



# HORIZON EUROPE

THE EU  
RESEARCH & INNOVATION  
PROGRAMME

2021 – 2027

Horizon Europe Cluster 4 - Digital, Industry  
and Space

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Overview 'Digital'

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# Cluster 4 'Digital, Industry and Space' – Political Priorities



[Action Plan on critical raw materials](#), [Chemical Strategy for Sustainability](#), [Circular Economy Action Plan – For a cleaner and more competitive Europe](#), [European Space Strategy](#)

[European data strategy | European Commission \(europa.eu\)](#)

[A European approach to artificial intelligence | Shaping Europe's digital future \(europa.eu\)](#)

[European Data Governance Act | Shaping Europe's digital future \(europa.eu\)](#)

[Data Act | Shaping Europe's digital future \(europa.eu\)](#)

[European Chips Act | European Commission \(europa.eu\)](#)

[Europe's Digital Decade: digital targets for 2030 | European Commission \(europa.eu\)](#)

# The 2030 Digital Compass

## Skills

**ICT Specialists:** 20 million + Gender convergence

**Basic Digital Skills:** min 80% of population

## Public Services

**Key Public Services:** 100% online

**e-Health:** 100% availability medical records

**Digital Identity:** 80% citizens using digital ID



## Infrastructures

**Connectivity:** Gigabit for everyone, 5G everywhere

**Cutting edge Semiconductors:** double EU share in global production

**Data – Edge & Cloud:** 10,000 climate neutral highly secure edge nodes

**Computing:** first computer with quantum acceleration

## Business

**Tech up-take:** 75% of EU companies using Cloud/AI/Big Data

**Innovators:** grow scale ups & finance to double EU Unicorns

**Late adopters:** more than 90% of European SMEs reach at least a basic level of digital intensity

# Policy Programme: a Path to the Digital Decade

## Multi-Country Projects

- ✓ **Multi-country projects** are large scale projects for:
  - ✓ the achievement of the targets for the digital transformation of the Union;
  - ✓ and industrial recovery.
- ✓ They will **pool EU, national, and private resources** to achieve progress that no Member State could do on its own.

Multi-country projects will facilitate investments in areas like:



High-performance computing



Common data infrastructure and services



Blockchain



Low-power processors



Pan-European deployment of 5G corridors



High-tech partnerships for digital skills



Secure quantum infrastructure and network of cybersecurity centres



Digital public administration



Digital innovation hubs

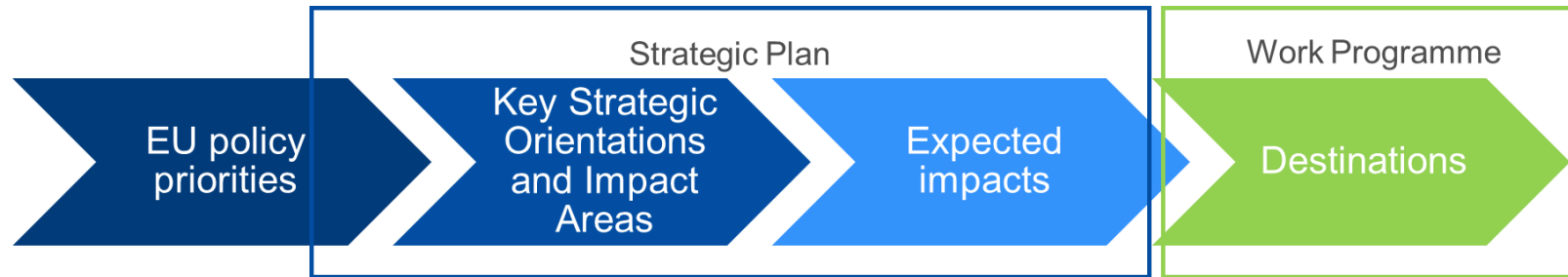
# Digital: synergies

- **Sectorial applications in clusters:** **Health** (augmented medicine, human-machine interactions, health data cloud...), **Cyber** (AI-based security, secure IoT, Crypto...), **Culture, Creative & Inclusive Society** (disinformation, digital democracy, cultural heritage...)
- **Digital Europe & CEF (digital):** informed by Research for uptake/deployment, often around **flagship areas/multi-country technology projects**.
- **Further synergies for uptake/deployment on case-by-case:** InvestEU (Green ICT, Connectivity...), Structural Funds, Resilience & Recovery Facility, IPCEI...



