Digital Transformation in Energy

Workshop

Smart grids in the new programming period:
the role of transnational R&I networks to strengthen smart energy
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Overview

- Digital Transformation in Transport Construction Energy Gov. & Public Admin – Presentation of the recent JRC Science for Policy Report
- The role of Digital Innovation Hubs (DIHs) in DT
- Update on the new Digital Europe Program (DEP) 2021-2027

https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/digital-transformation-transport-construction-energy-government-and-public-administration

JRC project: DT&AI

https://ec.europa.eu/jrc/en/publication/artificial-intelligence-european-perspective

Deliverable: Report on State of Play of Digital Transformation in selected policy areas

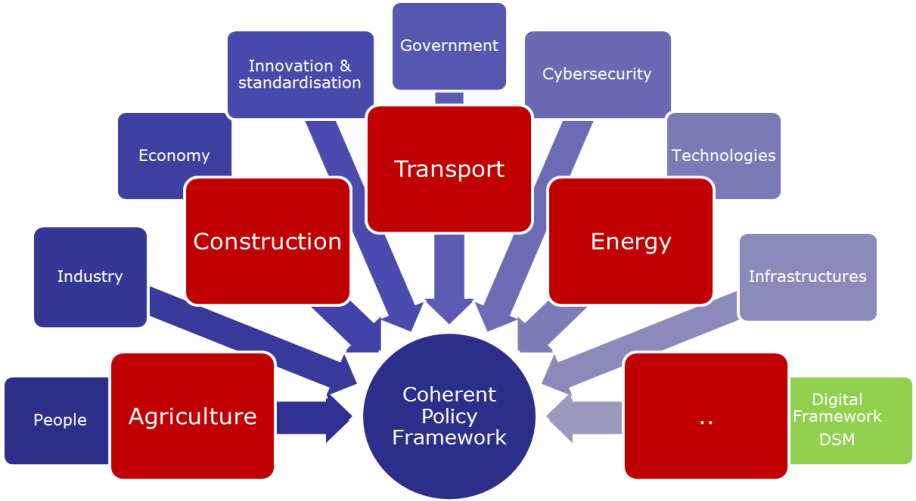
Purpose

- Provide an overview of the socio-economic impacts of digital transformation (DT) in selected policy areas
- Include, when feasible, initial recommendations for more coherent policy development

Covered policy areas

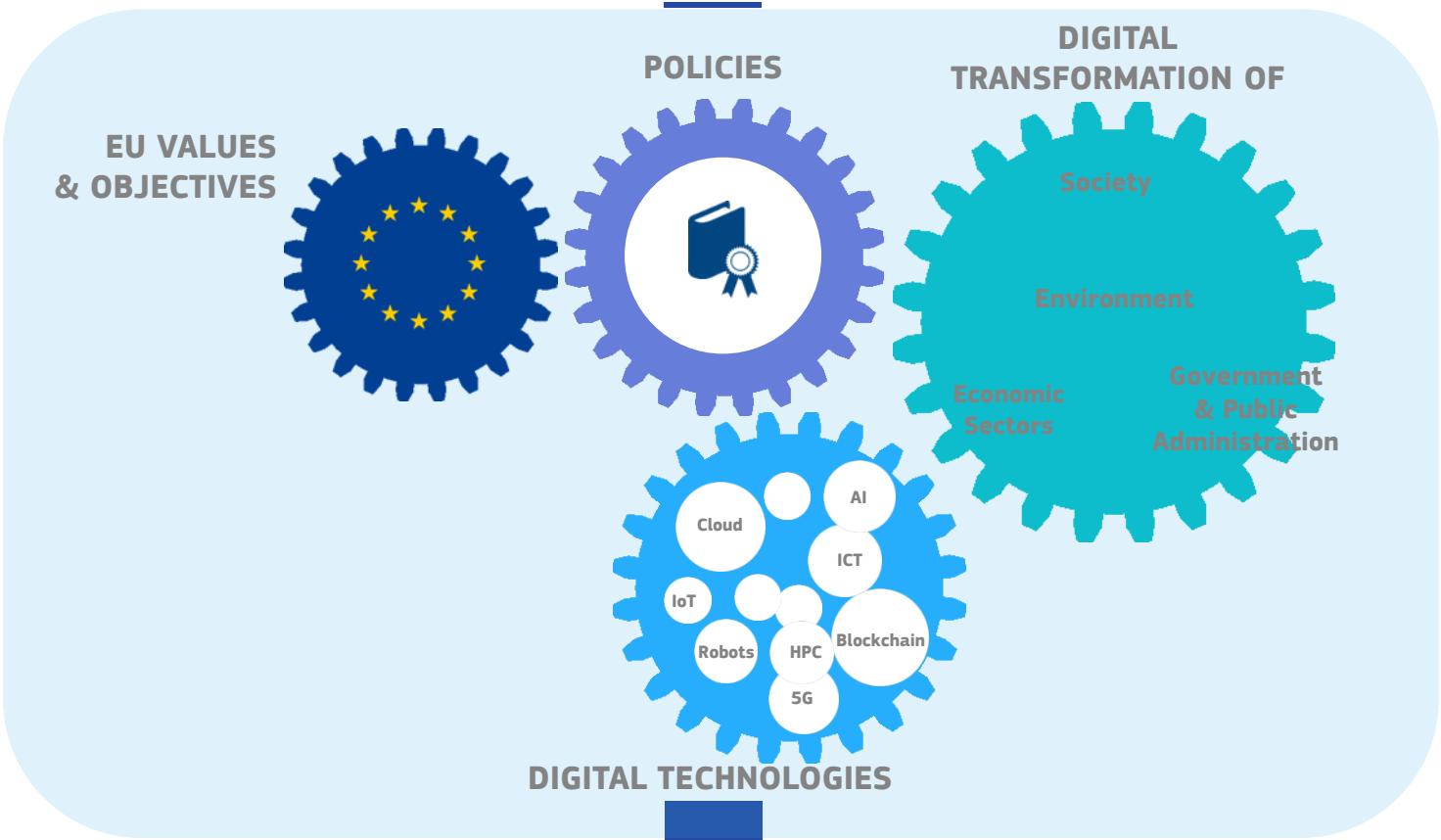
- Policy areas covered in 2018: Transport, Construction, Energy, Digital Government & Public Administration
- Policy areas investigated by relevant JRC thematic Units, using an agreed structure

