



Development of European Research Infrastructures

The role of Horizon 2020, Horizon Europe and the ESFRI process

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Research Infrastructures

Definition

'Research infrastructures' mean **facilities, resources and services** that are used by the **research communities** to **conduct research and foster innovation** in their fields. (H2020)

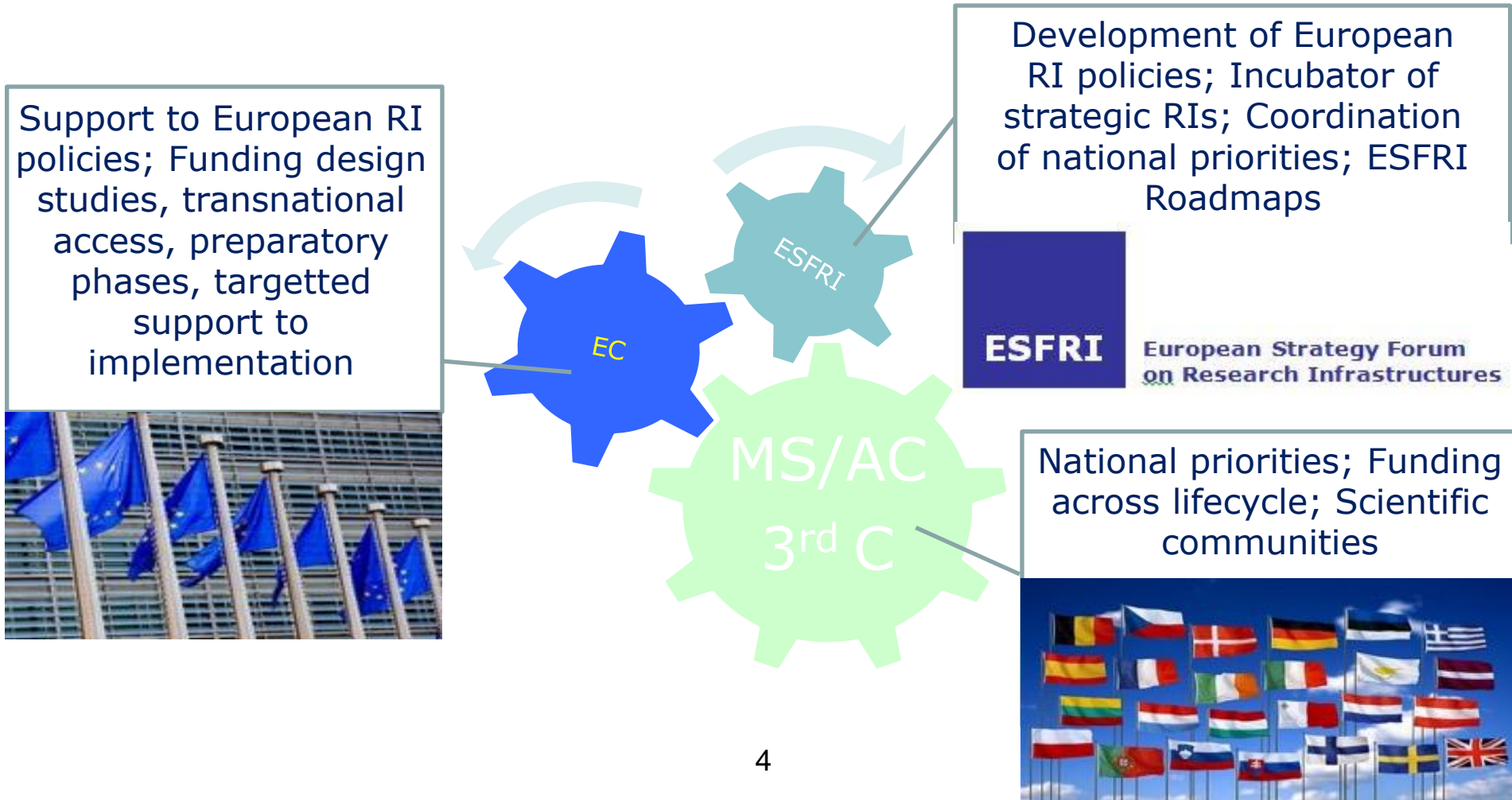
Characteristics

- Scientific equipment and instrumentation, knowledge-based resources (collections, archives), enabling ICT infrastructures (grid, computing)
- Single-sited, distributed or virtual
- Generally publically-owned and sustained by public support, providing excellence-based open access, focusing on lower technology readiness levels (TLRs), with limited economic activity

Why an EU approach to RIs?