# Cluster 4 – Strategic Priorities

*From EU priorities to Work Programme Destinations*



Cluster 4 directly supports the following three Key Strategic Orientations outlined in the Strategic Plan 2021-2024 ([ec\\_rtd\\_horizon-europe-strategic-plan-2021-24.pdf \(europa.eu\)](#) )

- Promoting an open strategic autonomy by leading the development of key digital, and enabling and emerging technologies, sectors and value chains (A)
- Making Europe the first digitally enabled, circular, climate-neutral and sustainable economy (C)
- Creating a more resilient, inclusive and democratic European society (D)

# Cluster 4 – Intended Impact & Destinations

## Strategic Plan (2021-2024) and Orientations

Making Europe the first digitally enabled, circular, climate-neutral and sustainable economy

Promoting an open strategic autonomy by leading the development of key digital, and enabling and emerging technologies, sectors and value chains

Creating a more resilient, inclusive and democratic European society

# Cluster 4 – Intended Impact & Destinations

## Strategic Plan (2021-2024) and Orientations



## Destinations

<p>Making Europe the first digitally enabled, circular, climate-neutral and sustainable economy</p>	<p>1. Climate neutral, circular and digitised production TWIN-TRANSITION</p>
<p>Promoting an open strategic autonomy by leading the development of key digital, and enabling and emerging technologies, sectors and value chains</p>	<p>2. A digitised, resource efficient, and resilient industry - RESILIENCE            3. World-leading data and computing technologies - DATA            4. Digital and emerging technologies for competitiveness and fit for the green deal - DIGITAL-EMERGING            5. Open Strategic Autonomy in developing, deploying and using global space-based infrastructures, services, applications and data - SPACE</p>
<p>Creating a more resilient, inclusive and democratic European society</p>	<p>6. A human-centred and ethical development of digital and industrial technologies - HUMAN</p>



# Cluster 4 – Intended Impact & Destinations

## Strategic Plan (2021-2024) and Orientations



## Destinations

<p>Making Europe the first digitally enabled, circular, climate-neutral and sustainable economy</p>	<p>1. Climate neutral, circular and digitised production TWIN-TRANSITION</p>
<p>Promoting an open strategic autonomy by leading the development of key digital, and enabling and emerging technologies, sectors and value chains</p>	<p>2. A digitised, resource efficient, and resilient industry - RESILIENCE  <b>3. World-leading data and computing technologies - DATA</b>  <b>4. Digital and emerging technologies for competitiveness and fit for the green deal - DIGITAL-EMERGING</b>  5. Open Strategic Autonomy in developing, deploying and using global space-based infrastructures, services, applications and data - SPACE</p>
<p>Creating a more resilient, inclusive and democratic European society</p>	<p><b>6. A human-centred and ethical development of digital and industrial technologies - HUMAN</b></p>

## Indicative Budget of Cluster 4

**2021-27 budget of 15.348 bn€** (including NGEU)

For the WP 2023-2024, the **programmable budget is ~2.7 bn€**, distributed *approximately* as:

DESTINATION	BUDGET 2023-2024
Destination 'Climate neutral, circular and digitised production'	<b>634.3 M€</b>
Destination 'Increased autonomy in key strategic value chains for resilient industry'	<b>559.2 M€</b>
Destination 'World leading data and computing technologies'	<b>161.0 M€</b>
Destination 'Digital and emerging technologies for competitiveness and fit for the green deal'	<b>461.5 M€</b>
Destination 'Open Strategic autonomy in developing, deploying and using global space-based infrastructures, services, applications and data' (incl. Other Actions)	<b>183.8 M€</b>
Destination 'A Human-centred and ethical development of digital and industrial technologies'	<b>317.5 M€</b>
Other Actions	<b>369.5 M€</b>

# Partnerships in Cluster 4

- Processes4Planet – Transforming the European Process Industry for a sustainable society (1,300M€)
- Clean Steel – Low-carbon Steelmaking (700M€)
- **Made in Europe** (900M€)
- **EuroHPC, High-Performance Computing (JU, 900M€)**
- **KDT, Key Digital Technologies (JU, 1,800M€)**
- **SNS, Smart Networks and Services (JU, 900M€)**
- **Artificial Intelligence, Data and Robotics (1,300M€)**
- **Photonics (340M€)**
- Globally competitive Space Systems (proposed)
- Metrology (Art. 185, 300M€)

# Climate neutral, circular, and digitised production 2023-2024

SECTIONS (MOST DIGITAL RELATED)	NUMBER OF TOPICS	ESTIMATED BUDGET (M€)
Manufacturing industry	6	189.6