A multidisciplinary approach



B1	Finance and Economy
B3	Territorial Development
B4	Human Capital & Employment
B6	Digital Economy (Project leader)
C3	Energy Security, Distribution and Markets
C4	Sustainable Transport
E2	Technology innovation in Security
E3	Cyber and Digital Citizens' Security
E4	Safety and Security of Buildings
E6	Demography, migration and Governance
I2	Foresight, Behavioural Insights and Design for Policy
I4	Intellectual Property and Technology Transfer

Conceptual framework to analyse DT



2019 report on State of Play of DT in selected policy areas – Report Structure

Chapter 1: Overview of DT [in Policy Area]

Chapter 2: DT Enablers and Barriers in [Policy Area]

2.1 Technology Infrastructure

Digital technologies (IoT, 5G, AI, etc.)

Data related aspects

Infrastructures (Telecom, etc.)

2.2 Standardisation & Legal Framework

IPR and legal issues

Standardisation

Cyber security

2.3 Innovation, Business models and Skills

Innovation

Territorial aspects: Digital Innovation Hubs

Industrial Modernisation

Skills

Chapter 3: Impacts of DT in [Policy Area]

3.1 Economic impacts

Economic growth, industrial competitiveness, internationalisation

3.2 Social impacts

People: societal welfare, societal aspects

Resilience

Future of work - impacts on workers

Ethics, Privacy aspects

Chapter 4: Conclusions: Way forward for Policy and Research

DT in Energy (I)

- Clean Energy for all Europeans EU package
- DT to manage ever increasing share of renewables, distributed generation, loads with new behaviours (such as electric vehicles), new services and products
- Requires coordinated consideration of technologies, services, standards, business models, and socio-economic factors

- **Evolving landscape: New technologies, alterations of roles (e.g. prosumers, communities), adjustments of the legal framework**
- **(Cyber) security, data, privacy issues**
- **Main risks are technology lock-ins, social exclusion, market oligopolies.**
- **New techs bring new energy demands**

DT in Energy (II)

