



ESFRI

European Strategy Forum
on Research Infrastructures

The European Strategy Forum on Research Infrastructures: some current issues and actions

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Member Executive Board

RIS NCP Training 29-30 January 2013, Geneve

- Mission of ESFRI: update

Strategy on RI development and sustainability

(assessment, evaluation methods and practices, implementation)

- ESFRI's roadmap process: new edition in 2015

(evaluation of projects, gap analysis, selection of new projects)

- Internationalization vs. Regional Issues

(role of global RIs GSO-G8+5, role of Regional RIs, role of Partner Facilities, Concentrations)

Conclusions on 'A reinforced European research area partnership for excellence and growth'

*3208th COMPETITIVENESS (Internal Market, Industry, Research and Space)
Council meeting
Brussels, 11 December 2012*

... 15)

EMPHASISES the need for renewing and adapting the mandate of ESFRI to adequately address the existing challenges and also to 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.

Mission of ESFRI

The European Strategy Forum on Research Infrastructures was founded in 2002 by the Research Ministers of the Member States and the European Commission

- To support a **coherent and strategy-led approach to policy-making** on new and existing pan-European and global Research Infrastructures (RI);
- To facilitate **multilateral initiatives** leading to **the better use and development of RI**, at EU and international level.

The Roadmap Mandate

- The Competitiveness Council of the EU mandated ESFRI on November 2004 to develop a strategic roadmap in the field of RI for Europe
- The ESFRI roadmap identifies new pan-European Research Infrastructures (RIs) or major up-grades to existing ones, corresponding to the needs of European research communities in the next 10 to 20 years, regardless of possible location

