DEP

DIGITAL EUROPE PROGRAMME

PROPOSAL FOR A REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL the Digital Europe Programme

COM(2018)434 final

Period of Application 2021 - 2027

RELEVANT WEBSITE FOR MORE INFORMATION

https://europa.eu/!pQ93Fc

FINANCIAL PROGRAMMING

(EUR MILLION)

2014-2020	New
2021	1 129.6
2022	1 247.8
2023	1 268.4
2024	962.3
2025	981.4
2026	1 000.4
2027	1 020.2
Total programming	7 610.1

IMPACT ASSESSMENT

The impact assessment for the Digital Europe Programme was carried out in 2018. For further information please consult: https://europa.eu/!BJ66th

Challenge

The global competition to control digital technologies forces European businesses, public sector and researchers to access the computing, data, or artificial intelligence resources they need outside the Union. Meanwhile, hundreds of thousands of jobs in crucial digital areas go unfilled, hampering investment and innovation.

Unless Europe improves its cybersecurity capabilities, its vital infrastructure and data are at risk. The take-up of digital technologies by European businesses, SMEs and public administrations is very uneven.

Unless Europe develops key digital capabilities, industries and skills, its strategic autonomy and competitiveness are at stake. Given the network effects of digitalisation (e.g., the need to promote EU interoperability and to reach critical mass in building state-of-the-art capacities), the EU can act decisively on these challenges, via co-investments with Member States and the private sector.

Mission

Support the digital transformation of the European economy and society, focusing on:

- Building essential capacities and advanced skills in key digital technologies, contributing to Europe's strategic autonomy;
- Accelerating their deployment and best use in areas of public interest and the private sector.

Objectives

1. Make Europe a world-leader in high-performance computing (HPC), by raising its scientific potential and industrial competitiveness;
2. Boost deployment of Artificial Intelligence-based solutions in critical areas like climate change or health;
3. Invest in cybersecurity to ensure the resilience, integrity and trustworthiness of European critical networks, infrastructures and services;
4. Promote advanced digital skills, in key technologies deployed by the programme;
5. Widen the adoption and best use of key digital technologies to make Europe more competitive and address major societal challenges.

Actions

HPC: Deployment of world-class exascale and post-exascale supercomputing capacities to ensure the widest access to and use of these capacities;

Artificial Intelligence: Deployment of EU-wide common data spaces based on a cloud-to-edge federated infrastructure and promote testing and adoption of Artificial Intelligence-based solutions;

Cybersecurity: Build up advanced cybersecurity capabilities (including a quantum secure communication infrastructure for Europe); promote the sharing of best practices and ensure wide deployment of the state-of-the-art cybersecurity solutions across the European economy;

Advanced digital skills: Boost academic excellence, by increasing the education offer and training in key digital technologies, such as HPC, cybersecurity, and Artificial Intelligence;

Adoption and best use of key digital technologies: Deployment of a network of European Digital Innovation Hubs supporting the digital transformation of European public and private organisations; contribute to address key societal challenges (e.g. environment and climate change) via high impact deployments; reinforce the European blockchain capacities and the digital transformation of public administrations and services while promoting an inclusive and trustworthy digital space.

Delivery mode

Actions focused on Artificial Intelligence, advanced digital skills and widening the best use of digital technologies, are directly managed by the European Commission with the support of the Executive Agency for Health and Digitalisation. The HPC actions are implemented primarily through the EuroHPC joint undertaking. Cybersecurity actions are implemented primarily through the European Cybersecurity Industrial, Technology and Research Competence Centre and the Cybersecurity Competence Network. The lead DG is DG CNECT.

Link to the 2014-2020 MFF

Although *Digital Europe* is a new programme, some of its activities build on selected actions deployed in the previous MFF under CEF Telecom and ISA2 (supporting the interoperability of the European public administrations). The programme also builds on results from the Horizon 2020 programme, making it possible to move technologies such as HPC and Artificial Intelligence into large-scale deployments.

Performance Framework

Make Europe a world-leading region in high-performance computing, improving our scientific potential and industrial competitiveness

Indicator	Dimension measured	Type	Source	Data availability
HPC infrastructures jointly procured	Integrated world-class exascale supercomputing and data infrastructure deployed and coordinated	Output	EC monitoring	First data 2023/24- estimated lag 6 month, annual
Usage of the exascale and post-exascale computers in total and by various stakeholder groups (universities, SMEs etc.)	Integrated world-class exascale supercomputing and data infrastructure made accessible on a non-commercial basis to public and private users and for publicly funded research purposes	Result	EC monitoring	First data 2023/24- estimated lag 12 month, annual