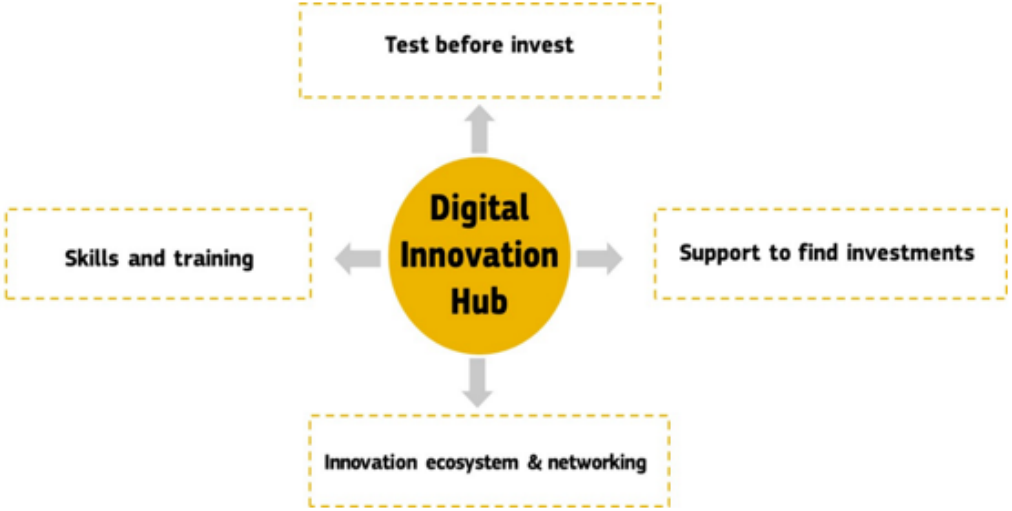
- In Europe the highest investments are in smart network management (34%), demand-side management (25%) and integration of distributed generation and storage (22%). These three taken together account for around 80% of total investments

- The DT can lead to the creation of higher value jobs, based on new digital services and activities and a new industrial value chain. These can mitigate job loss when traditional power plants close

DIHs as enablers of DT in Energy

What are Digital Innovation Hubs?

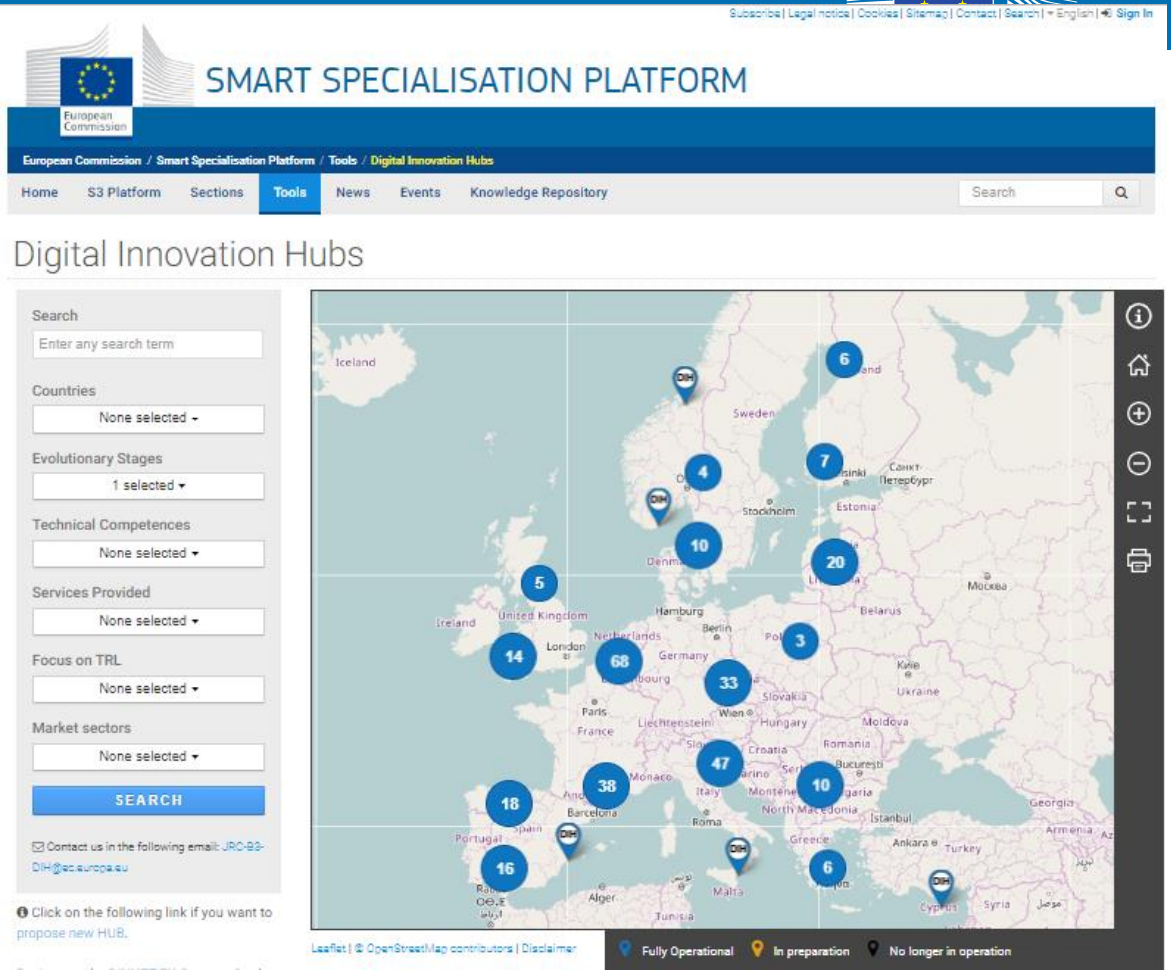
Digital Innovation Hubs provide
technological expertise and *experimentation facilities*
to enable the *digital transformation* of the industry and the public sector