First Roadmap
in 2006

Update in
Dec 2008

Update in
Dec 2010

*A stimulation
and incubator role*

ESFRI designed a **stage-gate process**

each proposal needs support by at least 3 MS or AC

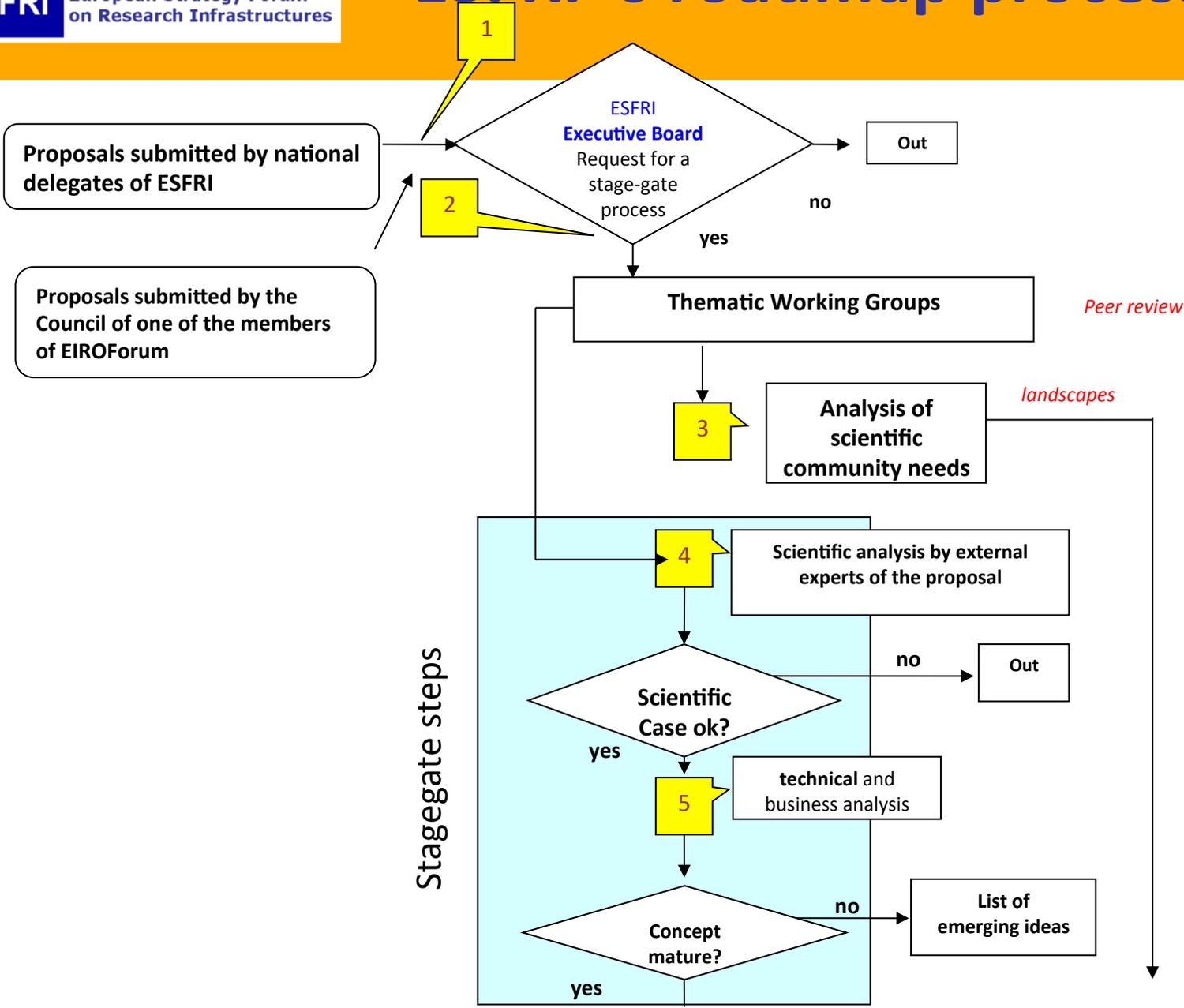
Scientific case

- ✓ Corresponds to future needs of the scientific communities in Europe
- ✓ Demonstrates impacts on scientific developments
- ✓ Supports new ways of doing science
- ✓ Pan-European value, comparison with the international level

