



European Strategy Forum
on Research Infrastructures

Intersection between Big Science and Science Diplomacy

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ESFRI Mission:

Support a coherent and strategy-led approach to policy-making on research Infrastructures in Europe



Draghi report on the future of European competitiveness...

“Most Member States cannot achieve the necessary scale to deliver world-leading research and technological infrastructures, in turn constraining R&I capacity.”

“Increased funding and stronger coordination is required to develop world-leading research and technological infrastructures, when scale is needed.”

ESFRI in a nutshell

- Established in 2002 with a mandate from the Council of the European Union
- Brings together representatives of Ministers of Member States and Associated Countries, and of European Commission
- Supports a coherent and strategy-led approach to policy making on Research Infrastructures
- Central platform for strategic thinking and collaboration, guiding the development of RIs in Europe
- Contributes to Europe's competitiveness in the global scientific landscape
- Integrates and strengthens the European Research Area (ERA)

Why are Research Infrastructures so important?

- Efficient RIs enable the greatest discoveries in science and technology
- Attract researchers from around the world
- Build bridges between research communities
- Allow the training of researchers
- Facilitate innovation and knowledge-sharing
- **Facilitates (and needs) International collaboration**



The Traditional Pillars of Scientific Diplomacy

International Cooperation Agreements

- Examples include large-scale scientific collaborations as an archetype “Big Science”, such as CERN, SKA or ITER,

Bridging Borders Tackling Global Problems

- This involves guiding international agreements with scientific principles to facilitate negotiations, for instance, on topics like climate change, Antarctic Research, natural resources, and strategic metals.
- Fifty years ago, only 2% of scientific publications were co-authored by scientists from multiple countries. Today, 30% of publications reflect international collaborations.

Bridging Divides through Scientific Cooperation

- Even in times of near conflict, when other channels are closed, scientific cooperation can remain open. An example is the SESAME Synchrotron in Jordan.

Historically, these pillars were based on a **stable and predictable 20th century world.**

In the 21st Century the complexity has increased

Changing Global Dynamics in Science

- Fifty years ago, the United States produced 28% of global scientific publications, the leading share worldwide. Today, it produces 14%.
- China is now the top producer of scientific publications.
- India ranks 3rd or 4th, with rapid growth in countries like Indonesia and South Africa.

Acceleration of Scientific Processes

- The number of publications is growing exponentially. Issue with Editorial Business.
- Manuscript-to-publication time has shrunk to a few weeks.

Rise of Private Sector Influence

- The role of private companies has expanded significantly.
- Consider examples like Amazon or Apple in comparison to public-sector projects like ITER versus the Apollo program. In the seventies: 1year Apollo=1year benefits of GM. Today: 1year benefits of Apple is 120 times 1 year of ITER.

European Dependencies and Challenges

- **Europe highly dependent on external sources** for advanced technologies and energy (semiconductors, GPUs, and AI....). Geopolitical situation is now fast-changing.
- **Europe lacks a fully coordinated European strategy.** Not new but very significant.
- From Open Space and Open Science to Strategic Sovereignty
Balance openness with strategic sovereignty. **Reliable partners must be prioritized.**
"As open as possible, as closed as necessary."
- Toward a Coordinated European Roadmap for Scientific Diplomacy. Role of
 - Universities and their adaptation to the modern world. **People is the key.**
 - Research Infrastructures (RIs), such as ESFRI and JRCs.
- Need for European Leadership and Consolidation
Forums like ESFRI help unify pan-European research infrastructures.
Europe must shift **from following global trends to generating them.**

Actions on Science Diplomacy by the EC

ERA Policy Agenda 2025 - 2027

SHORT-TERM ACTIVITIES

- International cooperation, taking research security considerations into account

European Strategy on RIs and TIs

Strengthening the international dimension and resilience

Action 20. Strengthen the international dimension of pan-European RIs and their role for science diplomacy notably through enlarging geographical coverage in high-priority scientific fields.....

Action 21. Develop actions to support: (i) the implementation of risk management, mitigation and contingency measures for infrastructures, (ii) trusted and secure storage, and (iii) the development of data sovereignty frameworks for secure and efficient data sharing.

Action 22. Promote the integration of candidate countries potential candidate and associated countries.

Council Conclusions 2022

Elaborate a method to map the global RI landscape, linking the European, national and regional, and consider cooperation schemes based on the EU's values and principles

ESFRI actions on Science Diplomacy

ESFRI Drafting Group on international cooperation

GOAL: To elaborate a report analyzing trends/gaps in international cooperation with recommendations to relevant stakeholders

Possible topics

- Current Landscape of Internationalization
- Internationalization Instruments and Mechanisms
 - ERIC model, Collaborative platforms (e.g., EOSC, Science Clusters, EuroHPC), Science Diplomacy: SESAME, CERN, EU-CELAC JIRI SOM (Pillar of Collaboration in RIs), ASEAN, EU-AU, Ukraine.
- Impact of Internationalization
 - Global nature of some RIs (ESO, SKA, ET, EUROArgos...)
- Recommendations

Conclusion

Europe needs a clear, **coordinated roadmap for Scientific Diplomacy** that combines its **strengths in talent, universities, and research infrastructures** with **strategic sovereignty** to **play a leading role** in global scientific and geopolitical relations.



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Thank you!

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