- ***Built around Competence Centres (CC):***
  - **Research and Technology Organisations (RTO)**
  - **Technical Universities**
- ***In collaboration with:***
  - **Industry associations**
  - **Clusters**
  - **Accelerators/Incubators**
  - **Innovation agencies**

DIHs are *innovation intermediaries* matching demand & offer of *digital services & technologies*

DIHs Catalogue in S3P – A yellow pages



DIH yellow pages
https://s3platform.jrc.ec.europa.eu/digital-innovation-hubs-tool

4 criteria (with self-declaration)

Coverage:
> 300 FO DIHs (Jan. 20)
> 150 NUTS2 regions
in almost every MS

- Additional info:

DIHs per country
Examples of DIHs
Services to SMEs
DIHs & market sectors
DIHs & clusters/EEN

DIHs declaring to provide digitalisation services in Energy

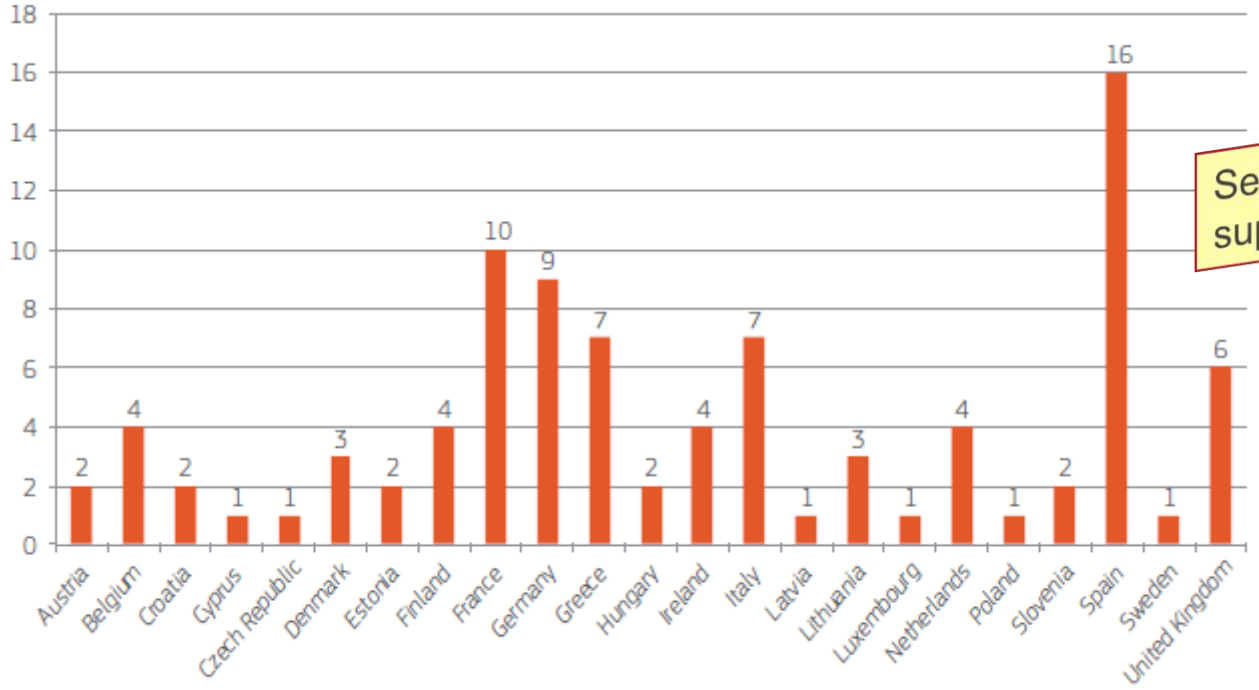


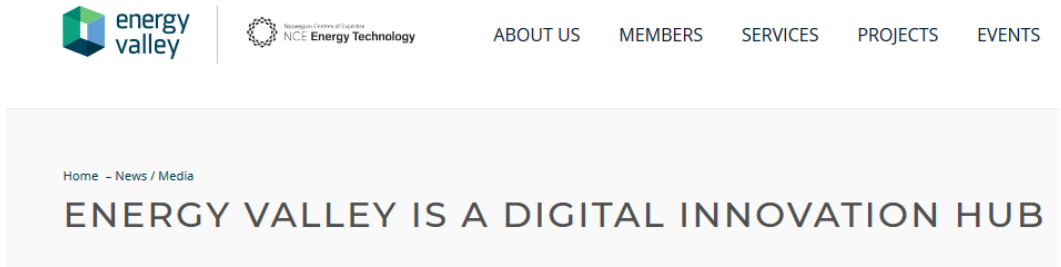
FIGURE 4.15: NUMBER OF DIHS SPECIALISING IN THE ENERGY SECTOR BY EU COUNTRY.
Source: JRC analysis.

Selecting "Electricity, Gas & Water supply" sector in the Catalogue

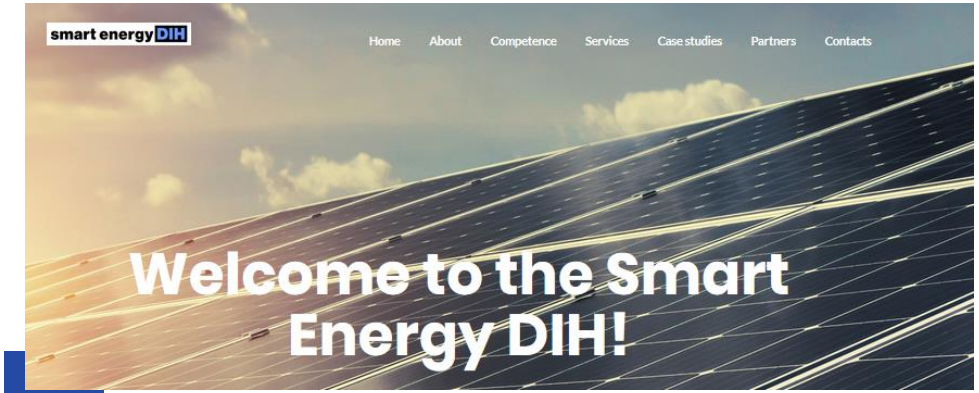
Self – declaration

Examples of DIHs specialising in Energy

Energy Valley, Norway https://energyvalley.no/energy-valley-dih/



Smart Energy Digital Innovation Hub, Lithuania https://smartenergydih.eu

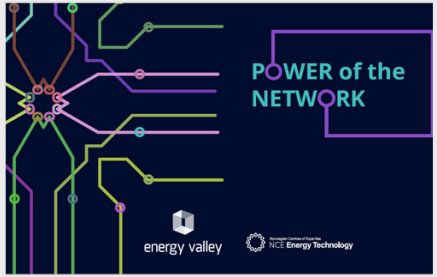


DT services offered to SMEs – Energy valley DIH

European Commission

energy valley

Norwegian Centres of Expertise NCE Energy Technology



Technology scouting and targeted matchmaking

Energy Valley is continuously mapping the key technology and competence differentiators of its member companies and institutions and actively help partners connect with the specific technology experts for their project or challenge at hand.

Expertise within the cluster members ranges from additive manufacturing and automation through submersible electronics and ROVs to data analytics and new business models for the digital transition. Tell us what you need, and we will connect you with the right person in the right company or institution.

Access to shared datasets

Access to realistic data sets and specific sensor output is of high value for companies developing new software applications for the O&G-industry. Operators have started sharing more data, like Equinor's open access to production data from the closed down Volve field, and AkerBP's Open Industrial Data project. In this initiative we focus on which data and data types that are shared by the operators today, how to get access to these data, and what strategies the operators have for future sharing of more data.

