Consortium GARR

CONFERENZA GARR 2021

soste nibile digitale

Il ruolo delle Infrastrutture di Ricerca per un futuro digitale dell'Europa

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Sommario

- Infrastrutture di Ricerca

- ESFRI

- Il ruolo delle IR in HE

- Le IR nel futuro digitale

- Prospettive per la comunità italiana

RESEARCH INFRASTRUCTURES

A European Research Infrastructure is a facility or (virtual) platform that provides the scientific community with resources and services to conduct top-level research in their respective fields. These research infrastructures can be single-sited or distributed or an e-infrastructure, and can be part of a national or international network of facilities, or of interconnected scientific instrument networks.

A BROAD CONCEPT

➤ Great scientific equipment or set of instruments.
➤ Scientific collections, archives and structured information.
➤ Electronic infrastructures (e-infrastructures).
➤ Any other entity of a unique nature necessary for research.

CENTRALIZED, DISTRIBUTED OR VIRTUAL
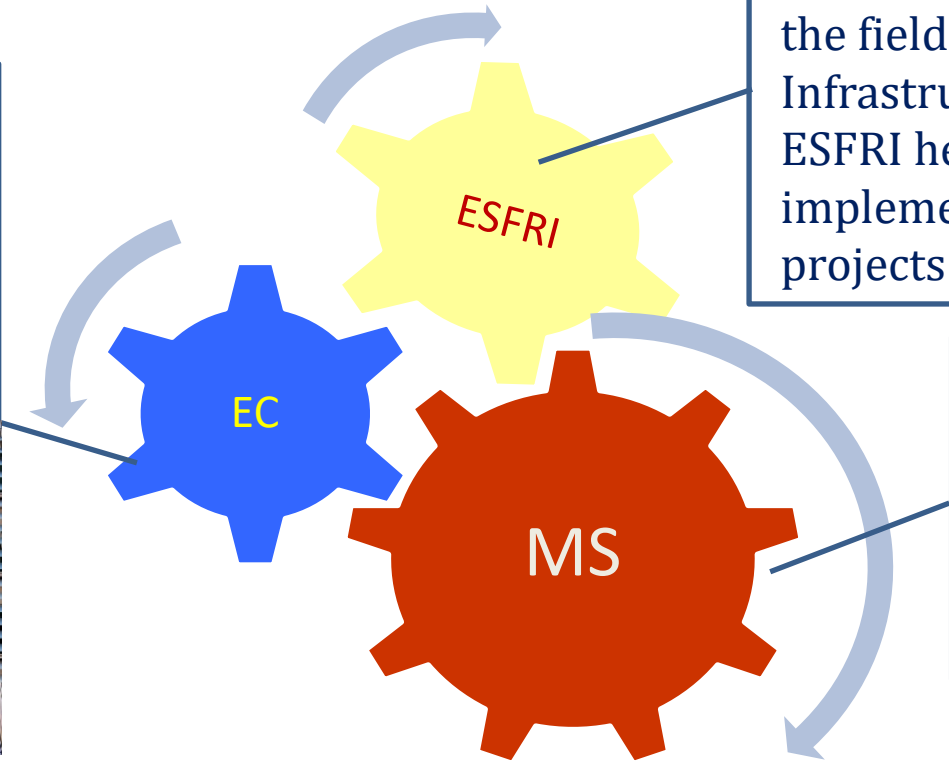
RESEARCH INFRASTRUCTURES
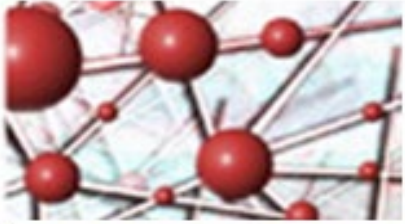
- **One of the pillars of the European Research Area**

- **Essential for European researchers to remain at the forefront of R&I**

- **Key element for European competitiveness**

- **At the centre of the knowledge triangle**

- **MAIN CHALLENGES:**

  – Overcoming European fragmentation

  – Facing increasing costs and complexity

  – Improve the efficiency of services and access offered by the facilities

  – Develop the full potential of data and e-infrastructures

HIGHER EDUCATION **INNOVATION** **RESEARCH**
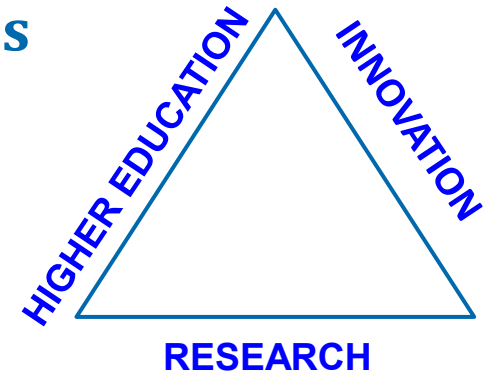
Actors in the definition of policies in RI

Funds actions for implementation through European R&I Framework Programme.