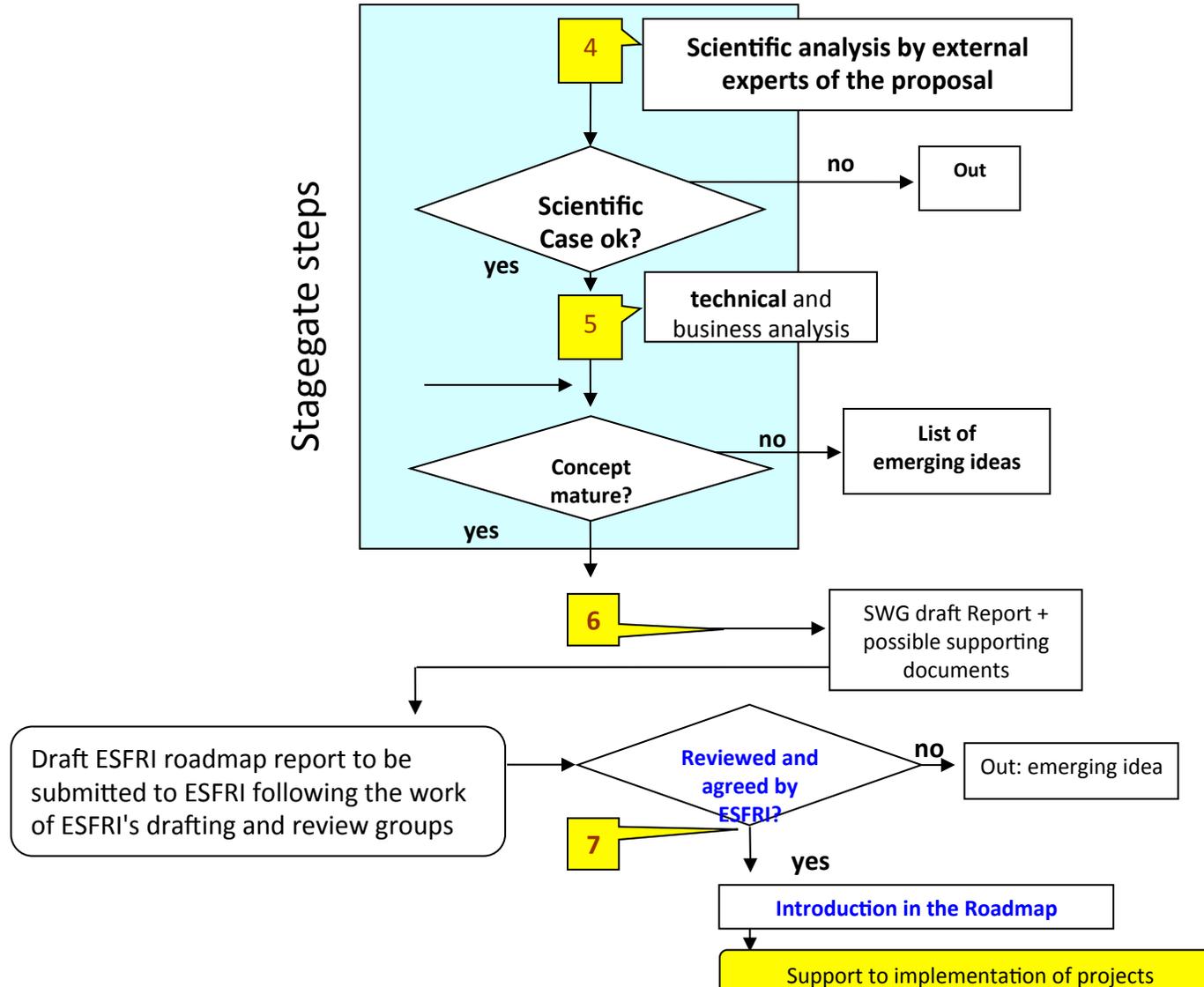
Concept case

- ✓ RI should be technologically and financially feasible; meet the necessary degree of maturity

ESFRI 's roadmap process



ESFRI 's roadmap process



ESFRI Roadmap Results

- From more than **260** proposals, **50** projects have been identified through several review stages between 2006 and 2010
- Projects meeting the “grand challenges”
- **10** of the projects are in the **implementation phase** and further **16** are proceeding towards the implementation phase until end of 2012
- *“By 2015, Member States together with the Commission should have completed or launched the construction of 60% of the priority European Research Infrastructures currently identified by ESFRI”*, Innovation Union Flagship Initiative

ESFRI Roadmap 2010

48 new - or major upgrade of - Research Infrastructures of pan-European interest

(+ 3 additional projects from the CERN Council strategic roadmap for particle physics*)

Social Sc. & Hum. (5)	Life Sciences (13)		Environmental Sciences (9)		Energy (7)	Material and Analytical Facilities (6)	Physics and Astronomy (10)		e-Infra-structures (1)
SHARE	BBMRI	ELIXIR	ICOS	EURO-ARGO	ECCSEL	EUROFEL	ELI	TIARA*	PRACE
European Social Survey	ECRIN	INFRA FRONTIER	LIFEWATCH	IAGOS	WindScanner	EMFL	SPIRAL2	CTA	
CESSDA	INSTRUCT	EATRIS	EMSO	EPOS	EU-SOLARIS	European XFEL	E-ELT	SKA	
CLARIN	EU-OPENSREEN	EMBRC	SIAEOS	EISCAT_3D	JHR	ESRF Upgrade	KM3NeT	FAIR	
DARIAH	Euro BioImaging	ERINHA BSL4 Lab		COPAL	IFMIF	NEUTRON ESS	SLHC-PP*	ILC-HIGRADE*	
	ISBE	MIRRI			HiPER	ILL20/20 Upgrade			
	ANAEE				MYRRHA				

 Distributed research infrastructures

 Single sited research infrastructures

ESFRI Projects

Area	Roadmap 2010	Implemented
Social Science and Humanities (SSH)	2	3
Environmental Sciences (ENV)	9	0
Biological and Medical Sciences (BMS)	13	0
Energy	6	1
Engineering, Physical Sciences, Materials and Analytical Facilities (EPS)	8	5
E-Infrastructures	0	1

Numbers

GDP 12¹² Euro in 2011
GDP PPP 25 000 Euro 501 Million people

DE 2.7¹² Euro 81 M
I 1.58¹² Euro 61.5 M

GERD UE 2% 240 G€

Expenditure in RI: 10 G€ per year
With ESFRI >12 G€ per year

2% of GERD increase by ESFRI + 0.8 % of GERD
ESFRI contributes to 0.01% to the Lisbon goal of 3% GDP

State of Play of the Implementation of the projects on the ESFRI roadmap

**Leo le Duc, chair ESFRI Implementation
Group**

ESFRI Implementation Group set up late 2011 to:

- Identify/analyse bottlenecks for implementation and propose solutions
- Support implementation regarding:
 - Governance
 - Legal issues
 - Access and Data policy
- Stimulate communication between scientific communities and funding agencies
- Summarize lessons learned/provide recommendations

IG interim conclusions

- Projects on ESFRI roadmap are at very different stages of maturity
- Governments are not enough connected to ESFRI projects
- Most projects start preparatory phase without (financial) commitment
- Transition from preparatory phase to implementation is problematic

Bottlenecks

Related to Finance

- Securing the necessary financial investment
- Developing a suitable funding model
- **Money for the coordinating activities of the hub !**
- Difficult for distributed RI to demonstrate full construction and operation costs
- Varying speed and processes of (political decisions) among MS

Bottlenecks

Related to Governance

- Design of an integrated and effective

Related to Legal

- Choosing the most appropriate legal model. Negotiations are lengthy and challenging and full of difficulties

The combined effect of **Legal and Governance** bottlenecks results in lengthy delays to the construction and implementation of the projects.

