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Open Science

How Open Science can revolutionize global knowledge cooperation

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Bonn, 4 November 2022. Knowledge needs to be globally accessible in order to combat the crises of our times, from climate and energy to health and food security. Technological advances such as cloud server storage and satellite-based internet connectivity could provide solutions for ubiquitous access. Yet, political will is needed to re-calibrate the regimes that prevent the free flow of knowledge.

In October 2003, science institutions around the world called for Open Access to Knowledge in the Berlin Declaration. The initiative aimed at deepening the connection of the global scientific community, and for accessible and inclusive representations of knowledge. Today, these ideals are core elements of the Open Science concept, which calls for scientific knowledge to be freely accessible and open to everyone. Open Access, Open Data, and

Open Source Software are key instruments to realise this vision by making data, software, and publications as findable, accessible, interoperable and reusable (FAIR) as possible. Digitally enhanced Open Science promises that more societal actors are included in transparent research and publication processes; that knowledge asymmetries between scientific communities are overcome; and that digitalisation supports the achievement of the United Nations 2030 Agenda on Sustainable Development by promoting science as a public good.

What are the reasons why almost two decades after the Berlin Declaration the promises of the Open Science have not been met?

„Investments in digital infrastructure must ensure that "open" means always openly accessible."

First, market and innovation-based regimes for privileging knowledge, such as intellectual property rights (IPR), patents, and subscriptions to journals and libraries, are structured that makes knowledge exclusive. IPR are an obstacle for communities to localise knowledge and benefit from products. COVID-19 vaccine patents remain a contentious debate as they disallow the free passing on of vaccine production knowledge. Gatekeeping extends to general scientific publishing, with the UNESCO Science Report 2021 noting that "five commercial publishers are responsible for more than 50% of all published articles and about 70% of scientific publications are still unavailable in open access." This fact is despite there being more open access journals and repositories than ever before.

Second, access to knowledge needs suitable infrastructure. The fact that cutting edge science is mostly disseminated online, while only 63% of the world population had access to the internet in 2021, means that too many are excluded from the ideas, repositories and publications which are shaping our societies and from the civic participation that provides them representation.

Third, if servers and repositories of open data sets are following a restrictive logic of data localisation while cross-border arrangements for free-flow of data are missing, other countries are beholden to the infrastructure and jurisdiction of those who have accumulated and centralised knowledge and its products. This continues existing asymmetries in knowledge access and production and can turn into a severe problem when governments restrict access to the internet or when they default to nationalism in a global crisis.

The 'Opening' of Science requires political will to manage the tension between economic incentives of innovation and the call for science to contribute to the *global common good*. Investments in digital infrastructure must ensure that 'open' means *always* openly accessible. Data and results must be *easily* FAIR. The private sector gatekeeping in scientific knowledge dissemination must be minimized. Preprints and transparent peer review processes need to be strengthened, just as the practice of public participation and collaboration in research (citizen science) and the incorporation of indigenous knowledge.

The EU promotes a model for reducing the influence of for-profit enterprises, and establishing science as a public good. The European Commission's Open Research Europe offers a repository for publications and datasets, a transparent peer review platform, a journal, a publishing house, a data repository and a knowledge index at the same time. However, this is a regional model. To fulfil the promise of the Berlin Declaration and Open Science, we need partnerships between states and research institutions which commit to an 'Open Research *Global'* approach, to expand cross-border flows and incentivise knowledge cooperation worldwide. Standard setters like UNESCO and the EU and research associations like Helmholtz and Leibnitz have embraced the Open Science concept. These initiatives can spearhead global partnerships. In this way, access to the processes and outcomes of science would not only be better aligned with Article 27 of the Universal Declaration on Human Rights, which declares science and its results a public good; scientific knowledge would also have better chances to contribute to global sustainability objectives and combat the crises of our times.

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