Support to the establishment of policies in the field of Research Infrastructures.
ESFRI helps to achieve the implementation of the projects of the "Roadmap".

ESFRI

EC

MS

Commitment of national resources for the construction and sustainability of Research Infrastructures.

ROLE OF ESFRI

The European Strategy Forum on Research Infrastructures (ESFRI) was established in 2002 with a mandate from the Council of the European Union to:

- support a coherent and strategy-led approach to policy-making on research infrastructures in Europe

- facilitate multilateral initiatives leading to the better use and development of research infrastructures

ESFRI brings together representatives of Ministers of the 27 Member States, 12 Associated States, and of the European Commission that are the decision makers and financers of the ESFRI Research Infrastructures

- indicates strategies for the necessary major financial investment (~20 b€) and long-term commitment for operation (~2 b€/year, +15% of current effort)

- upon mandate of Competitiveness Council of the European Union, ESFRI has completed the ESFRI Roadmap 2018 and it is working for the ESFRI ROADMAP 2021

www.esfri.eu

ESFRI INTRUMENTS

- EXECUTIVE BOARD – elected by ESFRI FORUM – prepares strategic documents and gives recommendations to the FORUM

- STRATEGIC WORKING GROUPs – in six scientific domains – perform the evaluation of the scientific excellence of the Research Infrastructure Projects and Landmarks and provide the Landscape Analysis in each domain

- IMPLEMENTATION GROUP performs the assessment of the maturity of the Research Infrastructure Projects and the implementation progress of the Landmarks

- AD HOC WORKING GROUPs – mandated by ESFRI FORUM – provide vision and advise on specific issues of general interest for RIs

ESFRI ROADMAP 2018

ESFRI PROJECTS

DIGIT	ENE	ENV	H&F	PSE	SCI

2010
- EU-SOLARIS (ENE)
- MYRRHA (ENE)
- WindSanner (ENE)
- AnaEE (H&F)
- ISBE (H&F)
- MIRRI (H&F)

2016
- ACTRIS (ENV)
- DANUBIUS-RI (ENV)
- EMPHASIS (H&F)
- EST (PSE)
- KM3NeT 2.0 (PSE)
- E-RIHS (SCI)

2018
- IFMIF-DONES (ENE)
- DiSSCo (ENV)
- eLTER (ENV)
- EU-IBISBA (H&F)
- METROFOOD-RI (H&F)
- EHRI (SCI)

ESFRI LANDMARKS

DIGIT	ENE	ENV	H&F	PSE	SCI

2006
- PRACE (DIGIT)
- JHR (ENE)
- EMSO ERIC (ENV)
- EURO-ARGO ERIC (ENV)
- IAGOS (ENV)
- ICOS ERIC (ENV)
- LifeWatch ERIC (ENV)
- BBMRI ERIC (H&F)
- EATRIS ERIC (H&F)
- ECRIN ERIC (H&F)
- ELIXIR (H&F)
- INFRAFRONTIER (H&F)
- INSTRUCT ERIC (H&F)
- ELI (PSE)
- ELT (PSE)
- ESS ERIC (PSE)
- European XFEL (PSE)
- FAIR (PSE)
- ILL (PSE)
- SKA (PSE)
- SPIRAL2 (PSE)
- CESSDA ERIC (SCI)
- CLARIN ERIC (SCI)
- DARIAH ERIC (SCI)
- ESS ERIC (SCI)
- SHARE ERIC (SCI)

2008
- ECCSEL ERIC (ENE)
- EISCAT_3D (ENV)
- EPOS ERIC (ENV)
- EMBRC ERIC (H&F)
- ERINHA (H&F)
- EU-OPENSCREEN ERIC (H&F)
- Euro-BioImaging (H&F)
- CTA (PSE)
- EMFL (PSE)

2016
- ESRF EBS (PSE)
- HL-LHC (PSE)

18 ESFRI PROJECTS
37 ESFRI LANDMARKS

ROADMAP 2018 STRATEGY REPORT ON RESEARCH INFRASTRUCTURES

http://roadmap2018.esfri.eu/media/1066/esfri-roadmap-2018.pdf

ROADMAP 2021

With the Roadmap 2021 ESFRI will update the strategy on European RIs aimed at strengthening the competitiveness and value (excellence and impact) of European research.

https://www.esfri.eu/sites/default/files/White_paper_ESFRI-final.pdf

In order to realise the Roadmap 2021, ESFRI will:

- update the Landscape Analysis

- monitor all Projects 2010 and Projects 2016

- evaluate New Proposals and decide upon new Projects 2021

Landscape analysis

The *Landscape Analysis* is a key ingredient of the Roadmap 2021.