Other Bottlenecks

- Bridging the gap between PP and Implementation phase
- Mobility & Access
(Trans-National Access)
- Site issues
- Technical challenges

Site selection and Technical issues are generally no big bottlenecks

Next steps

- The EC has set up an Expert Group on Assessment of the ESFRI projects.
- The members of the Expert Group are high level managers expert in setting up and managing RIs
- This group will assess the financial and managerial maturity of all 48 projects of the ESFRI roadmap.
- The Implementation WG will work together with the this Expert Group and the Strategy Working Groups to assist the implementation of he projects.

Expert Group on Assessment

Composition:

- Antonella Calvia-Goetz (Chair)
- Alfonso Franciosi
- Johannes Marks
- Sine Larsen
- Karl Tichmann
- Richard Wade
- Milena Zič-Fuchs

ESFRI evaluation criteria

- Providing scientific / technological cutting edge and managerial excellence
- Have a clear pan-European added value (at least 30% of users coming from non-host countries)
- Provide top-level services and training possibilities for young scientists
- Projects selected by peer review since demand exceeds supply
- Results published in the public domain

elements of pan-European relevance

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Evaluation of European Research Infrastructures	
Objective	Criterion
<p>Scientific and technological excellence and impact Potential for promoting the ERA through strengthening the knowledge base to address the grand challenges</p>	<ul style="list-style-type: none"> • Contribution to the advancement of Science and Technology <ul style="list-style-type: none"> – Ability to perform excellent research – Potential to enhance interdisciplinarity • Appropriateness of measures for the dissemination and/or exploitation of scientific and technological results. • Uniqueness: Complementarity or competitiveness with other RIs at national, regional, European or international level <p>(What is the most appropriate scope of the facility (regional/ European/ global), how does it integrate/ replace existing RIs?)</p> <ul style="list-style-type: none"> • Potential role in structuring the ERA <ul style="list-style-type: none"> – The potential to strengthen the development of an efficient European Research Area. – Relevance of the RI to EUROPE 2020 (in particular the priorities of smart, sustainable and inclusive growth) and its Innovation Union flagship, and to Horizon 2020 – The potential to address the grand societal challenges • The contribution, at the European and/or International level to <ul style="list-style-type: none"> – Knowledge generation in different areas – Knowledge transfer to industry and /or the wider society – Mobility of researchers • Quality and relevant experience of the individual participants (Institutions, Labs) and thus the overall quality of the research infrastructure.

<p>Socio – economic impact and competitiveness You have to differentiate between: Short-term outputs Middle-term outcomes Long-term impacts</p>	<ul style="list-style-type: none"> • Capabilities to generate impacts <ul style="list-style-type: none"> – Impact on European and/or regional competitiveness and economy – Impact on society – Impact on environment
<p>Governance and financial management</p>	<ul style="list-style-type: none"> • Appropriateness of the management structure and procedures <ul style="list-style-type: none"> – Transparent and efficient management. – Efficient research services. • Appropriateness of the allocation and justification of the resources to be committed • Access management strategy

1.2.2 Ex-ante criteria list (ESFRI Evaluation Report 2011, p.9)

Quote “As a first step, strategic aspects have to be evaluated. A proposal for a new RI or a major upgrade of an RI already in use should be carefully evaluated in the general context of the ERA. Some aspects are mentioned below, the criteria are provided in table 1.

a) Does the new/ upgraded RI fill a gap/ have **a strong and necessary role in the ERA?**

b) Does the new / upgraded RI represent the best / most convincing solution to the research needs that it addresses?

c) Does the new / upgraded RI be the best possible solution for the needs of research at European/ national/ regional level according to the **European relevance (uniqueness etc.)?**

d) Does the new / upgraded RI directly strengthen the **global competitiveness of the ERA?**

e) Does the new / upgraded RI appear to be the optimal economic solution?

f) Does the new / upgraded RI have direct and indirect benefits to society/ meeting grand challenges?

g) What is the contribution of the new / upgraded RI to education and training?

h) Does the new/ upgraded RI provide a convincing business plan (including governance issues, costing analysis, efficiency and risk analysis)?

i) How does the new / upgraded RI integrate in the international RI landscape/ how does it cooperate on international level?”

