ICT Solutions for Brilliant Minds

CSC

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EU funding for competitiveness
CSC – IT Center for Science Ltd.

In the current geopolitical situation, Europe's safety and prosperity require increased self-reliance. This is particularly true in the technology sector where we are dependent on non-European tech giants. To reduce these dependencies, **Europe must take decisive action to boost its own capabilities for developing and applying new technologies**, in order to create flourishing European markets for digital products and solutions. To secure this, we need to create a firm technology platform and ecocystem that European researchers and companies can use to experiment, innovate, scale and commercialise their activities. Europe needs to keep on investing in state-of-the-art digital infrastructure and hardware, as well as the talent and skills to make optimal use of them.

The positive economic and societal impact of strategically selected technology infrastructures is enormous. According to a market potential study, an **Open Web Index** for Europe is estimated to produce annual net benefits between 400 and 500 million €. Furthermore, the qualitative societal impacts are projected to significantly enhance European digital sovereignty, promoting a more balanced and open digital ecosystem[1]. Another study reveals, that for euro invested in CSC's **high-performance computing services**, 25-37€ was gained in return as direct economic benefit during five years. The SROI was measured within the scope of concrete customer cases in e.g. the following areas: drug development, LLM development, medical research and diagnostics, genome research, climate research, space modelling, material science[2].

The European Commission has projected the value of European **data economy** to reach €829 billion in 2025, as compared to €301 billion in 2018[3], and important steps have been taken to enable this. The EuroHPC initiative has shown Europe's power in scaling up computing capacity, and progress with other critical technologies has also been made. However, EU's weak spot is how to ensure that *data,* today's most valuable raw material that supports novel business models and groundbreaking research and innovation, *creates value in Europe and especially for Europe*. Currently vast amounts of data are leaking out from Europe and used for the benefit of non-European businesses, and also for purposes such as spreading disinformation, which is harmful for democracy and can put our European values at stake. **We must prioritise building data capacities and ownership for European researchers and companies**, in a similar way as we have been building the computing and AI capacity. Europe needs to start thinking strategically on this matter.

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[1] https://openwebsearch.eu/wp-content/uploads/2024/09/MarketAssessmentOfOWI-Report-V1.pdf

[2] https://csc.fi/en/media-release/sroi-of-cscs-high-performance-computing-services-studied-e25-37-return-per-euro-invested/

[3] https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/european-data-strategy_en

Europe needs a value-based ecosystem of computing, data, network connectivity and skills

To achieve the kind of tech and data sovereignty that Europe's safety and prosperity require, we must develop an interoperable ecosystem of **computing, data, network connectivity and skills**, taking into account the increasing technological convergence that is dissolving boundaries between once-discrete fields and challenging the traditional siloed approach to policy and strategy. To develop this kind of an ecosystem, the EU's next Multiannual Financial Framework (MFF) will have to include long-term funding for at least:

- **world-class computing capacity**, building on the EuroHPC initiative,
- **infrastructures for managing data to ensure value creation for Europe,** building on ongoing initiatives and infrastructures, such as the European Open Science Cloud (EOSC) and other common European data spaces, the Open Web Search project and the upcoming AI Factory Data Labs,
- **infrastructures for secure transferring data** for research and innovation purposes, such as submarine data cables; and
- **horizontal skills development** to ensure EU has strong human capital to develop, apply and understand the implications of HPC, AI, quantum and data, based on up-to-date skills intelligence.

In addition to securing funding for the enabling factors of research and innovation, it must be ensured that these enablers are taken into active and effective use. Thus, sufficient funding must also be allocated to the actual **research and innovation activities**, especially in key fields, such as digital twins and AI. This will ensure that Europe's skilled and innovative people can use their world-class computing and data infrastructure to achieve the kind of scientific breakthroughs and business innovations that will lift Europe's competitiveness to the next level.

While Europe must urgently boost its technological capabilities it must do it in a way that respects fundamental European values. **Use of data and AI must be ethical**, ensuring that individuals have the right to determine how their data is being used and that algorithmic decision-making is open and transparent, and doesn't create biases or discrimination. Attention must also be paid to **the climate and environmental impact of digitalisation**, taking into account both the negative impact of increased energy consumption and the positive impact of digital solutions in support of sustainable practices and processes, such as circular economy, process optimisation and evidence-based decision-making.

World-class computing capacity supports world-class research and innovation

Europe is already well on its way when it comes to developing the kind of research infrastructures needed for cutting-edge research and innovation. A prime example are the **EuroHPC resources[4]**, especially the AI Factories[5] that are designed to provide European researchers and companies with a one-stop-shop for the computing, data, talent, training and support they need in their work. The future MFF has to ensure that Europe will keep pooling its resources in the framework of EuroHPC and thus continue joint investments in world-class instruments for data-based research and innovation: supercomputers, quantum computers, data platforms, networks etc.

