



Germany – National Embedment

1. RI definition	
In which points does the National Roadmap deviate from the ESFRI Roadmap?	
Categories	National Roadmap
Funding	x
Categorisation of RI	x
Access to RI	
Organisation within national procedure	x
<p>RI for the purposes of the BMBF's National Roadmap Process are comprehensive, long-term resources that benefit research in all fields of science. These include laboratories, equipment, instruments, collections of materials and databases as well as service facilities. RI for the purposes of the National Roadmap Process distinguish themselves through the following features:</p> <ul style="list-style-type: none"> • They are of national importance for research policy. • They have a long service life – generally of at least ten years. • Access to them is generally open, and their utilisation is regulated on the basis of scientific quality standards. • The cost of establishing and installing the infrastructures is so high that considerable national public funding is necessary, justifying a comprehensive national decision-making process. • They must have an extensive governance system that is adequate for the relevant task. In cases involving various locations with complementary tasks, they must form a functionally integrated RI with common standards that can be regarded as a single entity. • The German share of planned development costs is at least € 50 million. For research infrastructures in the fields of humanities and social sciences or educational research, a threshold of € 20 million (German share) applies. • RI are an essential component of every scientific system and are of particular importance for Germany as a research location. They provide extensive, long-term research resources, such as laboratories, large-scale equipment, instruments, and collections of materials, databases and service facilities. • RI are either new and extensive RI or substantial upgrades of existing infrastructures (BMBF, 2016, p. 4). <p>Currently there are four basic categories of RI:</p> <ul style="list-style-type: none"> • Instruments are items of large-scale equipment that are directly available for conducting research projects. Examples in the natural sciences include the "FAIR" particle accelerator or the "CTA – Cherenkov Telescope Array" (see page 7). The research vessel SONNE (see page 11), for example, belongs to the environmental and engineering sciences category, and the "INFRAFRONTIER – Mouse models for research into complex diseases" (see page 6) to the category life sciences and medicine. • Resource and Information Infrastructures are information infrastructures that pool, process and provide data for specific research purposes; such as the German Socio-Economic Panel (SOEP) (see page 9), archives and libraries as well as object-related collections such as the "Deutsches Museum" in Munich. • Information Technology Infrastructures are so called e-infrastructures such as the high-performance computer for climate studies "HLRE 3" (see page 10) or high-performance communication and computer grids such as the "GCS – Gauss Centre for Supercomputing". • Social RI are, for example, centres for research and academic exchange that have been recently established in order to facilitate exchanges on or the development of new research topics – mainly in the humanities and social sciences – such as the Institute for Advanced Sustainability Studies and the Oberwolfach Research Institute for Mathematics (BMBF, 2016, pp. 6-11). <p>Some RI may fit into a number of categories at the same time. For example, technology centres</p>	



that work with large-scale equipment such as particle accelerators may also serve as social science RI or information infrastructures. In recent years, “distributed” RI that draw on a range of instruments at various locations have also been developed alongside conventional “centralised” RI. One example is the Cherenkov Telescope Array. Furthermore, existing laboratories in the life sciences have joined together to form distributed infrastructures under a common roof. These structures are characterised by a uniform governance system which, among other things, regulates the use of the RI. This allows participating research groups to work together on complex research issues and to access technologies and infrastructures at various locations (BMBF, 2016, p. 7).

2. RI players in the national R&I system

The RI players within the R&I system are displayed in figure 8.

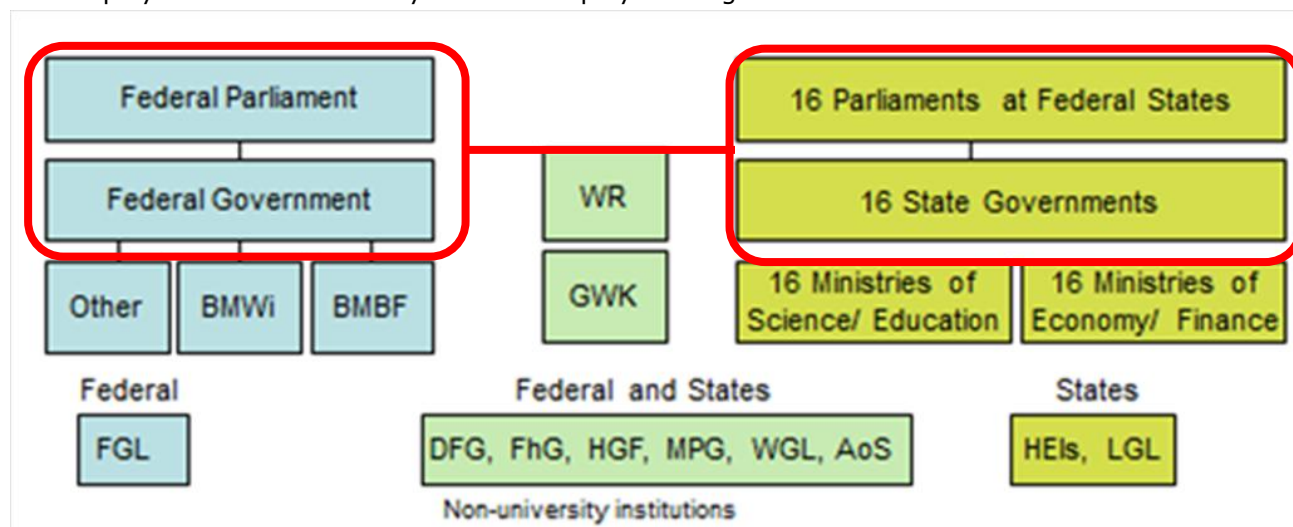


Figure 8: Organisational chart of the R&I system of Germany (Sofka u. Sprutacz, 2016, p. 18). Red colour indicates the bodies with the main decision power regarding RI.