1.3 Indicators to measure pan-European relevance

Headline indicators (fulfilment of each one of these dimensions is necessary)

- Uniqueness and attractiveness
- Making full use of talents
- Impact on technology development and science management

- a) Uniqueness and attractiveness are characters shared by several research infrastructures independently of their actual status as purely national enterprise or effectively pan-European consortium. The special PEV of a pan-European infrastructure based on a consortium of a plurality of EU and Associated Countries stays in the absolute necessity of joining the intellectual, technological and financial efforts of those partners in order to make the RI possible at all. These very reasons must be complemented by the attractiveness that extends beyond offering top quality jobs to the best international scientists willing to engage in construction and operation of and advanced RI, but also to attract the best EU researchers to perform research at the RI, the access being based only on the quality of their science proposals. Such attractiveness must act as a catalyser of joint programming in the field of research empowered by the RI. The RI project may also be highly desirable because does realize (or substantially contributes in realizing) the “unique capacity” of the ERA in a given domain where some excellent RI already exist, but where it is clear that added capacity at the “state of the art standard” is a strategic priority for EU/international research.
- b) Making full use of talents. Indicators on this must measure the potential of the RI to express the top capabilities of the EU / international scientists and technology developers to realize a truly innovative RI with clear sustainability schemes. Indicators should also address the role of the RI as a catalyser for strengthening the advanced training of young scientists and technology developers to meet the needs of European knowledge society, as well as the training of young managers of complex international undertakings.
- c) Understanding the “impact” at the pan-European, or global, dimension, leads to indicators on the effective role of the RI in addressing advanced research on the Grand Challenges, developing leading solutions to the data standards, prompting/forcing the development of novel technologies. The impact shall be measured also in the role of the RI in setting standards in the operation of the ERA also determining a higher level of joint programming in the field at EU and international level. Societal and local economic impact of the RI headquarters and nodes will also be measures by useful indicators.

a, b c are necessary, but not jointly sufficient; in addition, a pan-European infrastructure has to be excellent and this can be qualified by the general ESFRI criteria and the indicators of excellence that are proposed in 1.5 (omitted in this version)

Quoting the ESFRI Strategy Report: “Research Infrastructures provide **unique** opportunities to train **scientists and engineers** while facilitating **knowledge, technology transfer and innovation**. Research Infrastructures offer stimulating **research environments that attract** researchers from different countries, regions and disciplines. Thousands of researchers and students from universities, research institutions and industry, from Europe and from outside Europe, use Research Infrastructures each year. About 55% are researchers from universities, 20% are from public laboratories, 20% are from non-European research institutions, and 5% are from industry.

*Here one identifies that “**uniqueness**” and “**attractiveness**” of the RIs are positive elements of PEV that may be qualified and quantified by indicators.*

...

Research and innovation are the key drivers of Europe’s future, especially in periods of economic instability. **Europe has to make full use** of its available talent and resources. To achieve this, every effort should be made to implement the Research Infrastructures on the ESFRI roadmap since they are the guarantee for producing new ideas and developments which turn into innovations and hence, in a longer term, into jobs. It is however necessary to coordinate better and more efficiently the different funding instruments.

*Here one identifies that “**enabling full use of talents**” is a positive element of PEV that may be qualified and quantified by indicators.*

...

Irrespective of the field of research, pan-European Research Infrastructures, new or existing, must provide:

- scientific and **technological cutting edge and managerial excellence**, recognized at European and international level (in research, education and technology);
- clear **pan-European added value**, linked with facilities which deliver top level services attracting a widely diversified and international community of scientific users; host institutions awarding open access through international competition on the basis of excellence (selection by peer review since demand exceeds supply) and results published in the public domain (additional access might be offered either for training or for industrial research, the latter on a payment basis, as a marginal, non-economic, activity, not interfering with the peer reviewed access).”

*Here one identifies that “**advanced technology and managerial excellence**” are key elements of PEV that may benefit the whole ERA and these should also be qualified and quantified by indicators.*

Strategy Working Groups

- Central role
- Thematic domains focusing on interdisciplinarity of grand challenges
- Monitoring of scientific developments, taking innovation into account, addressing the issue of socio-economic impact
- Contribute on promoting the use and the development of e-Infrastructures
- To take responsibility for developing and overseeing coordinated actions for different ESFRI tasks as for example implementation and developing the ties with industry

Strategy Working Group Chairs

Health&Food: Murat Ozgoren

Social and Cultural Innovation: Adrian Dusa

Environment: Gelsomina Pappalardo

Energy: N.N.