- To **open access** to the research infrastructures existing in the individual Member State to all European researchers
- To **coordinate and rationalise** the development and use of research infrastructures, avoiding duplication of effort
- To trigger the **exchange of best practice**, develop **interoperability** of facilities and resources, develop the **training** of the next generation of researchers
- To **connect national research communities** and increase the overall quality of the research and innovation
- To **help pooling resources** so that the Union can acquire and operate research infrastructures at **world level**

Main actors in the European context



What is ESFRI?

- An **informal body** composed by representatives of Member States, Associated Countries and the EC on issues related to research infrastructures, **providing advice** to the Council.
- A **platform** giving national authorities the opportunity to be informed of and to explore (i.e. without *a priori* commitments) international and national initiatives of European significance.
- An **incubator** of new RIs, where Member States structure their priorities and negotiate.
- A European **knowledge hub** on research infrastructures.

ESFRI mandate

ESFRI was established in 2002 with a mandate from the EU Council (2001) 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
- **establish a European Roadmap** for research infrastructures (new and major upgrades, pan-European interest) for the coming 10-20 years, stimulate the implementation of these facilities, and update the Roadmap as the need arises (Council 2004, 2007, 2014, 2016);
- ensure the **follow-up of implementation** of already on-going ESFRI projects after a comprehensive assessment, as well as the prioritisation of the infrastructure projects listed in the ESFRI Roadmap (Council 2012);
- to **implement ERA Priority 2B**: Research Infrastructures (Council 2015).

ESFRI strategic role in practice

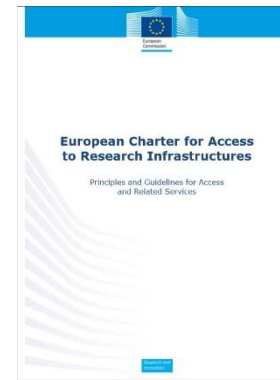
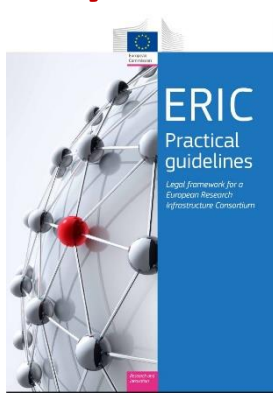
- ESFRI Roadmap **facilitates commitments** at national level
- ESFRI Roadmap **facilitates access to structural funds** (ex ante conditionality) and other sources of **funding** (ex. EIB)
- **Analytical work** (ad hoc working groups)
 - responding to Council requests: investments in e-Infrastructures, long-term sustainability action plan, RI prioritisation
 - own initiatives: socio-economic impact of RIs, links with industry and innovation (EIC), evolution of neutron sources
- **ERA Roadmap implementation** – Priority 2B
- Providing **visibility** to European RIs
- Facilitating **links** of European RIs with other EU and global partners

European Commission in ESFRI

- **Member of ESFRI**, its Executive Board and Working Groups
- Providing **ESFRI Executive Secretariat**
- **Support of ESFRI RIs** – Preparatory Phase funding, boosting implementation, fostering long-term sustainability