The aim of the initiative is both to share knowledge about available data types and data sources, and to identify challenges with data access from the developers' perspective.

Education and skills development

Inviting experts to give talks and interact. Sharing best practices experiences. Increasing ties between academic and industrial partners.

Project development

To identify relevant trends, challenges and opportunities, we perform strategic analysis of the cluster ecosystem together with selected industry experts within digital solutions, energy technology, technology transfer and sustainability. Based on response from the member companies and institutions we contribute to project development, creating consortia, funding proposals and workshops.

Incubator support

Energy.invented is our innovation platform for incubation programs and mentoring to cutting edge energy technology start-ups. We provide flexible office solutions, digital infrastructure, scale-up- and investment consultancy. We aim to create a world leading ecosystem for energy technology and our community will help startups connect to some of the best international professionals and mentors within energy technology.

DT services offered to SMEs – Smart Energy DIH

European Commission

Services

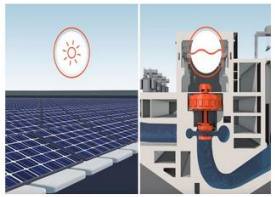
Smart Energy DIH provides full range services: concept validation and prototyping, testing and validation; pre-competitive series production; education and digital skills development; Visioning and Strategy Development for Businesses, Collaborative Researches, Incubator / accelerator support, Market intelligence, Mentoring, digital maturity assessment, visioning for digital transformation, fostering the integration, adaptation and customisation of various technologies, testing and experimentation with digital technologies (software and hardware), knowledge and technology transfer, supporting the preparation of business and financial models, access to financial institutions and investors, supporting the use of InvestEU and other relevant financing mechanisms, advertising, hosting or providing of training, boot-camps, traineeships.

Case studies

Advanced bifacial SoliTek solar plant

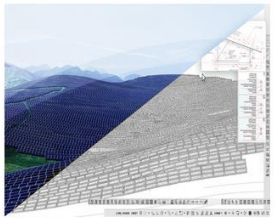
A new generation 2MW solar power plant, the first of its kind in Europe, is equipped with top of the line bifacial glass-glass solar panels and horizontal

Floating solar plant in Kruonis PSHP



Floating solar power plant project in Kruonis pumped storage hydroelectric power plant (PSHP) is developed by Lithuanian state-owned company Ignitis with the scientists from Kaunas University of

Detra Solar virtual reality software



Detra Solar developed software that creates 3D rendered images of the solar park design. These images can be manipulated and explored on screen

Why do we need DIHs in Europe?

European Commission

European companies are not making the most of all the opportunities digital has to offer

Highly digitised companies across Europe

Countries

of Danish companies

of Romanian companies

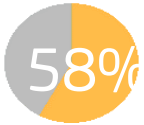
Sector

of computing companies

of metal products companies

Size

of SMEs



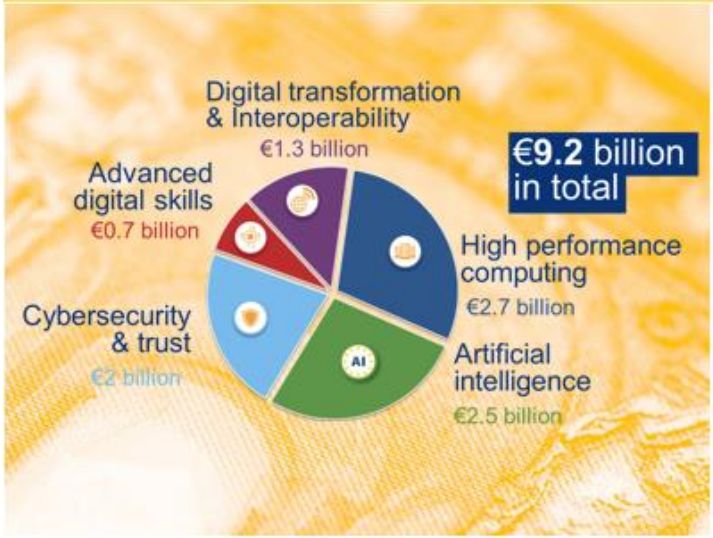
of large enterprises

New Digital Europe Program (DEP) 2021-2027

Digital Europe Programme

Funding programme focused on building the strategic digital capacities of the EU and on facilitating the large scale deployment of digital technologies, to be used by Europe's citizens and businesses

What?