Key Enabling Technologies: N.N.

Regional Issues – Development of a coherent view
on regional aspects of European RIs, Chair: Jacek
Gierlinski

Implementation – Support of the implementation of the projects, Chair: Leo Le Duc

Indicators – development of indicators for the evaluation of new and existing research infrastructures in terms of their pan-European relevance which are reasonable to be taken into account for future updating of the ESFRI roadmap, Chair: Giorgio Rossi

Assessment Expert Group – deals with legal, management and governance aspects and financial commitments, not with the scientific content of the projects, Chair: Antonella Calvia

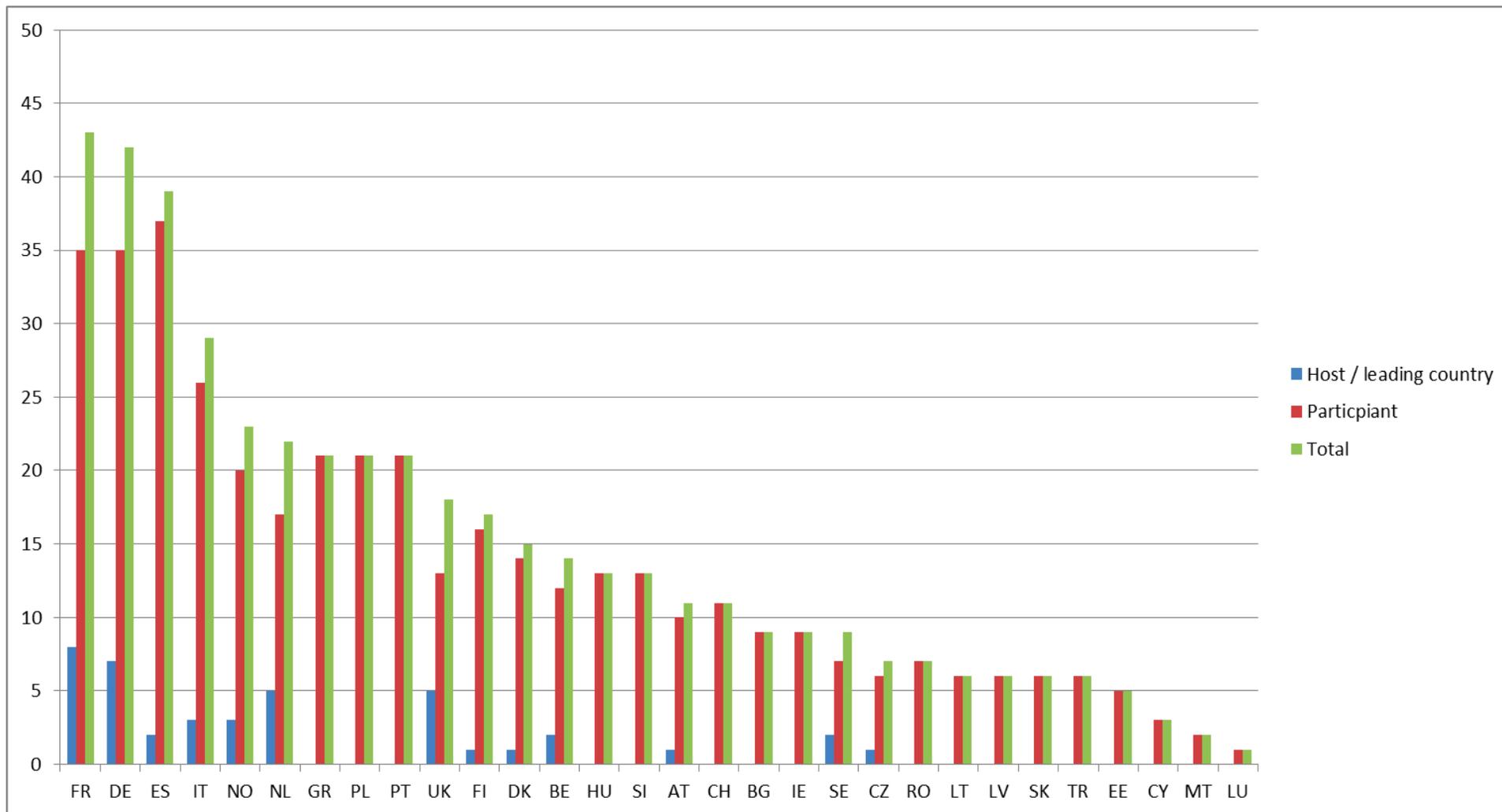
Regional Issues and Globalization of research infrastructures

Improve the efficiency of EU research by optimizing the availability of RIs, improving the mobility of researchers, enforcing full pan-European governance criteria and realizing high and distributed socio-economic benefits from RIs.