Boost the development of AI and use it to respond to critical issues of our time

Indicator	Dimension measured	Type	Source	Data availability
Co-investment in sites for experimentation and testing	Reinforcement and networking of existing AI testing and experimentation facilities in MS, to create European Reference Testing and Experimentation Facilities (TEFs)	Output	EC monitoring (part of the projects reporting requirements	First data in 2024; estimated lag between 12 and 18 months (linked to the reporting frequency); annually or bi-annually depending on the financial reporting requirement.
Usage of common European libraries or interfaces to libraries of algorithms, usage of Common European Data Spaces and usage of sites for experimentation and testing related to activities under this regulation	Core AI capacities made accessible to businesses and public administrations	Result	EC monitoring (part of the projects reporting requirements)	First data in 2024; estimated lag between 12 and 18 months (linked to the reporting frequency); annually or bi-annually (in line with the technical reporting requirement).
Cases for which organisations decide to integrate AI in their product, processes or services, as a result of the Programme	Core AI capacities deployed in the Union	Result	EC monitoring (e.g. survey sent to users of the capacities offered by the programme)	First Data in 2025; estimated Lag: maximum 3 years (for the fastest integrators of the technologies); at least once, but it could be repeated 3 years later.

Invest in cybersecurity to guarantee the resilience, integrity and trustworthiness of the Digital Single Market, including critical networks, infrastructures and services

Indicator	Dimension measured	Type	Source	Data availability
Cybersecurity infrastructure and/or tools jointly procured	Procurement of advanced cybersecurity equipment, tools and data infrastructures	Output	EC monitoring	First data in 2024; estimated lag 2 years; annually
Users and communities getting access to European cybersecurity facilities	Availability of advanced cybersecurity equipment, tools and data infrastructures	Result	EC monitoring	First data in 2024; estimated lag 2 years; annually

Promote advanced digital skills to address the shortage of digital experts, particularly in key technological areas

Indicator	Dimension measured	Type	Source	Data availability
Persons who have received training to acquire advanced digital skills	Skill development	Output	EC monitoring	First data in 2024; estimated lag 1 year; annual or biannual (depending on the type of courses).
Enterprises having difficulty recruiting ICT specialists	Skill gap	Impact	Eurostat	First data in 2024; estimated lag 1 year; annually
People reporting improved employment situation after the end of the training supported by the Programme	Skill acquisition	Result	Participants' survey	First data in 2024; estimated lag from 1 to 2 years; biannual

Widen the adoption and best use of digital technologies in all regions and sectors to make Europe more competitive and address major societal challenge

Indicator	Dimension measured	Type	Source	Data availability
Take-up of digital public services	Access of public sector and areas of public interests to state-of-the-art digital technologies	Result	EC monitoring (by contractor, cf. currently for CEF https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/Dashboards)	First data in 2021 (baseline); estimated lag 6 months; annually.
Enterprises with high digital intensity score	Uptake of advanced digital and related technologies by the Union industry, notably SMEs	Impact	Eurostat	First data in 2024; estimated lag 1 year; annually.
Extent of alignment of the National Interoperability Framework with the European Interoperability Framework	Interoperable digital solutions for EU level public services for European citizens and businesses	Result	EC estimation integrating MS survey (EIF Contact points)	First data in 2022; estimated lag 3 months; annually.
Businesses and public sector entities which have used the European Digital Innovation Hubs' services	Network of Digital Innovation Hubs	Result	EC monitoring	First data in 2022; estimated lag 1 year; annually

Estimation of baselines and targets

For new indicators, the estimation will be based on a mix of qualitative methods. For the indicators that provide contextual information, the targets will be based on past trends. As for the activities supported under CEF (deployment of Digital Service Infrastructures) and ISA2 programme (interoperability in administration applications), the DEP performance framework will build on the corresponding existing framework. This will ensure coherence and continuity in reporting between MFF 2014-2020 and MFF 2021-2027.

Indicator	Baseline	Target
1.1 N. of HPC infrastructures jointly procured	7 Supercomputers (2 precursors to exascale & 5 petascale supercomputers have been acquired in the context of the 2014-2020 MFF)	Based on the EuroHPC regulation, the programme shall procure at least two exascale systems by 2022-2023, and acquire one post-exascale system, as well as a hybrid HPC/Quantum computing infrastructure by 2027. Additional mid-range supercomputers will be acquired (precursor and petascale supercomputers). The form of procurement will be identified during the preparation of the work programmes.
1.2 Usage of the exascale and post-exascale computers in total and by various stakeholder groups (universities, SMEs etc.)	The indicator is strictly linked to the implementation of DEP; therefore, at the start of the Programme, the baseline is 0.	To define the targets, we will analyse the usage of supercomputers currently managed by PRACE and define a target that would represent a significant increase.
2.1 Total amount co-invested in sites for experimentation and testing	The indicator is strictly linked to the implementation of DEP; therefore, at the start of the Programme, the baseline is 0. There is no existing TEF offering the kind of services at European level. There are plenty of embryos of facilities, and DEP will invest in scaling them up to reach EU level and MS will co-invest for that scaling up effort.	The remaining 50% co-invested in TEFs (should be the same figure as the DEP funding under TEFs): 195M€.
2.2 Usage of common European libraries or interfaces to libraries of algorithms, usage of Common European Data Spaces and usage of sites for experimentation and testing) related to activities under this regulation	By construction, the baseline for this composite indicator is 0.	By construction, the target for this composite indicator is 1 (100%). Targets will be defined for each sub-indicator.

