# Inclusiveness, Engagement and Societal Elements in Cluster ‘Digital, Industry and Space’

Commission proposal for

# Horizon Europe

**THE NEXT EU RESEARCH & INNOVATION PROGRAMME (2021 – 2027)**

#HorizonEU

**Dr Nicholas Deliyanakis**
Economic and Social Transitions
**DG Research & Innovation**
European Commmission

European Commission

*Research and Innovation*

# CLUSTER 4 Digital, Industry and Space: why combined in a cluster?

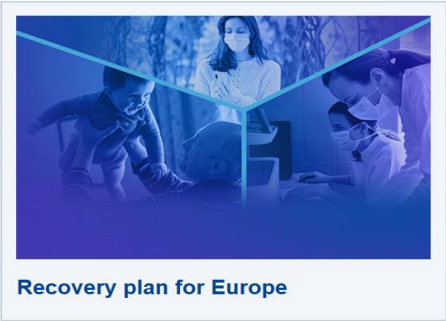
- **Digitisation, Key Enabling Technologies** and **Space** are major drivers and enablers
- The Cluster will develop **technological and industrial capacities** for industrial competitiveness, European resilience and the means to address global challenges
- It will support the **twin green and digital transition**: a digital, low-carbon and circular economy
- **European social and ethical values**, e.g. human element in manufacturing, sustainability, AI
- **Industry-oriented** but other players play crucial roles

# CLUSTER 4 Digital, Industry and Space: facts and figures

- EU industry provides 1 out of 5 jobs, 80% of EU exports, two thirds of private sector R&D.
- ICT sector: 5% of the EU economy, 25% of total business expenditure is ICT-related. Leading in next generation digital technologies is vital.
- The Circular Economy: 580,000 EU jobs and possibly € 600 billion in savings for EU businesses (8% of their annual turnover).
- Energy-intensive industries: 20% of global greenhouse gas emissions – Require new breakthrough technologies to meet climate action targets.
- The space sector: 230,000 EU jobs, ~ € 50 billion. Space technologies are key enablers.

European Commission

# Cluster 4 – Political Priorities







- European Space Strategy
- Action Plan on critical raw materials

European Commission

*Interaction between citizens, scientists and policy makers is essential to enrich research and innovation, and reinforce trust of society in science. I am proud of the hundreds of thousands involved citizens that already contributed to research and innovation and look forward to continue opening up research towards society and the world.*

**Mariya Gabriel** *Commissioner for Innovation, Research, Culture, Education and Youth*

# Cluster 4 – Vision

*Competitive technologies  respecting the boundaries of our planet, and reflecting human needs*

Twin Green and Digital transition

**Climate-neutral, circular and clean industry**


**Industrial and digital transformation**

- mastering technologies
- deploying technologies – technology infrastructures
- securing autonomy in strategic value chains

**Major contribution to Inclusiveness and Resilience**

- engagement with users, workers, citizens
- development of skills
- development of regions

European Commission

# Key Strategic Orientations

*Highlighted for Cluster 4*

A. **Promoting an open strategic autonomy by leading the development of key digital, and enabling and emerging technologies, sectors and value chains** to accelerate and steer the digital and green transitions through human-centred technologies and innovations.

B. **Restoring Europe's ecosystems and biodiversity, and managing sustainably natural resources** to ensure food security and a clean and healthy environment.

C. **Making Europe the first digitally led circular, climate-neutral and sustainable economy** through the transformation of its mobility, energy, construction and production systems.

D. **Creating a more resilient, inclusive and democratic European society**, prepared and responsive to threats and disasters, addressing inequalities and providing high-quality health care, and empowering all citizens to act in the green and digital transitions

European Commission

# Expected Impacts – Cluster 4

| KEY STRATEGIC ORIENTATION | EXPECTED IMPACT |
|---|---|
| **Making Europe the first digitally led circular, climate-neutral and sustainable economy** | **Global leadership in clean and climate-neutral industrial value chains, circular economy and climate-neutral digital systems and infrastructures (networks, data centres)**, through innovative production and manufacturing processes and their digitisation, new business models, sustainable-by-design advanced materials and technologies enabling the switch to decarbonisation in all major emitting industrial sectors, including green digital technologies. |
| **Promoting an open strategic autonomy by leading the development of key digital, and enabling and emerging technologies, sectors and value chains** | **Industrial leadership and increased autonomy in key strategic value chains with security of supply in raw materials**, achieved through breakthrough technologies in areas of industrial alliances, dynamic industrial innovation ecosystems and advanced solutions for substitution, resource and energy efficiency, effective reuse and recycling and clean primary production of raw materials, including critical raw materials. |
| | **Sovereignty in digital technologies and in future emerging enabling technologies** by strengthening European capacities in key parts of digital and future supply chains, allowing agile responses to urgent needs, and by investing in early discovery and industrial uptake of new technologies. |
| | **Globally attractive, secure and dynamic data-agile economy** by developing and enabling the uptake of the next-generation computing and data technologies and infrastructures (including space infrastructure and data), enabling the European single market for data with the corresponding data spaces and a trustworthy artificial intelligence ecosystem. |
| | **Strategic autonomy in developing, deploying and using global space-based infrastructures, services, applications and data**, by reinforcing the EU's independent capacity to access space, and securing the autonomy of supply for critical technologies and equipment. |
| **Creating a more resilient, inclusive and democratic European society** | **A human-centred and ethical development of digital and industrial technologies**, through a two-way engagement in the development of technologies, empowering end-users and workers, and supporting social innovation. |