# World leading Data and Computing Technologies 2023-2024

SECTIONS	NUMBER OF TOPICS	ESTIMATED BUDGET (EUR M)
Data sharing in the common European data spaces	3 (incl. 1 CSA)	84
From Cloud to Edge to IoT for European Data	4 (incl. 2 CSAs)	77
TOTAL estimated budget WP 2023-2024	7	161

EuroHPC JU: 254 MEUR

# Digital and emerging technologies for competitiveness and fit for the green deal – 2023-2024

SECTIONS	NUMBER OF TOPICS	ESTIMATED BUDGET (EUR M)
AI, Data and Robotics (incl. efficient, robust, safe, adaptive and trusted robots)	4	150
European Leadership in Emerging and Enabling Technologies	2	57
European Innovation Leadership in Photonics	6 (incl. 1 CSA)	93
Graphene and 2D materials: Europe in the lead	4 (incl. 1 CSA)	54
Flagship on Quantum Technologies: a Paradigm Shift	7 (1 SGAs in OA)	97
Open Source for Cloud/Edge and Software Engineering Fundamentals to support Digital Autonomy	3 (incl. 1 CSA)	35,5
TOTAL estimated budget WP 2023-2024	25	486,5

KDT JU: 590 MEUR, SNS JU: 265 MEUR



# Article 22(5) – Application in 2023 topics

## High TRL Quantum Technologies

Participation is limited to legal entities established in Member States, Iceland and Norway and the following additional associated country: Israel

- **HORIZON-CL4-2023-DIGITAL-EMERGING-01-40: Quantum Photonic Integrated Circuit technologies (RIA)**
- **HORIZON-CL4-2023-DIGITAL-EMERGING-01-41: Investing in alternative quantum computation and simulation platform technologies (RIA)**
- **HORIZON-CL4-2023-DIGITAL-EMERGING-01-43: Framework Partnership Agreement for developing large-scale quantum Computing platform technologies (FPA)**
  - **-02- SGA- Developing large-scale quantum Computing platform technologies (SGA)**

## Low TRL Quantum Technologies

Participation is limited to legal entities established in Member States, associated countries, OECD and Mercosur countries

- **HORIZON-CL4-2023-DIGITAL-EMERGING-01-50: Next generation quantum sensing and metrology technologies (RIA)**

# A human-centred and ethical development and industrial technologies 2023-2024

SECTIONS	NUMBER OF TOPICS	ESTIMATED BUDGET (EUR M)
Research and Innovation for Industry 5.0	4 (incl. 1 CSA)	26,5
European standards for industrial competitiveness	6 (all CSAs)	23
International cooperation	3 (all CSAs)	6,5
Leadership in AI based on trust	7 (incl. 1 CSA)	143
An Internet of Trust	4 (incl. 1 CSAs)	47
eXtended Reality (XR)	3 (incl. 1 CSA)	53
Digital Humanism and human compatible technologies	2 (all CSAs)	4,5
Systemic approaches for accelerating uptake of technology and innovation incl. <u>NCP Network(s) for Cluster 4 (Digital, Industry and Space)</u>	4 (all CSAs)	14
TOTAL estimated budget WP 2023-2024	<b>33</b>	<b>317.5</b>



# Thank you!

## # HorizonEU

<http://ec.europa.eu/horizon-europe>



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# Call - TWIN GREEN AND DIGITAL TRANSITION 2023

## *HORIZON-CL4-2023-TWIN-TRANSITION-01*

**81 MEur**

### *HORIZON-CL4-2023-TWIN-TRANSITION-01*

#### **Manufacturing industry**

-02: High-precision OR complex product manufacturing – potentially including the use of photonics (Made in Europe and Photonics Partnerships) (IA)

-07: Achieving resiliency in value networks through modelling and Manufacturing as a Service (Made in Europe Partnership) (RIA)

- 08: Foresight and technology transfer for Manufacturing as a Service (Made in Europe Partnership) (CSA)

	ToA	Budget (ME)	EU contribution (ME)	No of projects	Call period
-02	IA	48	5-6	8	01-Dec 2022 to 20-Apr 2023
-07	RIA	32	4-6	6	01-Dec 2022 to 20-Apr 2023
-08	CSA	1	1	1	01-Dec 2022 to 20-Apr 2023

# Call - WORLD LEADING DATA AND COMPUTING TECHNOLOGIES 2023

## *HORIZON-CL4-2023-DATA-01*

**76 MEur**

### *HORIZON-CL4-2023-DATA-01*

#### **Data sharing and analytics capacity**

- 02: Integration of data life cycle, architectures and standards for complex data cycles and/or human factors, language (AI, data and robotics partnership) (RIA)
- 07: Collaboration with NSF on fundamental research on new concepts for distributed computing and swarm intelligence (CSA)