Why?

Compete globally

- Other regions of the world invest huge amount of public capital in advanced technologies. For example, the US and China spend € 10-20 billion annually on AI alone

Achieve scale through collective co-investments

- Given the size of investments needed, scale required and risks involved Europe needs to pool the resources together

Regain control over Europe's value chains and ensure Europe's technological sovereignty

Better address Europe's economic and societal challenges

- E.g. climate, health, mobility and public services

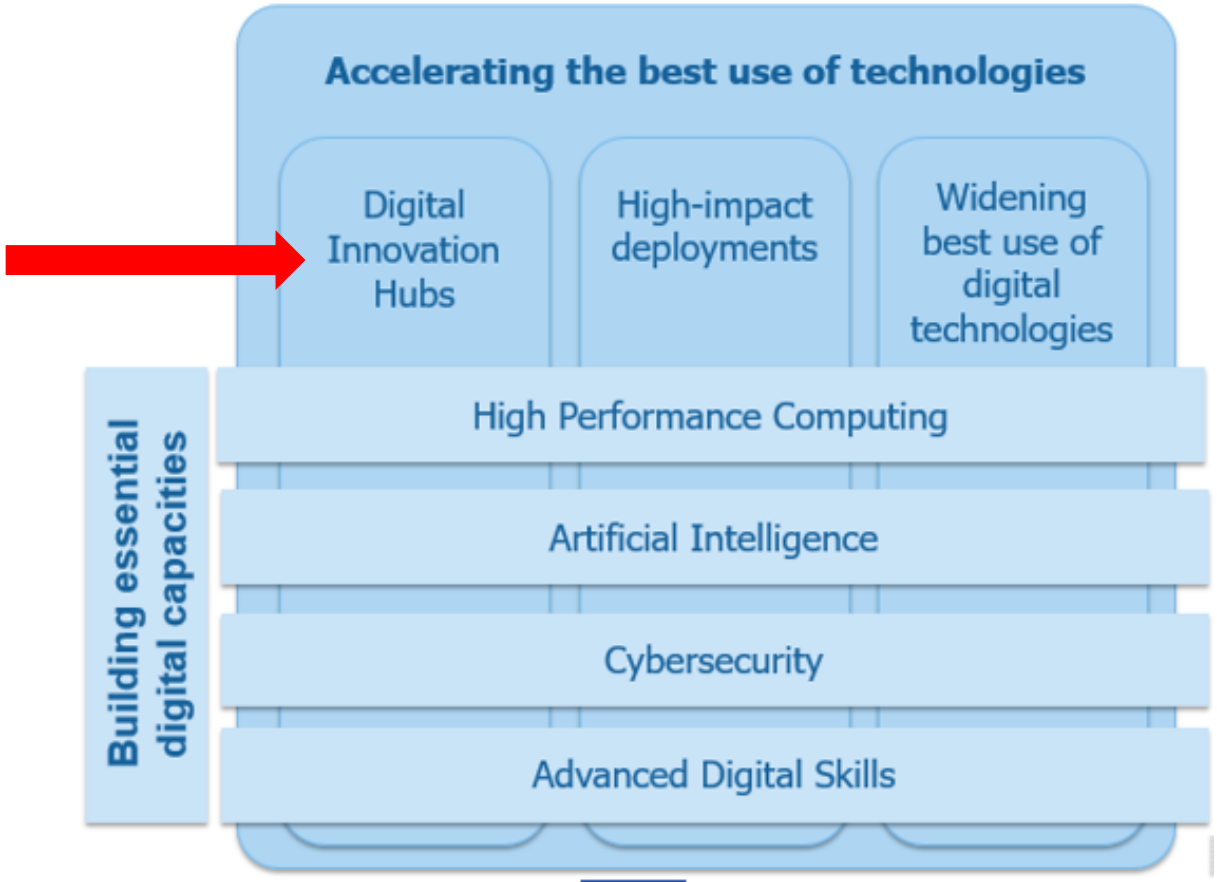
Ensure broad take-up of digital technologies across all regions of EU

- In deploying latest technologies to offer best services to citizens and business

Support SMEs to acquire/access latest technologies and skills

- More than 400 000 EU vacancies in these fields

Digital Europe Program structure



Building essential digital capacities

High Performance Computing

- Procure **exascale machines**
- Upgrade existing **supercomputers,**
- **Quantum computing**
- Make **supercomputing accessible** throughout Europe
- Widen the **use of supercomputing**