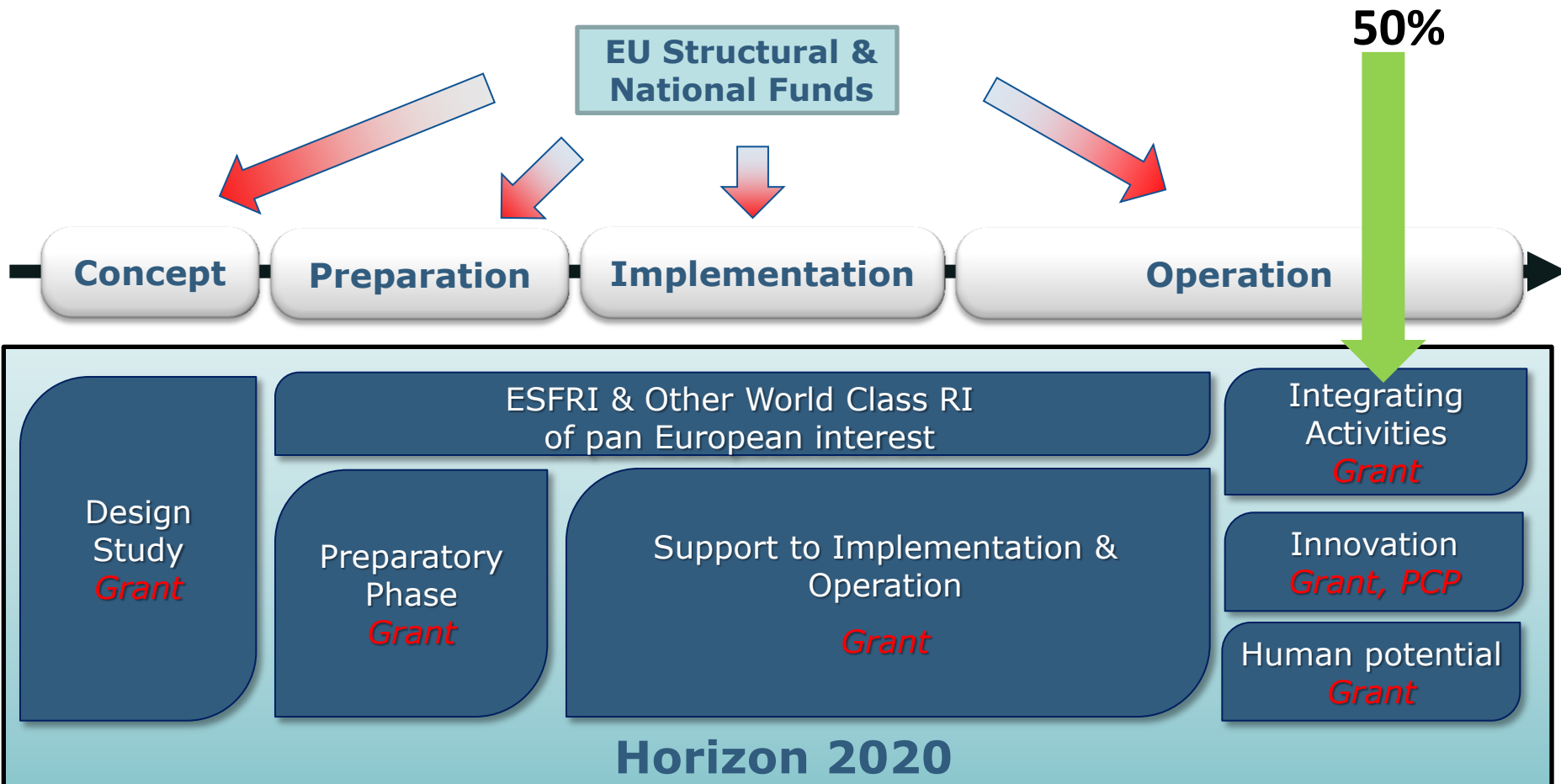
European Commission support for RIs

- Funding RI development across the life-cycle (structural funds, Framework Programmes for R&I, sectoral programmes)
- RI policy development – **ERIC** legal framework, SWD on **long-term sustainability** of RIs, **Charter for Access** to RIs