Particular attention must be paid to ensuring that all the shared European infrastructures work as an **interoperable ecosystem** where the critical parts of the technology value chain are included,

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[4] https://eurohpc-ju.europa.eu/index_en
[5] https://digital-strategy.ec.europa.eu/en/policies/ai-factories

taking also parallel initiatives such as the initiatives for developing European semiconductors into account. This will require continued funding for the EuroHPC Federation Platform[6] as well as linkages with initiatives like the European Open Science Cloud (EOSC) and the Common European Data Spaces to allow for more and more data to flow into the ecosystem to fuel its operations. Due attention must also be paid to skills development as an integral part of the ecosystem.

Data is the key ingredient of disruptive research and innovation

Europe must tap into its unused data resources and do it in a way that benefits European researchers and innovators the most. This requires scaling up the efforts for federating the existing European data spaces and repositories, consisting of the existing sectoral data spaces[7] (including the European Open Science Cloud[8]), the upcoming EuroHPC AI Factory Data Labs foreseen in the Commission's AI Continent Action Plan[9] as well as tools and policies for effective and secure storing and sharing of data. The governance of a federated European data infrastructure must be designed so that it fosters European ownership of data and supports responsible use of **sensitive data** whose role in e.g. health research and innovation can be game-changing.

A key element of a European data infrastructure is a **European web index**, a giant library catalogue that keeps track of all the web pages, documents, pictures and videos on the internet. Currently only non-European tech giants have such indices which gives them practically full control over e.g. search engine markets. Having Europe develop its own web index would make European innovators more competitive and less reliant on non-European actors. Therefore, the next MFF must secure sustainable funding for the European web index that is currently being developed in the framework of the Open Web Search project[10] that will run until early 2026.

To allow for the data to flow between the relevant infrastructures, fast and reliable network connectivity is needed, not only within Europe but also with like-minded partners elsewhere in the world. This will entail investments in e.g. **submarine data cables**, such as the one suggested in NORDUnet's 2030 vision Polar Connect[11].

Competitiveness starts with people

While computing, data and connectivity infrastructures are important, in the end of the day any meaningful research and innovation depend on skilled and innovative people. Therefore, the EU must take its new Union of Skills[12] seriously and ensure that the future MFF allocates sufficient funding to continue its implementation well into the 2030's. From the point of view of competitiveness and technological sovereignty, it is particularly important to invest in the **EU skills academies and joint study programmes in the areas of AI, quantum and data**. At the same time, it is crucial to understand that new technologies crosscut and transform all fields of society and must therefore be taken into account in all fields and levels of education, not only the technical field itself.

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[6] https://csc.fi/en/news/csc-led-consortium-to-deliver-the-eurohpc-federation-platform/

[7] https://digital-strategy.ec.europa.eu/en/policies/data-spaces

[8] https://eosc.eu/

[9] https://digital-strategy.ec.europa.eu/en/factpages/ai-continent-action-plan

[10] https://openwebsearch.eu/

[11] https://nordu.net/polar-connect/

[12] https://commission.europa.eu/topics/eu-competitiveness/union-skills_en

Another key aspect of the Union of Skills is the intention to rely more and more on **skills intelligence** when deciding on education policy priorities. This will allow the education offering to respond to the evolving needs of the labour market, making sure that European companies have access to the kind of skills their competitiveness depends on at any given time. Increased reliance on skills intelligence will also require increase gathering, storing and analysing of skills data – something that must also be funded from the new MFF, building on existing solutions such as the Data Space for Skills[13].

In addition to developing talent, the EU must also focus on **attracting and retaining talent**. The Union of Skills rightfully recognises the importance of excellent scientific working conditions for this endeavour. One key aspect of this are state-of-the-art research infrastructures, including world class supercomputers whose funding must thus be secured in the new MFF for two reasons: attracting talent and providing those talented people with the tools they need to perform their groundbreaking data-based research and innovation.

Europe must use its R&I capabilities in a strategic and sustainable way

Having the computing, data, connectivity and skills in place is necessary but still only the starting point. To make the most of these enabling factors of data-based research and innovation (R&I), the new MFF must also fund some **flagship R&I projects**, similarly to what is being done now with Destination Earth[14] and OpenEuroLLM[15]. Whether the future EU-funded R&I projects will be about digital twins like Destination Earth or large language models like OpenEuroLLM or something completely different must be determined based on emerging trends and needs in the R&I community. Similarly to the skills intelligence mentioned earlier, some intelligence gathering and forecasting must be done here too, in good cooperation with the key actors of the R&I community.

As stated in the political priorities of the 2nd von der Leyen Commission, R&I must be put at the heart of Europe's economy. The future MFF must reflect this by allocating a larger share of EU budget to R&I. As with the current MFF, a sizeable part of this funding must be allocated to R&I that advances the **clean transition**. Similarly, attention must be paid to ensuring that research infrastructures funded from the EU budget operate in a sustainable way. Impactful sustainability and energy efficiency indicators for research infrastructures must be put in place, addressing their entire life-cycle from construction and operation to decommissioning.

Kimmo Koski
Managing Director
kimmo.koski@csc.fi

Irina Kupiainen
Director of EU Affairs, Policy and
Business Development
irina.kupiainen@csc.fi

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[13] https://www.skillsdataspace.eu/
[14] https://destination-earth.eu/
[15] https://openeurollm.eu/