# Cluster 4 – Content

Ten intervention areas:

- Manufacturing technologies
- Key digital technologies
- Emerging Enabling Technologies
- Advanced materials
- Artificial intelligence and robotics
- Next generation internet
- Advanced computing and big data
- Circular industries
- Low carbon and clean industries
- Space, including Earth observation

European Commission

# Key Enabling Technologies (KETs) at the heart of European Industry and Society


High-level Strategy Group on Industrial Technologies (2018)

***Re-finding Industry – Defining Innovation***

## Updated criteria for KETs

- Enabling – multiple cross sectoral, society, environment, circular economy, green growth
- Key capacity – impact on people, society, safety & security, connectivity
- Relevant – research, development, production, underpinning societal participation and democratic engagement, European sovereignty

**Updated list of KETs:** Existing KETs are still relevant, but

- Merge Nanotechnologies and Advanced Materials
- Merge Photonics and Micro/nanoelectronics
- Widen scope of Biotechnology to Life-Science Technologies

## Two new KETs:

- Artificial Intelligence
- Security and connectivity technologies

European Commission

# Some examples of what we are doing


European Commission

# Some examples of what we are doing

European Commission

# Citizen engagement as part of EU policy

- at the core of the Commission's New Push for European Democracy and more participatory decision-making
- an integral part of the EU's Open Science policy priority
- an integral part of the European Research Area

**In Horizon 2020**

- 2000 projects with societal engagement
- 20 dedica ted citizen science projects

# Why is citizens engagement important?

- Contributes to **excellence**
  - Enlarges the scope of R&I, and the quality and quantity of data collected
  - Leads to – and enables – innovative and creative approaches

- Increases effectiveness
  - Leverages vast societal capabilities and collective intelligence
  - Enhances relevance and responsiveness of R&I: outcomes align with the needs, values and expectations of society
  - Increases robustness of outcomes and reduces time-to-market

- Improves the **relationship between science and society**
  - Improves transparency, co-ownership and trust of society in the process and outputs of R&I, helping respond to increased science denial
  - Ensures that the outcomes of R&I are more inclusive in nature and less likely to generate opposition
  - Encourages mutual learning between science and society

# Social Sciences and Humanities (SSH) in Cluster 4 Digital, Industry and Space

Societal understanding and engagement are key ingredients for success,

as well as a new agenda for industry-relevant skills

*How will this principle be made a reality in the activities?*

- *Dialogue is needed, taking needs and concerns into account*
- *Examples from Horizon 2020:*

European Commission

# SSH in H2020 LEIT - I

- Societal engagement in nanotechnology – understanding and dialogue

2013 Nanodiode Outreach and dialogue

2014 SEEINGNANO Novel visualisation tools for 'Seeing at the Nanoscale'

2015 NANO2ALL Nanotechnology Mutual Learning Action Plan

2017 GONANO Governing Nanotechnologies through Societal Engagement – improve the responsiveness of R&I processes to public values and concerns.

- a project generalising these approaches:

2020 SocKETs 'Societal Engagement with Key Enabling Technologies'

– to enable industry to engage with people in developing Key Enabling Technologies, considering societal priorities, expectations and concerns.

European Commission

# SSH in H2020 LEIT - II

- Human-centred approaches to Factories

Facts4Workers Worker-Centric Workplaces for Smart Factories

SatisFactory Augmented-reality approaches to make factories productive and attractive to workers

Factory2Fit Making the factory environment flexible and adaptable – enhance worker motivation, satisfaction and productivity – knowledge workers in smart factories with fulfilling careers

MANUWORK Balancing Human and Automation for the future

Capitalising on the 4th Industrial Revolution

Skills needed for new Manufacturing jobs (support action)

Effective Industrial Human-Robot Collaboration

ERASMUS+ Blueprint for Sectoral Cooperation on Skills, e.g. in additive manufacturing, construction, batteries

# SSH in H2020 LEIT - III

- Reconfigurable and reusable customised products

Repro-Light Re-usable and re-configurable parts for sustainable LED-based lighting systems

FreeWheel Smart Mobility Platform for the social inclusion of the disabled and elderly

- Cultural heritage

NanoRestArt Nanotechnologies to restore contemporary art

# SSH in H2020 LEIT - IV

- Society and Artificial Intelligence

SIENNA Ethics of AI and Robotics, Human Enhancement and Genomics; to develop ethical codes

SHERPA Impact of smart systems on ethics and human rights

K-PLEX Big data approaches to knowledge creation, e.g. 'Will historians ever have big data?'

# Enhancing citizens engagement in Horizon Europe

Reinforce interaction between science and society

- by promoting the cocreation of R&I agendas
- by involving citizens and civil society directly in 'doing' research and innovation
- through dedicated activities
- while monitoring citizens' contributions and the uptake of R&I in society

# Some ideas explored in Cluster 4 2021-22

- Circular by design manufacturing
- AI-enhanced smart manufacturing
- Urban manufacturing close to clnsumer
- Robust, transparent, bias-free AI
- Trustworthy social networks
- Workforce skills for Industry 4.0
- Foresight activities

# Want to know more?

- Industrial Research and innovation website
- Success stories
- Horizon magazine articles
- Key Enabling technology projects on youtube


European Commission