	ToA	Budget (ME)	EU contribution (ME)	No of projects	Call period
-02	RIA	45	9	5	01-Dec 2022 to 29-March 2023
-07	CSA	1	1	1	01-Dec 2022 to 29-March 2023

#### **From Cloud to Edge to IoT for European Data**

- 04: Cognitive Computing Continuum: Intelligence and automation for more efficient data processing (AI, data and robotics partnership) (RIA)
- 06: Coordination and Support of Cognitive Computing Continuum research and policy (CSA)

	ToA	Budget (ME)	EU contribution (ME)	No of projects	Call period
-04	RIA	28	4-6	6	01-Dec 2022 to 29-March 2023
-06	CSA	2	2	1	01-Dec 2022 to 29-March 2023

# Call - Digital and emerging technologies for competitiveness and fit for the green deal - 2023

## *HORIZON-CL4-2023-DIGITAL-EMERGING-01*

### *HORIZON-CL4-2023-DIGITAL-EMERGING-01*

**108 MEur**

#### **AI, Data and Robotics (incl. efficient, robust, safe, adaptive and trusted robots)**

-01: Novel paradigms and approaches, towards AI-driven autonomous robots (AI, data and robotics partnership) (RIA)

#### **European leadership in Emerging Enabling Technologies**

-12: Adaptive multi-scale modelling and characterisation suites from lab to production (RIA)

#### **European Innovation Leadership in Photonics**

-51: Pervasive photonics - multi-technology integration for digital infrastructure, sensors and internet of things (Photonics partnership)(RIA)

-53: Versatile light sources and systems as tools for manufacturing and medical application (Photonics Partnership) (RIA)

- 57: Advanced imaging and sensing technologies (IA)(Photonics Partnership)

	ToA	Budget (ME)	EU contribution (ME)	No of projects	Call period
-01	RIA	30	8	4	01-Dec 2022 to 29-March 2023
-12	RIA	22	5-7	4	01-Dec 2022 to 29-March 2023
-51	RIA	18	3-5	4	01-Dec 2022 to 29-March 2023
-53	RIA	18	3-5	4	01-Dec 2022 to 29-March 2023
-57	IA	20	5-7	4	01-Dec 2022 to 29-March 2023



# Call - Digital and emerging technologies for competitiveness and fit for the green deal - 2023

## *HORIZON-CL4-2023-DIGITAL-EMERGING-01-CNECT*

### *HORIZON-CL4-2023-DIGITAL-EMERGING-01-CNECT*

**154 MEur**

#### **AI, Data and Robotics (incl. efficient, robust, safe, adaptive and trusted robots)**

-02: Industrial leadership in AI, Data and Robotics – advanced human robot interaction (AI Data and Robotics Partnership) (IA)

#### **European leadership in Emerging Enabling Technologies**

-11: Low TRL research in micro-electronics and integration technologies for industrial solutions (RIA)

#### **Graphene and 2D materials: Europe in the lead**

-32: Sustainable safe-by-design 2D materials technology (RIA)

-33: 2D materials of tomorrow (RIA)

-17: Framework Partnership Agreement for developing large scale quantum simulation platform technologies (FPA)

-19: Framework Partnership Agreements in Quantum Communications (FPA)

#### **Flagship on Quantum Technologies: a Paradigm Shift**

-40: Quantum Photonic Integrated Circuit technologies (RIA)

-41: Investing in alternative quantum computation and simulation platform technologies (RIA)

-43: Framework Partnership Agreement for developing large-scale quantum Computing platform technologies (FPA)

-50: Next generation quantum sensing and metrology technologies (RIA)

#### **European Innovation Leadership in Photonics**

-56: Photonic Strategies and Skills Development (CSA) (Photonics Partnership)

#### **(Other Actions) Flagship on Quantum Technologies: a Paradigm Shift**

-02- SGA- Developing large-scale quantum Computing platform technologies (SGA)

	ToA	Budget (ME)	EU contribution (ME)	No of projects	Call period
-02	IA	30	10	3	01-Dec 2022 to 29-March 2023
-11	RIA	35	3-4	10	01-Dec 2022 to 29-March 2023
-32	RIA	6	3-5	2	01-Dec 2022 to 29-March 2023
-33	RIA	12	3-4	3	01-Dec 2022 to 29-March 2023
-40	RIA	12	4-6	2	01-Dec 2022 to 29-March 2023
-41	RIA	20	7-12	2	01-Dec 2022 to 29-March 2023
-43	FPA			0	01-Dec 2022 to 29-March 2023
-50	RIA	10	2-3	3	01-Dec 2022 to 29-March 2023
-56	CSA	4	1-3	2	01-Dec 2022 to 29-March 2023
	ToA	Budget (ME)	EU contribution (ME)	No of projects	Call period
-02-SGA	SGA	25	25	1	2nd quarter of 2024