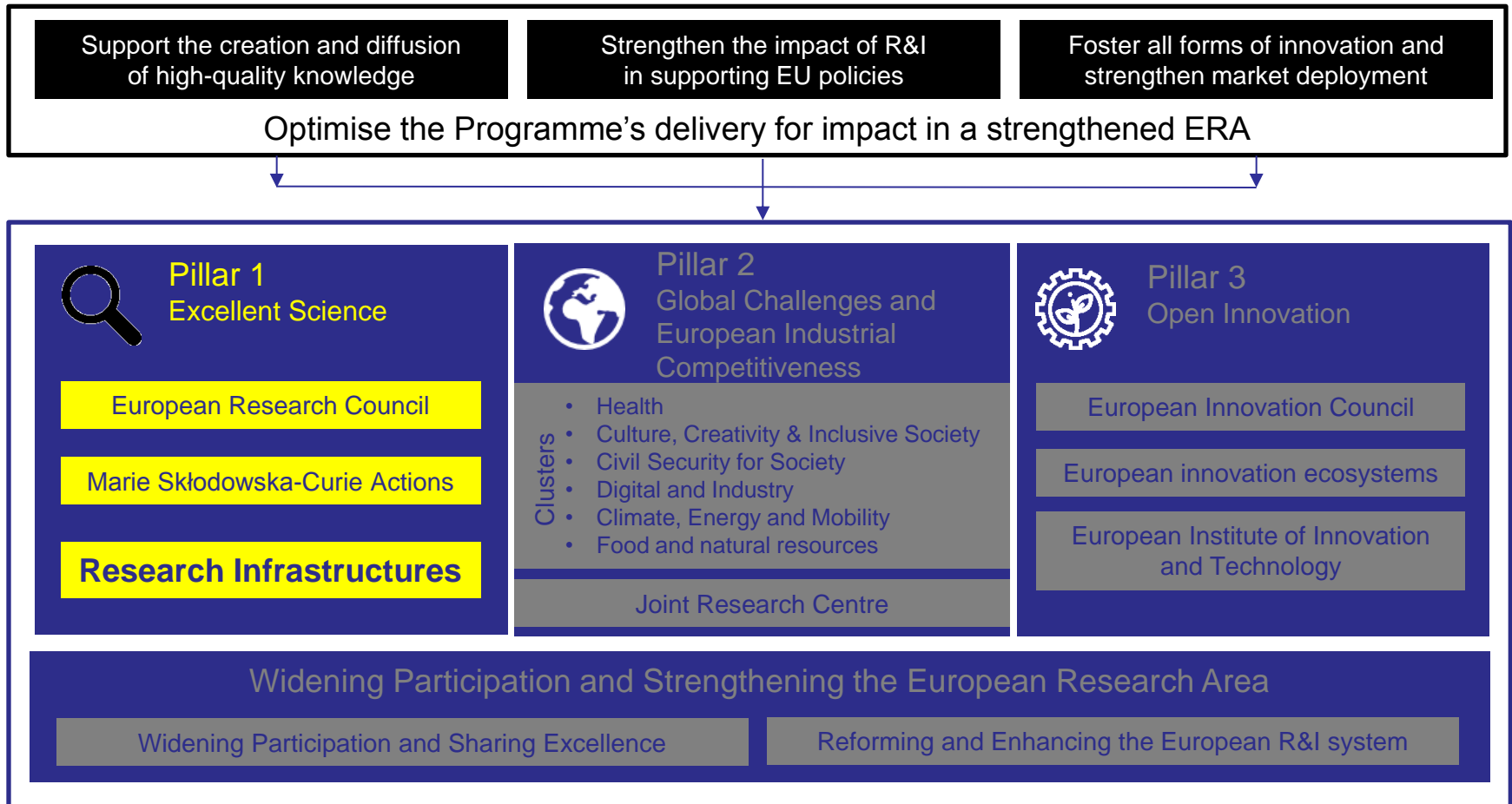


Research Infrastructures in Horizon 2020

A Coherent Toolbox of Activities



The future - Horizon Europe



Challenges for RIs in Horizon Europe

- The EU **strategic approach to RI development** has generated clear advantages:
 - avoiding duplication of efforts
 - pooling knowledge and resources
 - rationalising and amplifying RI use
 - optimalsing and standardising processes and procedures
 - consolidating the global leadership of European RI
- The **European RI landscape** is becoming richer and more mature (ESFRI RIs, integrated networks providing access, RI clusters, etc.)
- **New challenges** to be addressed:
 - ensuring long-term excellence and sustainability
 - delivering impact to science and society



RIs in Horizon Europe - areas of interventions

- 1. Consolidating the Landscape of European Research Infrastructures**
- 2. Opening, Integrating and Interconnecting Research Infrastructures**
- 3. The innovation potential of European Research Infrastructures and activities for innovation and training**
- 4. Reinforcing European Research Infrastructure policy and International Cooperation**

RI LIFECYCLE

PREPARATION

preparatory phase, business & construction plan, political and financial support secured, data policy & data management plan, cost book, legal entity

IMPLEMENTATION

site construction and deployment of organisation, recruitment, IPR & innovation policies, perennial operations and upgrade plan, secure funding for operation

DESIGN

design study, business case, and financial support obtained, common access policy, top-down breakdown of costs, governance, HR policy

ESFRI:

Key Minimal Requirements for different lifecycle stages (ESFRI Roadmap Guide 2021)

RATION

High quality results, services to the community, outreach, development of instrumentation and obtain political and financial support for follow up

CONCEPT DEVELOPMENT

concept screening, consortium formation, access policy and funding concept, scientific and project leadership

TERMINATION

e.g. dissolution, dismantling of facilities and resurrection of site, reuse, merger of operations and organisation and (major) upgrade

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Scientific community – long-term needs, priorities, research goals

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frontier research results, scientific excellence, impact, management

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EU Framework Programmes –
Evaluation - scientific excellence, impact, management
National funding – national, regional, institutional priorities and evaluation procedures

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ESFRI Roadmap – Evaluation along key minimal requirements:

- Scientific case: excellence, strategic dimension (landscape), pan-European relevance, impact
- Maturity for implementation: political support and funding commitments, governance, user strategy, etc.

