



ESFRI LANDSCAPE ANALYSIS 2024

# EXECUTIVE SUMMARY

## Since 2016, ESFRI has introduced the Landscape Analysis in its Roadmaps, providing an overview of the European Research Infrastructure (RI) ecosystem, identifying key RIs and their global positioning.

The ESFRI Landscape Analysis 2024 presents three main novelties:

It is the first Landscape Analysis report to be decoupled from the Roadmap, providing the framework and the rationale for the next Roadmap;

It includes the first version of the ESFRI RIs Portfolio, developed as an online tool to ensure up-to-date and readily usable information about all ESFRI RIs;

For the first time, the analysis performed has also been based on inputs received directly from the main stakeholders.

The landscape of European Research Infrastructures is at a transformative crossroads, marked by rapid technological advancements, evolving governance dynamics, and pressing societal challenges while facing constrained budgets.

The ESFRI Landscape Analysis 2024 offers a comprehensive analysis of this dynamic environment, encapsulating current states, services, impact, future trends, challenges, and opportunities combining domain specific findings along the six ESFRI Scientific domains (Data, Computing and Digital Research Infrastructures, Energy, Environment, Health and Food, Physical Sciences and Engineering, Social Sciences and Humanities), with broader cross-domain views.

**Technological Convergence and Innovation:** The RI landscape is predominantly driven by advanced technologies such as Artificial Intelligence, quantum computing, and digitalisation. These technologies revolutionise research methodologies across various domains, fostering a fundamental shift towards more holistic and efficient scientific discovery, innovation and a diverse services portfolio.

**Sustainability and Green Innovation:** A strong commitment to environmental stewardship and sustainable development characterises the RI landscape, with initiatives supporting climate change policies and emphasising the development of low carbon energy sources and environmental sustainability.

**Adaptive Response to Global Challenges:** The RIs' capacity for rapid adaptation and response to global crises, including health emergencies and climate change, underscores their vital role in addressing urgent societal needs through flexible infrastructures and rapid response mechanisms.

**Data-Driven Research Paradigm:** A significant trend towards data-intensive research methodologies is reshaping scientific inquiry. This transformative shift is being enabled by enhanced data capabilities and digitalisation, leading to breakthroughs across various domains.

**Ethical and Societal Responsibility:** Ethical considerations and societal impact are increasingly prioritised, ensuring that technological and research advancements align with societal values and standards.

**Challenges and Future Outlook:** The RI landscape faces multifaceted challenges, including sustainable funding, interdisciplinary collaboration, and alignment with EU policies and societal goals.

**The ESFRI RIs Landscape Analysis 2024 reflects a dynamic and responsive approach to the needs of the European research ecosystem. This dynamic evolution needs strategic alignment, interoperability, openness, digital transformation adaptability, engagement with societal challenges, and support for cross-domain research.**