# Call - A HUMAN-CENTRED AND ETHICAL DEVELOPMENT OF DIGITAL AND INDUSTRIAL TECHNOLOGIES 2023

*HORIZON-CL4-2023-HUMAN-01*

*9 MEur*

*HORIZON-CL4-2023-HUMAN-01*

## **Research and Innovation for Industry 5.0**

- 54: Green and digital skills and training needs for a just transition (CSA)

## **International Cooperation**

-91: International Hub for Digital Partnerships in the Indo-Pacific (CSA)

-92: R&I cooperation with Sub-Saharan Africa (CSA)

-93: R&I cooperation with Latin America (Mexico, Brazil, Argentina, and other countries in the BELLA network or members of RedClara) (CSA)

	ToA	Budget (ME)	EU contribution (ME)	No of projects	Call period
-54	CSA	2.5	0.5	5	01-Dec 2022 to 29-March 2023
-91	CSA	2.5	2.5	1	01-Dec 2022 to 29-March 2023
-92	CSA	2	2	1	01-Dec 2022 to 29-March 2023
-93	CSA	2	2	1	01-Dec 2022 to 29-March 2023

# Call - A HUMAN-CENTRED AND ETHICAL DEVELOPMENT OF DIGITAL AND INDUSTRIAL TECHNOLOGIES 2023

**HORIZON-CL4-2023-HUMAN-01-CNECT**

**200.5MEur**

**HORIZON-CL4-2023-HUMAN-01-CNECT**

## Leadership in AI based on trust

-01: Efficient trustworthy AI - making the best of data (AI, Data and Robotics Partnership) (RIA)

-02: Large Scale pilots on trustworthy AI data and robotics addressing key societal challenges (AI Data and Robotics Partnership) (IA)

-03: Natural Language Understanding and Interaction in Advanced Language Technologies (AI Data and Robotics Partnership) (RIA)

-04: Open innovation: Addressing Grand challenges in AI (AI Data and Robotics Partnership) (CSA)

-05: Through AI from Disinformation to Trust (IA)

## An Internet of Trust

-11: Next Generation Internet Fund (RIA)

-12: Pilots for the Next Generation Internet (IA)

-13: Next Generation Internet International Collaboration - USA (RIA)

-14: Next Generation Internet Commons Policy (CSA)

## eXtended Reality (XR)

-21: Next Generation eXtended Reality (RIA)

-22: eXtended Reality for Industry 5.0 (IA)-25: eXtended Collaborative Telepresence (IA)

-23: Supporting the emergence of an open human-centric Metaverse (CSA)

## European standards for industrial competitiveness

-65: Support facility for digital standardisation and international cooperation in digital partnerships (CSA)

-66: Promoting EU standards globally (CSA)

## Digital Humanism and human compatible technologies

-81: Digital Humanism - Putting people at the centre of the digital transformation (CSA)

-82: Art-driven digital innovation: Towards human compatible and ecologically conscious technology (CSA)

	ToA	Budget (ME)	EU contribution (ME)	No of projects	Call period
-01	RIA	35	7-9	5	01-Dec 2022 to 29-March 2023
-02	IA	24	8	3	01-Dec 2022 to 29-March 2023
-03	RIA	20	6-8	3	01-Dec 2022 to 29-March 2023
-04	CSA	4	4	1	01-Dec 2022 to 29-March 2023
-05	IA	10	5	2	01-Dec 2022 to 29-March 2023
-11	RIA	27	27	1	01-Dec 2022 to 29-March 2023
-12	IA	13	3-5	5	01-Dec 2022 to 29-March 2023
-13	RIA	4	4	1	01-Dec 2022 to 29-March 2023
-14	CSA	2	2	1	01-Dec 2022 to 29-March 2023
-21	RIA	26	5-8	4	01-Dec 2022 to 29-March 2023
-22	IA	25	5-8	4	01-Dec 2022 to 29-March 2023
-23	CSA	2	2	1	01-Dec 2022 to 29-March 2023
-65	CSA	1.5	1.5	1	01-Dec 2022 to 29-March 2023
-66	CSA	1.5	2.5	1	01-Dec 2022 to 29-March 2023
-81	CSA	2.5	2.5	1	01-Dec 2022 to 29-March 2023
-82	CSA	3	3	1	01-Dec 2022 to 29-March 2023