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**EU Framework Programmes –
Evaluation - scientific excellence,
impact, management**

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ESFRI – Monitoring of ESFRI Projects
– part of Roadmap methodology
EU Framework Programmes –
Monitoring of EU-funded projects,
Assessment Expert Group (2014)

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frontier research results, services to

ESFRI – Evaluation – decision on ESFRI Landmarks (key minimal requirements)

EU Framework Programmes – support for full implementation, development of services, impact, etc.

and resurrection of site, reuse, merger of operations and organisation and (major) upgrade

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ESFRI – Monitoring of ESFRI Landmarks
EU Framework Programmes – support for long-term sustainability

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Decision on upgrade (restart of the cycle) or decommissioning – scientific community, owners, national authorities

scientific community, owners, national authorities

ERA Roadmap

ERA Priority 2b – Make optimal use of public investments in RIs

High-quality, accessible RIs are at the heart of the knowledge triangle of research, education and innovation. RIs are key to Europe's ambition to lead global movement towards open science and help tackling societal challenges.

Actions:

- At National level MS and AC should ensure that the **ESFRI roadmap and their national RIs roadmaps are compatible** with each other.
- At National and European levels there should be a **careful examination of the planned financial contributions**, to new ESFRI projects and to existing ones, in order to ensure their sustainability.
- At European level, the **use of the European Structural and Investment Funds** for these purposes should wherever possible be encouraged.
- **Horizon 2020** should facilitate implementation of the ESFRI projects.

RI Roadmapping - The Big Picture



The Need

A strong research infrastructure (RI) ecosystem needs:

- Sustainable strategic and financial planning across the lifecycle
- Long-term (public and private) investment
- High-quality monitoring and evaluation procedures
- Solid business models
- Political commitment and supportive policies

The Problem

Insufficient coordination and coherence between national systems leads to:

- Unreliable overview about the future needs in the RI ecosystem
- Unstable financing, esp. in the pre-operational phase (valley of death)
- Growing concerns about long-term sustainability of existing RIs
- Wrong policy decisions based on incomplete information

The Solution: Better harmonisation and alignment of roadmapping procedures across Europe

ESFRI Roadmap

1st ESFRI Roadmap cycle

- First Roadmap published in 2006, updated in 2008 and 2010, and contained **48 Projects** intended to foster European leadership across a broad range of scientific fields.
- Required major financial investment (~20 b€) and long-term commitment for operation (~2 b€/year)