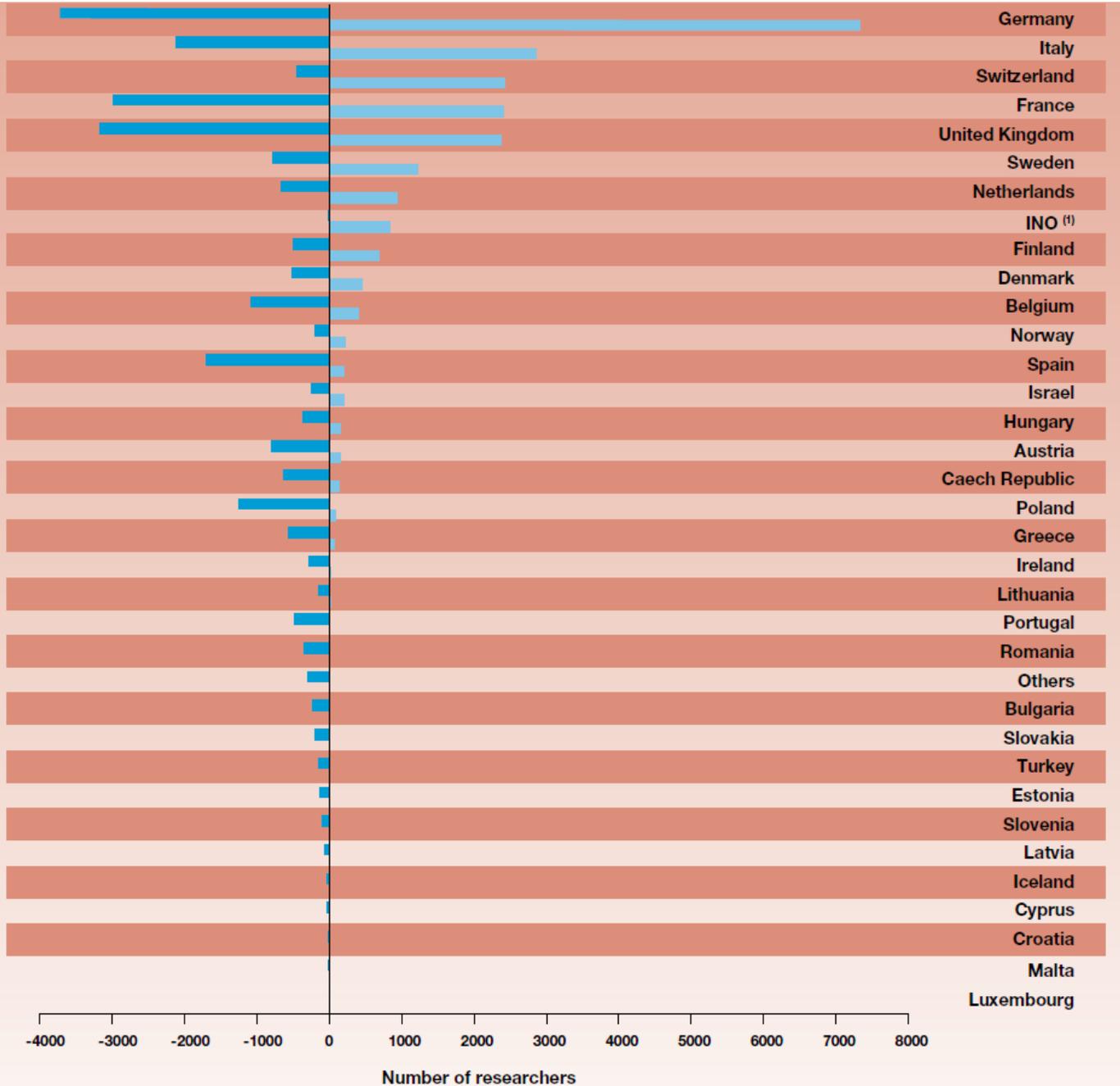
Analyse the benefits of concentrations (Barcellona, Hamburg, Lund, Grenoble, Villigen, Trieste, Harwell Campus, Saclay...) as well as of territorial distribution.

Partnership with pan-European or Global Infrastructures.

ESFRI research infrastructures across the EU territory



FP6 mobility of researchers



Source: DG Research and Innovation
 Data: DG Research and Innovation, Eurostat
 Note: (1) INO: International organizations and research infrastructures not based in a single country.