National relevance of RI

RI are one of the central prerequisites for excellent basic research, significant technological advancements and the development of new research areas. Thus, RI are essential for the performance of research and innovation in Germany. Furthermore, the availability of innovative RI is essential for strengthening Germany’s international competitive position and its integration into international research as well as for providing highly performing RI especially for use by scientists and researchers from the German universities. This includes the relevant finance structures, the portfolio management of RI as well as the provision of a professional management for planning, construction, and operation of large-scale projects and infrastructures.

Embedding of RI in the national R&I system

RI are integrated in the German research and innovation system in all higher education and non-university research institutions as well as in federal and state-owned research institutes (Figure 8). The funding of RI in higher education institutions is shared by state governments and the Deutsche Forschungsgemeinschaft (DFG). Non-university RI are funded by the federal government and the state governments. RI at thematic research institutes are financed by both respective federal government ministries and state governments (BMBF, 2014).

3. RI in the National R&I System

Germany is organised on a **federal basis**, with competencies shared between the federal and the "Länder" (federal states) level. R&I policy making is organised within the federal system of Germany.

The cooperation between federal and Länder level is based on **Article 91b (Basic Law)** and has organised the administrative arrangement to establish a **Joint Science Conference (Gemeinsame Wissenschaftskonferenz – GWK)**. Since RI are operated by institutions which are financed by the government and the federal states, the GWK convention includes a **shared financing ratio**. The Federal Ministry of Education and Research (BMBF) has a clear share of responsibilities concerning costs for construction and operation: The implementation of RI concerning **operational costs lies purely in the hands of the research organisations** respectively on institutional level. Constructional costs could be applied at federal level (BMBF) by those RI which have successfully passed the NRIRMP.

Since 2005 the funding share for RI is organised in the "pact for research and innovation". The pact was extended in 2014 to cover the period 2016-2020. It is binding for the **Deutsche Forschungsgemeinschaft (DFG)** and the four major organisations for non-university research: **Fraunhofer-Gesellschaft (FhG)**, **Helmholtz-Gemeinschaft (HGF)**, **Max-Planck-Gesellschaft (MPG)**, and **Leibniz-Gemeinschaft (WGL)**. In the pact a significant target is set to extend Germany's contribution for developing, constructing and extending as well as operating international unique RI. Research organisations and institutions are responsible for the construction and operation of RI (BMBF, 2014).

4. Major national strategies for international cooperation in R&I and strategic integration of RI

National High-tech strategy:

The high-tech strategy of the federal government of Germany determines the national strategic fields which are further specified in the respective thematic programmes and strategies (e.g. research on health, national research strategy bio economy 2030 and individual calls for research such as the call on energy storage). These strategies and programmes are orientation for respective thematic strategies of RI. Linked with the European dimension, the federal government of Germany operates according to its strategy for the European research area and has committed itself to contributing to the construction and operation of European and international RI. Furthermore, the federal government of Germany has been actively designing processes such as ESFRI and GSO, as well as the integration of the national Roadmap processes with the ESFRI processes.

Leibniz Roadmap for Research Infrastructures:

With the Leibniz Roadmap for Research Infrastructures, the Leibniz Association is now presenting a plan for the future so that excellent research can continue to be carried out over the next 10 to 15 years, and to advance the standard of this research to the highest levels. The Leibniz Roadmap contains concepts for RI which the Leibniz Association has prioritised in an internal process – with priority going to concepts which require a larger consortium of Leibniz partners and external partners (Leibniz Association, NN).

HGF-Roadmap:

This Roadmap presents a list that has been coordinated within the Helmholtz Association of those RI which will be strategically relevant for the Helmholtz Association, or in the individual research fields, for implementation of the scientific portfolio. These projects are regarded as being desirable and necessary in the six research fields of the Association from a scientific point of view and in consideration of scientific policies involved. The Helmholtz Roadmap serves as a basis:



- For discussing the strategic planning with the sponsors. It therefore forms a cornerstone for binding planning within the BMBF processes, e.g. for preparation of a national Roadmap.
- For consultations on the strategies for financings, setup and operation of RI using already-formulated evaluation criteria and processes (i.e. using precise timescales and budgets, summary cost estimates, setting priorities, including the planning for closures/switch-offs and [new] structuring of the management for these infrastructures),
- for independent assessment of the research infrastructures by the Science Council, if applicable,
- for concrete consultation with the user community

and not least, for the ongoing discussion within the Helmholtz Association itself, for regular revision and updating of the Association's research portfolio, as well as the infrastructure planning (Helmholtz Association, 2016, p. 5).

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Further links

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