It provides an overview of the European RI ecosystem by identifying the main RIs operating transnational access in Europe, in all fields of research, and major new or ongoing projects, as well as an outlook to the global landscape of relevance.

Content

➢ Analysis of trends and gaps in each scientific fields

➢ Identification of interconnections among RIs across the six fields

➢ Focus on the Pan EU Research Infrastructure services and their broader impacts

Three main areas were identified:

❑ The analysis of the relevance of ESFRI Research Infrastructures for Sustainable Development Goals (SDGs)
❑ The analysis of capacity of RIs to respond to emergencies (as for example in the case of the COVID-19 crisis)
❑ The contribution of ESFRI RIs to the digital transformation (including EOSC)

This would showcase the relevance of RIs for societal challenges, including the capacity to respond to any type of emergencies, and for innovation.

LE INFRASTRUTTURE DI RICERCA IN HORIZON EUROPE

➤ **Il contesto politico**

➤ **Strategia**

➤ **Programmazione**

➤ **Opportunità**

The 6 political priorities
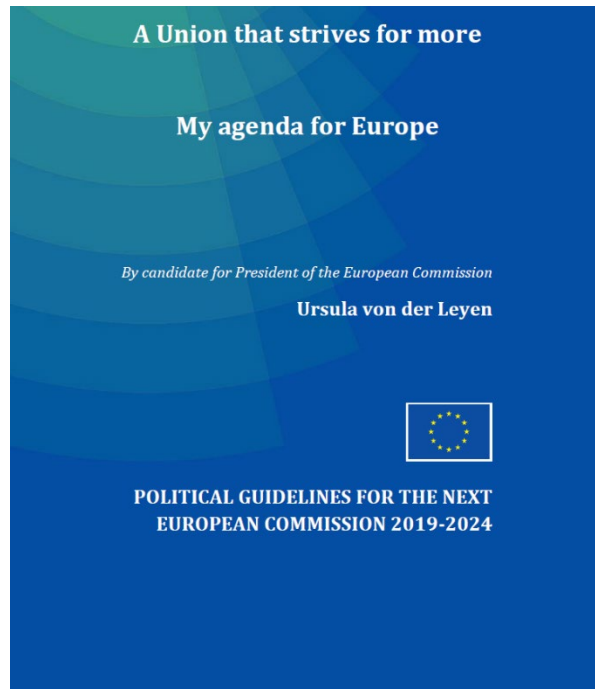
- ✓ A European Green Deal
- ✓ An economy that works for people
- ✓ A Europe fit for the digital age
- ✓ Protecting our European way of life
- ✓ A stronger Europe in the world
- ✓ A new push for European democracy

ESFRI White Paper 2020 *Making Science Happen*

ESFRI — European Strategy Forum on Research Infrastructures

Research Infrastructures as an essential pillar of the ERA

Ecosystem striving for scientific excellence, transnational services, education and skills