A “**European Distributed Research Infrastructure**” is a Research Infrastructure with a common legal form and a single management board responsible for the whole Research Infrastructure, and with a governance structure including among others a Strategy and Development Plan and one access point for users although its research facilities have multiple sites.

It must be of pan-European interest, i.e. shall provide unique laboratories or facilities with user services for the efficient execution of top-level European research

It must bring significant improvement in the relevant scientific and technological fields, addressing a clear integration and convergence of the scientific and technical standards offered to the European users in its specific field of science and technology.

A “**node**” of a European Distributed Research Infrastructure is a national facility acting as the regional partner centre and entry points for the RI:

- having identifiable management structure,
- either having or planning to have adequate research facility in line with the RI profile,
- coordinating local research activities in line with the RI profile,
- offering open access to users and an integrated and wider set of services,
- contributing in kind and/or in cash to joint activities,
- collaborating in seeking funding for these activities and share such acquired funding,
- participating in development of a common IP policy,
- participating in promotion and marketing activities.

A “**Regional Partner Facility**” (RPF) to a Research infrastructure of pan-European interest must itself be a facility of national or regional importance in terms of socio-economic returns, training and attracting researchers and technicians. The quality of the facility including the level of its scientific service, management and open access policy must meet the same standards required for pan-European Research Infrastructures. The recognition as an RPF should be under the responsibility of the pan-European Research Infrastructure itself (or the members of a to-be ERIC) based on a regular peer review.

New projects for the 2015 Roadmap, with criteria of

- a) Scientific uniqueness,
- b) Increase of unique capacity of the EU

GAP ANALYSIS, FLUX ANALYSIS OF RESEARCHERS
ANALYSIS OF BENEFITS, ECONOMIC, SOCIAL, TRAINING,
COHESION, GLOBAL IMPACT

Regional Issues and Globalization of research infrastructures

Global Research Infrastructures: a G8+5 study where the EU (also through ESFRI) has a stimulating role.

- Global research infrastructures may constitute the basis for the national or regional development of comprehensive innovation clusters around the global research infrastructures, with the aim to coordinate other nationally or regionally important infrastructures, research labs, technology transfer and education structures which need to be identified and supported along the life-cycle of the research infrastructure. In addition, different RIs with complementary capabilities working in similar scientific areas should consider realising collaborative global research infrastructure.
- Other common principles include: the use of variable geometry schemes where only interested stakeholders should participate along the full life-cycle; the use of harmonized evaluation criteria to assess the benefits of a global research infrastructure; and clear rules for accepting additional partners.

- ***Real single-sited global facilities*** are geographically localized unique facilities whose governance is fundamentally international in character. The Large Hadron Collider (LHC) at CERN and ITER are current examples. The possibility of future opportunities which may arise from similar projects being developed in different countries needs to be kept in mind, in order to ensure that only one such facility is built.
- ***Globally distributed research infrastructures*** are research infrastructures formed by national or institutional nodes, which are part of a global network and whose governance is fundamentally international in character. Ocean, earth or seafloor observatories fit very well into this category, including oceanography fleets of research vessels and polar research facilities (both for the Arctic and Antarctic), as well as large telescope arrays. Ad-hoc distributed facilities, linked with time-limited campaigns of observations, might also be considered for possible inclusion in this category. Scientific information exchange, data preservation and distributed computing infrastructures relying on open high-speed connectivity, provide new opportunities in terms of virtualization of resources, advanced simulation environments and improved and wide access to research infrastructures.
- ***National facilities of global interest*** are national facilities with unique capabilities that attract wide interest from researchers outside of the host nation. Antarctic or ocean drilling facilities are typical examples. Existing research infrastructures with the potential for wide international utilisation (for instance, facilities that leverage geographical advantages or exhibit unique opportunities for advanced research) may fall under this category. Countries may accordingly propose those national facilities that have the potential to be opened for global participation, taking due care of balancing international and national interests.

Innovation

- To identify and promote the innovation and industrial capabilities of the RIs on the ESFRI roadmap;
- To strengthen the cooperation of pan-European RIs with industry;
- To stimulate, where appropriate, the industrial involvement in the conceptual design phase of RIs;
- To promote the access of industrial users to the RIs.

Chair: Jean Moulin

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- Efficient use of structural funds. Dialogue with DG Regio and concertation with MSs
- Smart Specializations
- Industrial use of RIs
- Training, integration in curricula for young and for professionals
- Effective costing and cost sharing
- ...