

# IMPROVING IMPLEMENTATION OF WORLD CLASS RESEARCH INFRASTRUCTURES

1. ASSESSMENT OF THE EFFECTIVENESS OF THE RI FUNDING INSTRUMENTS UNDER THE UNION FRAMEWORK PROGRAMME, IN PARTICULAR THE PREPARATORY PHASE FUNDING FOR RIS IN EARLY PHASES OF THEIR LIFECYCLE, THE INDIVIDUAL SUPPORT FOR FOSTERING THEIR IMPLEMENTATION AND ENHANCING THEIR SUSTAINABILITY; PROVIDE RECOMMENDATIONS FOR IMPROVEMENTS.
2. ASSESSMENT OF THE RI PROGRESS TOWARDS IMPLEMENTATION AND LONG-TERM SUSTAINABILITY; EVALUATE THE FUTURE OUTLOOK OF THE PAN-EUROPEAN (OR GLOBAL) RELEVANCE OF RIS IN RELATION TO THEIR SCIENTIFIC GOALS AND THE EVOLUTION IN THEIR LIFECYCLE; PROVIDE RECOMMENDATIONS

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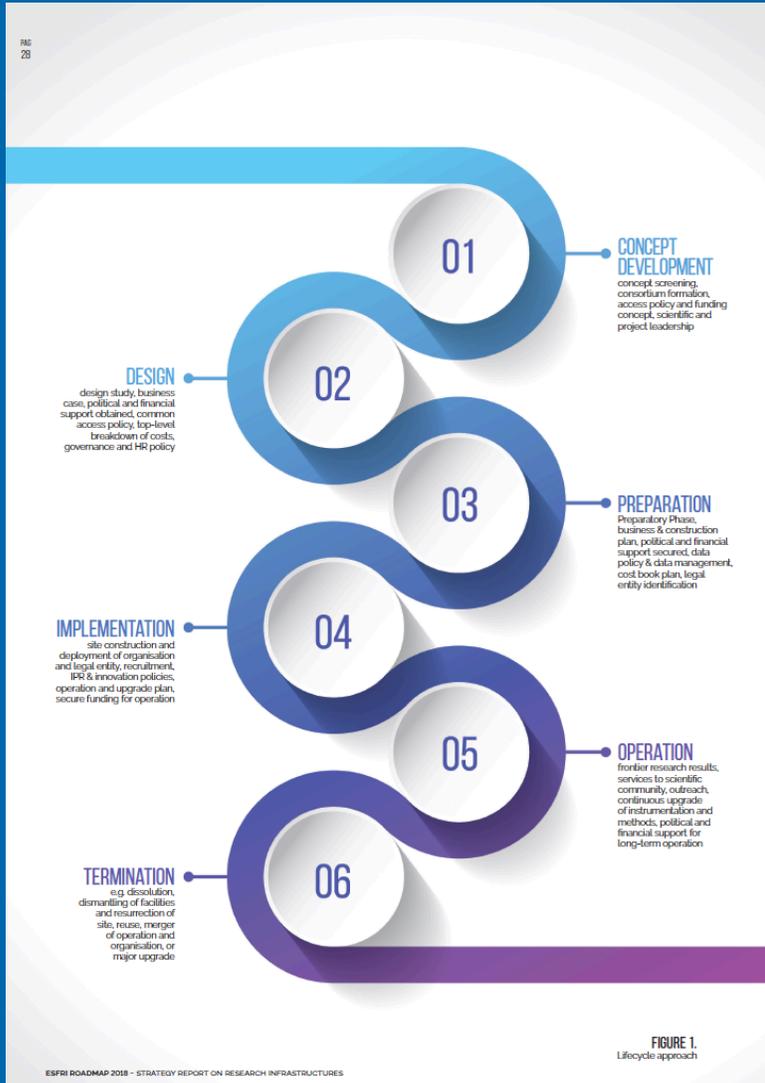
ESFRI Workshop on the Future of Research Infrastructures in the European Research Area

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# LIFECYCLE



CONCEPT DEVELOPMENT COMES FROM THE SCIENTIFIC COMMUNITY AS A NEED TO ADDRESS NOVEL FRONTIERS OF RESEARCH: ALTERNATIVES ARE CONSIDERED, CONCEPTUAL DESIGN REPORTS ARE DONE WITH INSTITUTIONAL MEANS, OR THROUGH EC DESIGN STUDY GRANTS

IMPLEMENTATION DESCRIBES THE FULL SET UP OF THE RI ALSO SETTING THE FUNDAMENTALS FOR ITS **COST CONTROL, SUSTAINABILITY AND POLITICAL SUPPORT.**

IT SHOULD BE COMPLETED IN **10 YEARS** ACCORDING TO ESFRI, IT MAY BE FASTER IN SOME CASES.

