

Considerations regarding the Strategic Planning for Horizon Europe

Position paper by the Helmholtz Association on the orientations of Horizon Europe for 2021-2024

1. General Comments on the Programme

Horizon Europe (HE) should focus on where it can unfold its true added value: Making Europe fit for the challenges to come. This requires a focus on research in areas of high societal relevance, notably climate and ecosystems, energy, health, information technologies and transport. It also requires pushing the boundaries on our understanding of matter, since new breakthrough solutions and technologies will arise from all of these fields, as many examples show.

One main challenge for the impact of HE will be to learn from H2020 and **not to fall prey to the siren call of short-term impact**. Stressing impact as done in H2020 and funding collaboration primarily in high TRL levels means drying out collaboration where it is at its most fruitful: Long-term R&I agendas starting at low TRL create new knowledge and set the ground for new breakthrough developments. Such agendas, jointly developed by academia and further stakeholders, are the basis for addressing the global challenges. Notably **European Partnerships** must not only focus on short-term results, but also include R&I activities with ambitious long-term visions in TRL 0-5.

Excellence-based generation of knowledge must not be concentrated in Pillar 1, but should also play a role in Pillar 2, and should be implemented via collaborative R&I projects.

Research Infrastructures (RI) make a decisive contribution to tackling the “Global Challenges and European Industrial Competitiveness”, Missions and Partnerships. The RI programme must be supported with:

- Doubling the budget for the EU to have the world-class RI needed to attract the best scientists and innovators and to seed the next scientific breakthroughs; a doubled budget is vital to ensure access to national RI across borders in Europe.
- Increased crosstalk between projects funded under the “Global Challenges”, those linked to Missions and under the EU Partnerships must take place with projects in the RI programme, without prejudice to the budget increase for the RI programme under HE.
- Fair transnational access for researchers to RI, efficiently organised and directly supported under HE, to avoid discrimination of researchers from EU countries with fewer RI facilities.
- A federated approach to the operation and upgrade of similar RI across Member States that goes beyond ESFRI (e.g. evolution of advanced communities as MS-driven initiatives, when suitable).

2. Specific Considerations

In addition to the main overarching aspects discussed here, a comprehensive and multi-disciplinary analysis with detailed comments to clusters, Missions and Partnerships is included in the annex to this document.

2.1. Cluster Health

R&I in the cluster health must include the necessary collaborative basic biomedical research to build close linkages among clinical, epidemiological, ethical, environmental and socio-economic research, as well as with regulatory bodies and industry. A better understanding of diseases and their underlying systemic mechanisms is essential to end up with personalised solutions for disease prevention, diagnosis, treatment and therapy. These solutions

require the development and/or expansion of federated databanks and innovative data analysis technologies as offered by the “LifeTime” initiative. The notion of “impact” in health research and healthcare should encompass increased outreach to patients and improved quality of life in addition to the development of innovative diagnostic methods and therapies.

2.2. Cluster Digital, Industry and Space

The EU must tackle missing segments in key strategic value chains to guarantee European autonomy in terms of core technologies. This comprises quantum technologies and neuromorphic computing, modular supercomputing, computational/virtual design in material science, the optimization of inorganic and organic/biological systems, the full exploitation of 3D manufacturing, the design of an integrated metrology system, a sustainable supply of raw materials, spintronics and memristive technologies, non-volatile and energy-efficient information technology (Green IT), embodied AI in robotics and metrics for IT security.

2.3. Cluster Climate, Energy and Mobility

A sustainable energy supply meeting the increasing demand requires a transition to an energy mix with a considerably higher share of **renewable energy sources**. However, geothermal energy systems are not considered under HE: An energy system that relies largely on renewables needs decarbonised sources, such as geothermal. Networking with major energy-related RI, e.g. materials foundries is essential, as well as their funding.

We welcome very much that **climate action** will be at the heart of HE, with the intention of devoting 35 % of the budget to climate objectives. For climate action we need not only funding for solutions and transformation, but a thorough understanding of climate processes, as well as upcoming impacts of climate change. This knowledge is a prerequisite to the development of sound solutions and securing successful transformations. Without adequate funding for basic climate research and continuous data gathering the modelling of future climate scenarios cannot be improved.

2.4. European Open Science Cloud Partnership

This future partnership should be implemented according to a co-fund model, since the involvement of the Member States is vital for its successful adoption by the various scientific communities. The activities envisaged in the first four years shall focus on the enhancement of the scientific service portfolio and its connection with the federating core through the development of the European Data Infrastructure. In addition, R&I for scalable and efficient long-term data management systems and storage technologies is needed to be able to apply the novel data analysis and prediction methods on huge datasets.

Brief portrait of the Helmholtz Association

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