Research Infrastructures as strategic investments

Research with impact that addresses complex societal challenges

Research Infrastructures as knowledge and Innovation hubs

Basis of European competitivness, with regional impact and global outreach

Coherence between European, national and regional priorities

Research Infrastructures for sustainable development and funding

Research Infrastructures as major promoters of Open Science

Interconnected services providing FAIR and **quality certified** Open Data

ESFRI´s contribution to Research Infrastructure policy

Ensure appropriate capacity

Infrastrutture di Ricerca in Horizon Europe
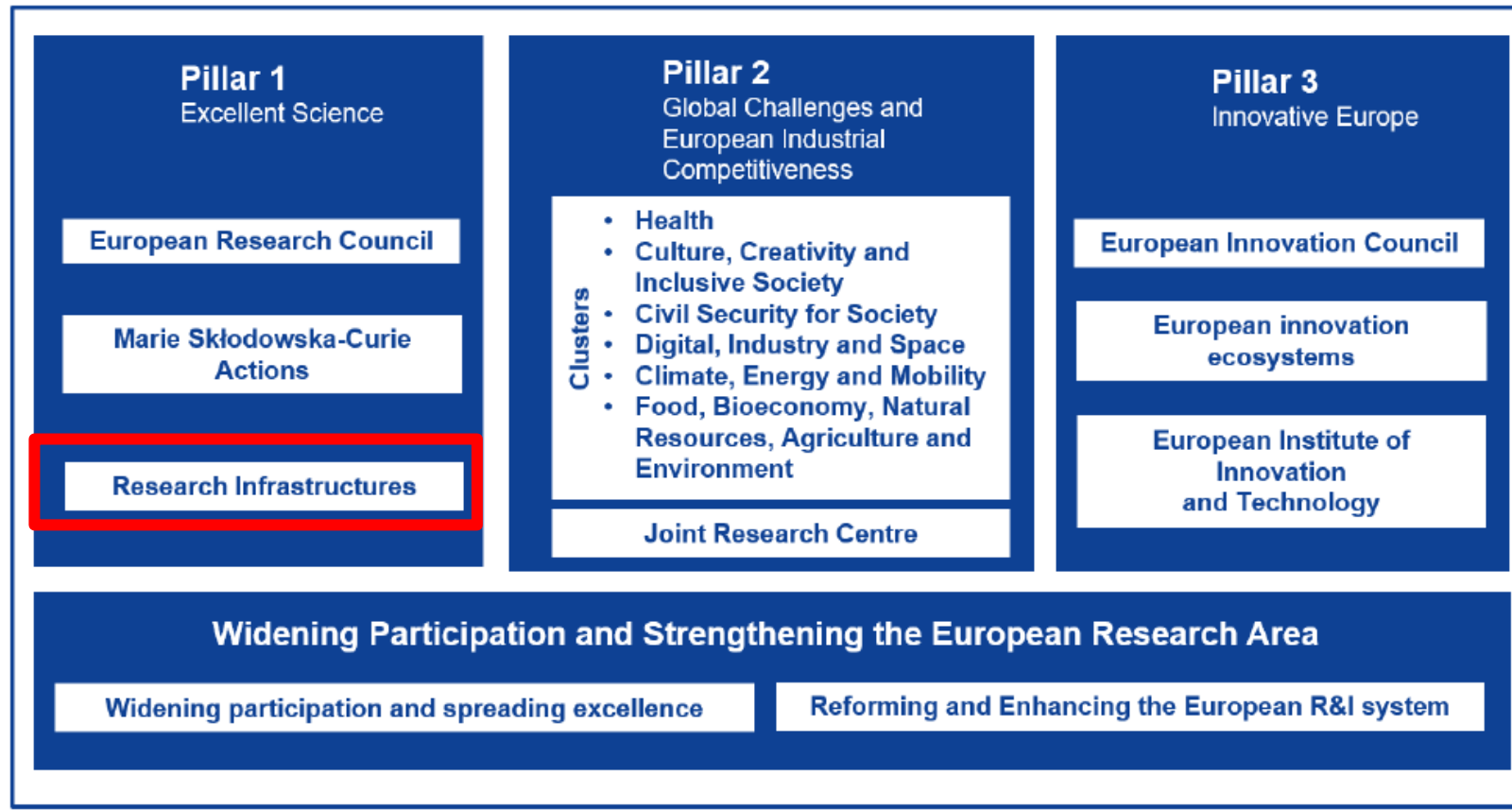
RI Strategic Orientation Document

Pillar 1 – Research Infrastructures

- *Empowering Europe through world-class and accessible Research and Technology Infrastructures*

European RIs have the potential to enhance society's long term and consistent problem-solving capacity

New efforts are now needed to ensure the provision of customised and results-oriented RI services and resources to accelerate the transition towards a green and digital future and to support an effective and responsive health system as well as evidence-based policy-making

To better address new global environmental, social and economic challenges, the renewed ERA requires a more explicit contribution of research infrastructures themselves to Europe's wider policy objectives, thus putting science at the service of the society and increasing Europe's competitiveness.

Struttura del WP per IR

- approccio basato sull'impatto
- strutturato intorno alle destinations

Bilanciamento con ricerca fondamentale

Importanza dell'alta formazione (ERA e EHEA)

Sinergia con altre componenti di HE (*Pillar 2, widening ERA*)

Obiettivo

La realizzazione di un efficace ecosistema di IR, integrato ed interoperabile, che copra l'intero spettro che va dalla ricerca di base allo sviluppo tecnologico, che supporti l'Open Science e la competitività europea

Struttura del WP per IR

➢ **Destination - Developing, consolidating and optimising the European research infrastructures landscape, maintaining global leadership (INFRADEV),** to contribute to a strong, excellent and impactful European Research Area, by reinforcing RI capacities in Europe, their role at the global level and the policy-making in this field;

- Policy context: ERA Communication; ESFRI White Paper 2020

- ESFRI lifecycle approach: concept, preparatory phase, RI ecosystem, support to ESFRI; int. cooperation; ...