IT CAN BE PARTIALLY SUPPORTED **ALSO** BY EC GRANTS AND CONTRACTS

## EFFECTIVE AND TIMELY IMPLEMENTATION OF RI

- The status of IMPLEMENTED RI has been certified by achievement of the ERIC and/or by adoption in the ESFRI LANDMARK list, usually after **10 years** as PROJECT
- Most of IMPLEMENTED RIs face own as well as “environmental” difficulties in reaching stability in the construction and operation
- The preparation phase can be lengthy

## Falling short of EFFECTIVE IMPLEMENTATION

- Uncertain Costing analysis and Cash Flow analysis

A robust cost-book, with regular updates and independent validation, is often missing.

This is reflected on the practical engagement of politically-supporting MS/AC.

- Some Landmarks have not reached a CLEAR and STABLE cost analysis
- Some Landmarks face SUBSTANTIAL increase of cost with respect to the politically agreed financial support level
- Some ERICs do engage the Members for a financial support that corresponds to a small fraction <<50% of the agreed cost and only for the short term – 5 years
- Some ERICs struggle for COVERAGE (e.g. geographic) that is key to their scientific mission

## Falling short of EFFECTIVE IMPLEMENTATION

- Early definition of SUCCESS STORIES by ESFRI (2010) did not help the Research Infrastructures

Political push for RIs has slowed down rather than accelerated their “mature implementation” so that they are not as RESILIENT as a “public good” must be

- Leadership and top management effectiveness are not always fully addressed, resilient management structure, continuity and responsiveness of RI to national and EC authorities is often unsatisfactory and a sign of incomplete implementation
- Some RIs maintain a Research Project flavour that has practical drawbacks

## THE EC HIGH LEVEL EXPERT GROUP ON SUSTAINABILITY OF RIs

- Has translated the Lifecycle Approach in to a Ladder of READINESS LEVELS
- Has identified RL according to the fulfilment of key milestones
- Has drafted advise to the EC on how to possibly optimize the support towards IMPLEMENTATION and SUSTAINABILITY

# A GRID OF IMPLEMENTATION READINESS LEVELS (RL) MATCHING THE LIFECYCLE

RL	Lifecycle and RL description
	Concept Development, Design
RL 1	Design Study – Conceptual Design Report – Initial agreement with at least 3 MS/AC; readiness to apply to ESFRI Roadmap

**Reaching RL 1:** The initial formulation of a RI concept has very variable dynamics and often develops out of scientific collaborative research or networking or is **nursed in the execution of RIA contracts that imply a large transnational access (TA) effort**. A feasibility study is carried out during the conceptual phase leading to a **Conceptual Design Report (CRD)** usually funded institutionally or based on international collaboration, or sometimes carried out as a Design Study (DS) in the FP. **Design Studies stimulate bottom-up emergence of novel hypothesis** for RIs and the production of a formalised CDR that describes the building blocks of the RI idea and project and sketches a first evidence-based analysis of costs and efforts needed.

# A GRID OF IMPLEMENTATION READINESS LEVELS (RL) MATCHING THE LIFECYCLE

	Preparation
RL 2	Technical Design Study – advanced RI architecture, siting option evaluation and solutions - Cost Book, Data Management Plan
RL 3	Advanced Financial Plan and minimum consortium plan – in-kind contributions estimate and policy; construction and operation cost analysis and relative discounted cash flow needs <sup>22</sup> for both construction phase and early operation; ‘business plan’ for the consortium.

According to ESFRI the 10-year term should be largely sufficient for the Projects to reach the implementation phase (maturity) implying that:

the Preparation is completed by the **timely achievement of a full Technical Design Report (TDR) and a detailed Cost Book (CB)** for the Construction Phase of the RI (major construction of a novel plant, construction/organisation of the headquarters of a distributed infrastructure, construction/organization of national nodes), a **financial and human-resource plan are drafted and validated** by the partners, the partners established a **sustainable legal vehicle** to deliver and run the RI.

# A GRID OF IMPLEMENTATION READINESS LEVELS (RL) MATCHING THE LIFECYCLE

	Implementation and Construction
RL 4	Advanced legal setup, ERIC, AISBL or other. Stable minimum Consortium with 5-10 years financial commitment. European Investment Bank loan study, Structural Funds eligibility and suitability analysis with respect to financial/business plan.

RL4 describes the achievement of a stable Legal consortium capable of engaging in the construction of the RI and in its early operation. A minimum number of Partners (MS+AC) capable of engaging adequate resources (>80% of total construction cost as from RL3) for at least 5-10 years must join into a legal format.

It can be the **ERIC** or other legal format capable to provide the **warranties enabling the application for EIB loans or Structural Fund** evaluations or other financial instruments.

Although **explicit support** towards construction is not included in the FP measures, collaborative grants to develop technologies do represent, in many cases, a contribution to the construction phase.

