control over the applicant's corporate structure and decision-making process is not exercised in a manner that restrains or restricts in any way its ability to perform and complete the action;

(b) the access by non-eligible third countries or by non-eligible third country entities to classified and non-classified sensitive information[175] relating to the action will be prevented;

(c) the persons involved in the action will have national security clearance issued by a Member State where appropriate;

(d) the results of the action shall remain within the beneficiary and shall not be subject to control or restrictions by non-eligible third countries or other non-eligible third country entities during the action and for a specified period after its completion.

(e) For the topic data space for security and law enforcement, other entities will also have to prove that they will only perform specific and clearly defined tasks.

(f) For applicants established in the EU and controlled from a third country and established in in Associated Countries, that are not subject to export restrictions to EU Member States on results, technologies, services and products developed under the project for at least 4 years after the end of the action, in order to ensure the security of supply.

More information about the procedure, the conditions and the guarantees will be detailed in the call documents and the online manual in the EU Funding & Tenders portal.

Procurement actions will also be subject to these restrictions (articles 12(5) and 12(6)) and, when applying article 12(6), will use the same conditions as calls for proposals (a, b, d and e). More information will be published in the Funding and tenders portal and in the procurement-related documents.

[174] See Article 12(5) and 12(6) of the Digital Europe Programme Regulation

[175] Commission Decision 2015/444/EC, Euratom of 13 March 2015 on the security rules for protecting EU classified information (OJ L 72, 17.3.2015, p. 53).