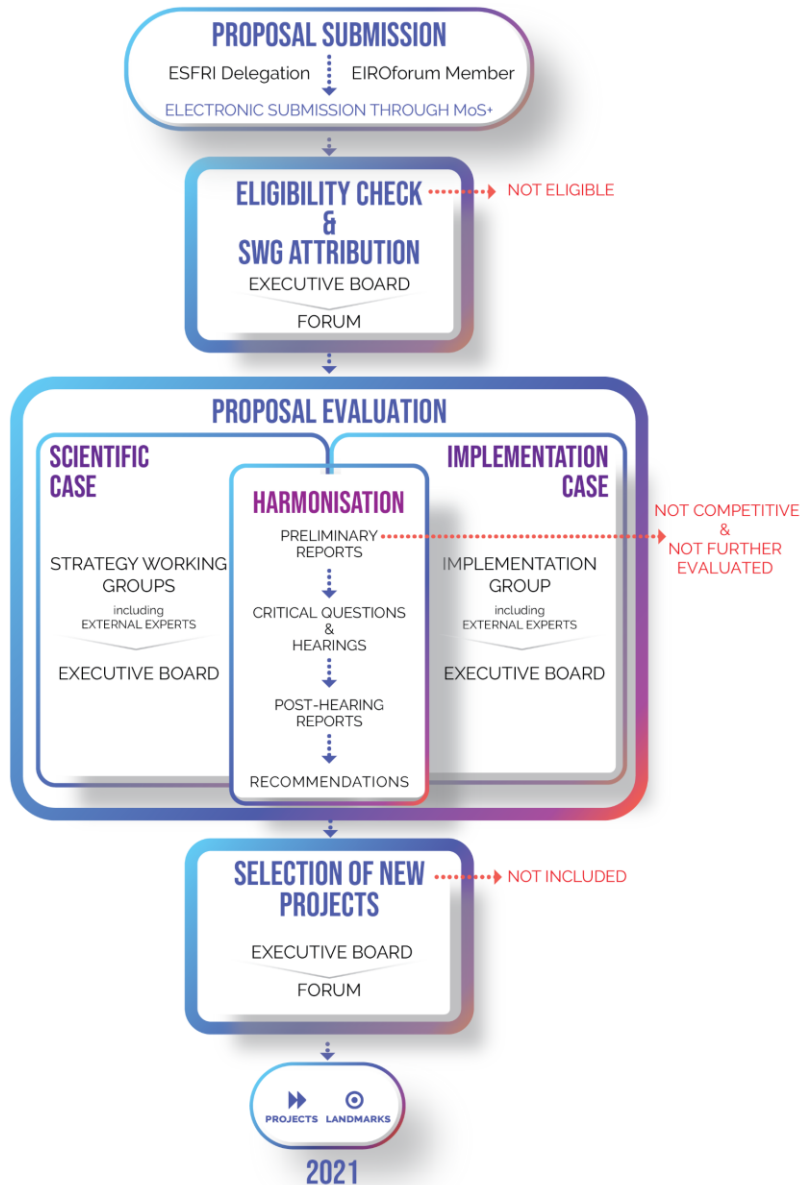
2nd ESFRI Roadmap cycle

- ESFRI Roadmap 2016 and 2018 - **37 ESFRI Landmarks** (~14,5 b€ capital value and ~1,4 b€/year) + **18 ESFRI Projects** (~3 b€ construction costs, 10-year rule) – strategic RIs for the future of ERA + **Landscape Analysis**.
- ESFRI Roadmap update in 2021.





European Commission



Scientific evaluation

- 1) scientific excellence
- 2) pan-European relevance
- 3) socio-economic impact
- 4) User strategy and access policy
- 5) e-needs (infrastructure and services)

Assessment of maturity

- 1) stakeholder commitment
- 2) preparatory work & planning
- 3) governance, management & HR
- 4) finances
- 5) feasibility & risks

National Roadmaps - InRoad Recommendations

I. Achieving higher degree of coordination between national and European RI Roadmapping processes

1. National processes contain at least the following **key elements**:
 - **Landscape analysis** – updated inventory of existing RIs and identification of needs and gaps
 - Identification of **long-term strategic priorities** in a transparent manner
 - **Evaluation and monitoring** of RIs according to scientific, managerial, strategic and societal dimensions across the lifecycle
 - Prioritisation of new and existing RIs in view of **available funding**
2. Better **integration of RI roadmapping** into the national research and innovation ecosystems and across other national policies (ex. education, health, etc.)

National Roadmaps - InRoad Recommendations

1. **Achieving higher degree of coordination between national and European RI Roadmapping processes (cont.)**
3. Ensure good connection of national RI roadmaps with **long-term funding plans**
4. **User communities** should prioritise their needs with a long-term perspective

National Roadmaps - InRoad Recommendations

II. Achieving higher degree of coordination between regional, national and European funding frameworks

5. Governments should improve **financial predictability and stability** across the RI lifecycle and ensure **sustainable provision of RI services** to broad user communities.
6. Closer **synergies need to be established** across regional, national and European levels through greater **coherence of priority-setting** and adjustment of **regulatory frameworks** of different funding instruments.
7. **Communication, mutual learning and cooperation** between RIs and other stakeholders need to be fostered to promote adequate and sustainable funding of RIs and enhance their societal value.

National Roadmaps - InRoad Recommendations

III. Best practices and common standards for RI business planning

8. All RIs should develop a **business plan** in order to align their strategy, resources and goals and to connect their mission with national and international strategic agendas.
9. Business plan should be used as an **active management tool** aimed at ensuring long-term sustainability of the RI.
10. Continuous **stakeholder engagement** is needed for the development, implementation and updating of a sound business plan.

Thank you for your attention

HORIZON 2020