# A GRID OF IMPLEMENTATION READINESS LEVELS (RL) MATCHING THE LIFECYCLE

	Operation
RL 5	Established RI, construction completed, operational budget in place, ESFRI-Landmark status or other (EIROForum etc.). Delivery of Science results, Open Access to Users, Science Services and Services for Innovation, Open Data facilities and basic FAIR Services, continuous upgrade

**RL 5** is the start of the mature stage of a RI is characterised by the delivery of scientific services to the user community or advanced construction and is equivalent to that defined by ESFRI as Landmark status. An ESFRI Landmark is a reference infrastructure in its main disciplinary domain.

**OFTEN** Operation phase budget is absorbed by increased construction cost and delays, creating a difficulty in the operation cost management

## EFFECTIVE TIME TO IMPLEMENTATION

**RL 1 to RL 4** corresponds to the preparation phase of the RI lifecycle

A pivotal measure here is the FP Preparatory Phase (PP) grant, often followed or accompanied by other measures reserved to ESFRI Projects.

The PP grants (typically EUR 1-5 million for 4 years) are meant to support the process of maturing of the RI on all the key aspects, from technical to consortium construction and sustainability plan both in terms of human and financial resources. WP-structure

**OTHER resources are seldom structured and mostly informal in-kind contributions (does not establish a budget line at MS/AC ministerial level)**

## Measures to support the TRANSITION from one RL to the NEXT

Financial support for reaching a RL will be funded during the implementation phase

A Check-Point will verify that the RI has reached a RL. This will open the possibility to ask for a grant to support the work needed to reach the next higher RL

## Measures to support the TRANSITION from one RL to the NEXT

*It seems that **targeted** funding, focused on RIs undertaking a sub-set of all possible call-related activities may be more effective. In this way, RIs could tailor their project activities to optimise their likelihood of progressing along the readiness levels.*

*By **tailoring the funding instrument to allow RIs to address a sub-set of specific call activities**, the HLEG envisages that the **time needed to progress between RL1 and RL4 would be reduced as RI efforts would be focused where they are most needed rather than dispersed across less urgent activities.***

*A ‘personalised’ approach should be developed to ensure maximum European-added-value for all RI types, while avoiding the creation of long-term dependence on EC funds.*

## EFFECTIVE TIME TO IMPLEMENTATION

*It is suggested that in order to improve the prospects for sustainability the EU should insist on co-funding arrangements with Member States for the preparatory and implementation phases with a significant element of the Member State funding being provided as cash.*

*Furthermore, in order to encourage projects to work to increase financial commitment, it is recommended that the EU should insist on milestones linked to continued funding based on specific targets for increased financial and political commitment.*

## Measures to support the TRANSITION from one RL to the NEXT

*A panel of **independent experts** should be set-up by ESFRI and the EC, with fixed term engagements and rotation mechanisms that warrant continuity and renewal.*

*The panel would evaluate the successful achievement of an RL at the end of a FP-funded grant or contract, as well as, upon request by the MSs and ACs that are financing the development of the RI.*

*The panel should make use of all established indicators, but should also analyse independently the specific features of the RI, its consolidated status in the lifecycle, as well as the evolution of the Landscape, in order to help in optimising the next steps.*



**IMPACT -> INTEROPERABILITY OF DATA (EOSC)  
-> INTEROPERABILITY OF RESEARCH INFRASTRUCTURES**

**Moving from a sustainable eco-system towards a synergic and collaborative eco-system that leads to intelligent use of research resources to address global challenges in a way that involves actors beyond the excellent science community**

**AT THE SAME TIME**

**supporting and fostering full expansion of the «excellent» science capital that has thematic character**

## EFFECTIVE TIME TO IMPLEMENTATION

In line with the EC objective of **consolidating the landscape of European RIs** and highlighting their role in Horizon Europe Missions, RIs at RL5 and RL6 will become active in clustering activities to address shared challenges.

The Landscape Analysis update of ESFRI has indicated the importance of interfaces between RIs both in the same domain of science as well as interdisciplinarity.

A vision of a **well-connected system of RIs has been proposed in the ESFRI Roadmap 2018**, and ‘clustering’ is one of the steps toward this process.

The cluster projects are indeed extremely valuable as they enable the pooling of effort across RIs to tackle common challenges that would be impossible for any single RI to tackle effectively in isolation and to avoid duplication of effort.

## **SUSTAINABILITY must be built into the IMPLEMENTATION phase**

- The EOSC (building the EOSC) can play an effective structuring effect to RIs from RL2 to RL6
  - the goal of **populating the RI eco-system** includes **increasing the diversity** AND the **complementarity**.
  - To pursue the **INTEROPERABILITY** of the data AND of the **INFRASTRUCTURE** is a **need** for future sustainability and compliance with EOSC that must be addressed and practiced through all **IMPLEMENTATION** stages, from RL2 to RL5 and then RL6
  - The correct **MIX of Research and Service** must be built in the governance, management, costing, and financial as well as human resource plan

**ATTRACTIVE** for ambitious scientists, **PRODUCTIVE** for a broad interdisciplinary community