2.2.1. Usage of the European AI platform	The baseline will draw from usage levels of the AI4EU platform at the start of the programme. At the moment it is estimated that 100 resources will be available on the platform by the start of DEP and that between 50-100 additional resources will be added per year (these are not simply assets put on the platform but "ready-to-use" assets, tested and fully usable and docked/linked to the right pipelines, and with the right licenses). Additional services will also be made available through the platform (e.g. access to cloud/HPC computing), and collaboration with other services/initiatives and federation of services even more resources would become available through the AI on Demand platform. The intensity of usage of these assets will have to be re-assessed later on. Some of the resources will be used extensively and other will be used more for "niche" applications. The multiplication factor is what counts. Because even if some tools can be found elsewhere, the AI on demand platform – as the central and reference access point - aims to guarantee that the resources offered are of quality, ready to use, have the correct license etc. In addition to providing such resources, the AI-on-demand-platform will offer supports to DIHs - such as "train the trainer" programme	At least 200 "ready to use" resources available on the platform. The target number of the users of such resources will have to be reassessed, based on the experience form the AI-on demand platform funded under H2020, and the demand from the various users of the platform, including EDIHs, etc.
2.2.2. Usage of European Data Spaces	The indicator is strictly linked to the implementation of *DEP*, as it measures the usage of the TEFs set-up by the DEP programme, therefore, at the start of the programme, the baseline is 0.	500 organisations using the data spaces as data providers or data users. Targets might need to be revised based on data on the final number of data spaces initiated in the first two years of the work programme. The DEP work programme 2021-2022 will support the establishment of 10 Data Spaces (Green Deal, Health, etc.). Data Spaces will offer a secure and trusted mean to make available data, for both the private and public sector, based upon voluntary agreements or legal obligations where such obligations are in force. Once data spaces will have been deployed and will be fully operational it is expected that a minimum of 50 organisations per data space will use them as data provider and/or data reuser.
2.2.3. Usage of testing and experimentation facilities.	The indicator is strictly linked to the implementation of *DEP*, as it measures the usage of the TEFs set-up by the *DEP* programme; therefore, at the start of the programme, the baseline is 0.	220 users for the 4 sectorial TEFs by 2025 (the lack of any similar experience makes setting an accurate target challenging): => projects starting beginning 2023 - 1 year to establish the TEF infrastructure and testing environments and scenarios - therefore the hosting of AI providers to start the testing and experimentation will start in 2024 - each TEF is expected to host about 10 experimenters in the starting phase - i.e. during 2024 - therefore at the beginning of 2025 10 testing times 22 TEFs gives 220 usages of TEFs by 2025. Regarding Edge AI TEF - 12 users of the edge AI TEF are expected by the end of 2025. Reasoning: Edge AI TEF will have to procure and install the equipment first, so it will be operational in mid/late 2023. That leaves 2 years for running the prototyping and testing activities, which also have some lead-time which obviously it depends on the complexity of the specific projects. By the end of 2025 the Edge AI TEF is expected to have served