➢ **Destination - Enabling an operational, open and FAIR EOSC ecosystem (INFRAEOSC),** aiming at delivering a "Web of FAIR Data and Services" for Science: a trusted virtual environment supporting Open Science, based on key horizontal core functions, with their corresponding e-infrastructures, and service layers accessible to researchers across disciplines throughout Europe;

- Policy context: Open Science, Europe fit for the digital age; European Data strategy, EOSC, ERA Communication

- EOSC – partnership; support to the EOSC legal Entity start-up phase; increase level of fairness; ....

Struttura del WP per IR

➢ **<u>Destination - RI services to support health research, accelerate the green and digital transformation, and advance frontier knowledge (INFRASERV),</u>** with a focus on the provision of integrated RI services to enable R&I addressing major societal challenges, notably in health, in support of the green and digital transformation and ensuring resilience to crises as well as to support curiosity-driven research and advancement of frontier knowledge in broad scientific domains;

- Policy context: Europe fit for the digital age, European Data Strategy, European Green Deal, Economy that works for people; ESFRI White Paper; Industrial strategy, ERA Communication, EOSC; Recovery plan

- Approccio mirato basato sulle priorità politiche EU

- Supporto per servizi customized e accesso (per RIs e networks)

➢ **<u>Destination - Next generation of scientific instrumentation, tools and methods and advanced digital solutions (INFRATECH),</u>** to enable new discoveries and keep Europe's RIs at the highest level of excellence, while paving the way to innovative solutions to societal challenges and new industrial applications, products and services;

- Policy context: Europe fit for the digital age, European Green Deal; ERA Communication; European Industrial Strategy, EOSC, Technological sovereignty

- Approccio bottom up o mirato per IR per lo sviluppo di nuova strumentazione scientifica; sviluppo di strumenti di IA per il miglioramento della qualità e dell'utilizzo dei dati; utilizzo di altri strumenti digitali per ricerca di tipo interdisciplinare.

Anche in collaborazione con il settore privato.

Struttura del WP per IR

Destination - Network connectivity in Research and Education – Enabling collaboration without boundaries (INFRANET), providing high-bandwidth networks and network services to interconnect researchers, data and computing resources in a non-discriminatory way regardless of the location of the users and the resources to allow scientists to conduct excellent research.

- Policy context: Europe fit for the digital age, Economy that works for people, Connectivity strategy, digital sovereignty

- Miglioramento/upgrade della connettività, scala internazionale, connettività tra HPC, ...

Tempistica

HE ufficialmente adottato, 12 maggio 2021

Lancio HE – evento nazionale, 25 maggio 2021

Infoday EU su IR, 28 giugno 2021

Infoday nazionale – 12 luglio 2021

Le IR nel futuro digitale

➢ Tutte le IR producono grandi quantità di dati

➢ Necessità di sviluppo di nuovi strumenti digitali per la full exploitation dei dati

➢ Necessità di capacità di calcolo per studiare fenomeni complessi

➢ Strumenti digitali per favorire l'interconnessione tra IR in ambiti diversi per rispondere alle grandi sfide

Esempi:

- COVID-19, SDGs

- Human Brain, Destination Earth, etc.

- Cancro, prossime pandemie, medicina personalizzata, telemedicina

- Ambiente/rischi e salute; risorse – cibo (agricoltura);

- Energia- nuovi materiali- nuove tecnologie

Prospettive per la comunità italiana

❑ Attiva e positiva partecipazione della comunità italiana in IR in H2020, ci si aspetta di continuare anche in HE

❑ ESFRI, ERICs, consolidamento parte italiana nel EU RI landscape

❑ Partecipazione italiana ad EOSC

❑ EU policy priorities

❑ Interconnessioni/integrazione per nuovi servizi, nuova strumentazione, IA e altre soluzioni digitali anche con industria

❑ Connettività

❑ Partnership e Missions

❑ Clusters in Pillar 2

❑ Sinergia con MSCA e ERC in Pillar 1

❑ Potenziale per l'innovazione/Technological Infrastructures

❑ Alta formazione (ERA e EHEA, ruolo per Università ed Enti italiani, promuovere utilizzo di IR a studenti, tesisti e dottorandi

❑ Sinergia con fondi nazionali (PNR, PNIR, PNRR, Fondo di Coesione, FESR)