Artificial Intelligence

- EU-wide **common data spaces**
- **Large Testing and Experimentation Facilities**
- **Scaling up the European AI platform** to access tested AI technologies

Cybersecurity

- Deploy **competence centres network** with MS
- **Cybersecurity shield, quantum communication**
- **Certification schemes**
- **Cybersecurity tools**

Advanced Digital Skills

- **Master courses**
- **Short term trainings**
- **Job placements**
- **Platform for Skills and Jobs**

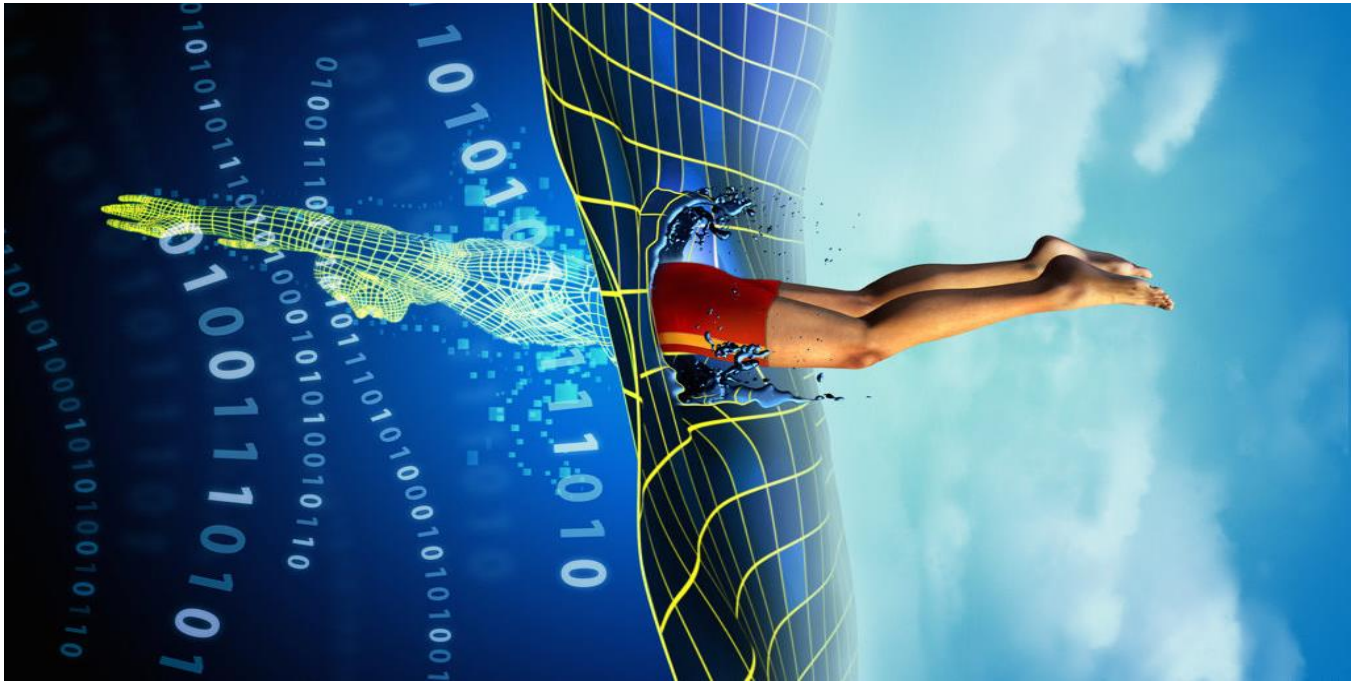
Application areas include, but are not limited to, **health**, **climate**, **environmental**, **manufacturing**, **agriculture**, **energy**, **financial** and **mobility**

European Commission

Programs are complementary

Horizon Europe	• Research • Innovation
Digital Europe	• Strategic capacities (Computing, data, testbeds,..) • Advanced digital skills • EU-Wide deployment
Connecting Europe Facilities	• Broadband and 5G roll out • Connecting Communities
European Regional Development Funds	• Digital connectivity in white and grey areas • Support to enterprises in line with Smart Specialisation • Digital skills for all citizens
Agriculture Funds	• Making use of Big Data for CAP monitoring • Broadband rollout in rural areas
InvestEU	• Leverage private capital for investments in SME, research, digital, infrastructure, skills…

Thank you !



European Commission