		around 12 projects (this is an estimate).
2.2a N. of cases for which organisations decide to integrate AI in their product, processes or services, as a result of the Programme	The indicator is strictly linked to the implementation of *DEP*, as it aims to measure its impact; therefore, at the start of the programme, the baseline is 0.	The lack of any similar experience makes setting an accurate target challenging. Targets will need to be assessed based on data collected about the usage of the various tools offered by the programme measured after 2 years. Indeed, it is too speculative to give such estimate at this stage, as it should integrate the actions from the Data/Cloud services and DIHs as well, and this will only happen later in the process. We should be able to provide some estimates later in the programme, once the usage of the various tools DIGITAL is provided. The number of take-up of AI solution in products, services and processes should be a function of the number of AI tools available on the AI-on-demand-platform, the usage of the data-space and cloud infrastructure, the number of "test before invest" of AI tools via DIHS, and the number of AI solutions successfully validated in TEFs.
3.1 N. of cybersecurity infrastructure and/or tools jointly procured.	The indicator is strictly linked to the implementation of *DEP*; therefore, at the start of the Programme, the baseline is 0.	7 - The number of joint infrastructure or joint actions will be defined by the European Cybersecurity Competence Centre. Today we have none defined yet (as the GB does not exist), we expect MS to agree on a couple to start with, while the Commission wish to see eventually a large number of joint actions
3.2 N. of users and user communities getting access to European cybersecurity facilities	The indicator is strictly linked to the implementation of *DEP*; therefore, at the start of the Programme, the baseline is 0.	Target is to have at least 20 Member States using each facility. The title of the indicator is not precise enough, number of users or number of communities will lead to significant difference. In view of the point above, the more realistic will be to measure the number of Member States using/committed to the joint action mentioned above.
4.1 Number of persons who have received training to acquire advanced digital skills supported by the Programme	The call has significantly changes from the *CEF* pilot for Master courses.	To be defined according to the total financial allocation per action and the estimated unit costs (already used in the context of other programmes for similar actions such as European Social Fund (short-term trainings), and the pilot funded under *CEF* (4 Master's courses to be delivered as of end 2021).
4.2 N. of enterprises, in particular SMEs, having difficulty recruiting ICT specialists	57% (EU 28)	This is a context indicator. Its evolution depends on a number of external factors, in particular on the availability of ICT specialists in the labour market and the demand for these profiles from businesses. This means that if companies become more digitalised, we can expect that the demand will increase, leading to a possible increase in the value of this indicator, even if the offer increases at the same time. The contribution of the programme cannot be isolated in a straightforward manner.
4.2b N. of people reporting improved employment situation after the end of the training supported by the Programme	0.	This is an indicator already used in the monitoring of the European Social Fund. In general terms, the target is that more than 50% of participants have improved their employment situation.
5.1 Take-up of digital public services	By construction, (as the indicator measures progress toward target in percent) the baseline for this composite indicator is 0.	This indicator is a composite indicator measuring the progress towards the uptake targets for selected digital public services supported by the programme used as proxies. For each digital solution to be used as a proxy, one or several sub-indicators will measure its uptake. E.g.: number of projects reusing a solution, score evaluated against the completion of the planned work in the context of the maintenance of a core system, etc. For each sub-indicator, a level of progress is computed based on the baseline and target. This figure cannot exceed 1 (100%). We then compute an average of these percentages, which give a score for the service. The next step is to compute an average of the scores of each services by topic. Each area has equal weight. Finally, these figures are combined to compute the global score. Scope of the indicator: Indicator 5.1 covers the following digital public services, grouped by

areas of focus:

1. Common services platform:

1.1.1. Take-up of eTranslation (metrics: # of projects reusing the service)

1.1.2. Take-up of eDelivery (metrics: # of projects reusing the solution)

1.1.3. Take-up of interoperability testbed (metrics: # of projects reusing the solution)

2. Once-only principle implementation

2.1.1. Schedule Performance Index and Cost Performance Index. If the score is higher than one, the planned take-up is on track. If the ratio is less than one, the project is not on track. In ideal conditions, the ratio should be one.

2.1.2. Number of Member States connected by the end of the action.

3. Support to an EU electronic identity system

3.1.1. Number of countries enabled by the funded activities to exchange the new digital identity credentials

4. Digital services in the area of justice and consumer protection. [The target metric is evaluated against the successful completion of the planned work under each component, as set out in the respective WP. A value of 1 equals 100% of the objectives have been met, a value of 0,5 indicates that the objectives were met partially, and a value of 0 indicates that the objectives have not been achieved]:

4.1.1. Maintenance and evolution of the core EU justice and consumers systems -

4.1.2. e-Justice Communication via Online Data Exchange (e-CODEX)

4.1.3. Common platform for online investigations and enforcement (EU eLab)

Weights:

Each area of focus receives an equal weight to compute the overall score. This table presents an indicative weight distribution.

Area of focus	Weight
Common services Platform	25%
Once Only Principle implementation	25%
Support to an EU electronic identity system	25%
Digital services in the area of justice and consumer protection	25%

5.2 Enterprises with high digital intensity score	15.4% (2020)	We will assume an acceleration of the trend, or in other words a more rapid increase of the share of companies with at least high digital intensity scores. However, the isolation of the programme's contribution is not straightforward due to exogenous factors. The rapid evolution of the measured technologies does not allow for a comparable significance of a potential increase of the index across the years.
5.3 Extent of alignment of the National Interoperability Framework with the European Interoperability Framework	Baseline value will be established based on the results collected at the end of 2020.	The Member States are expected to fully implement the EIF. The full implementation of the EIF is equal to a score of almost 4
5.4 N. of businesses and public sector entities which have used the European Digital Innovation	The indicator is strictly linked to the implementation of *DEP*; therefore, at the	129 600 (2028) The minimum target, specified in the impact assessment, is 42 000

Hubs' services	start of the Programme, the baseline is 0.	for 7 years. Assuming there will be around 200 EDIHs by 2023, and that the average number of users of test before invest services per EDIH will progressively grow to 200 by 2028, the target can be fixed at 129 600 supported entities.