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# Open Science: Can't Wait!

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Open science changes the rules of the game, focusing on universal access and transparency in the research process. It is the key to faster progress, innovation, and the fight against disinformation.

Open science, also known as open access (OA), is the philosophy and practice of conducting scientific research in a transparent and accessible way. It includes not only open access to publications, but also to research data, methodology, software, and the entire scientific process. This represents a paradigm shift from the “publish or perish” model to “share and thrive.” It is closely related to the concept of open knowledge – knowledge freely available to all, such as that provided by Wikipedia.

It is surprising that such an approach still needs to be introduced and actually debated. Publicly funded science should serve the society that foots the bill for it! It is quite a paradox that we pay three times over: first, taxpayers fund the research itself, then they bear the cost of preparing and drafting the publication; and finally, they often must pay again to gain access to it. This is the kind of absurdity that openseekers to correct.

## Golden Standard

Access should include everything that does not violate privacy or security. Raw data, methodology, research protocols, negative results, and reviews – all these contribute to elevate the integrity of science. Transparency is the best cure for pathologies in science, such as falsifying data to make it appear to better support a chosen thesis.

Of course, it is necessary to share information prudently, taking care to protect, for example, research subjects whose anonymity could be compromised. The principle of FAIR – findable, accessible, interoperable and reusable – is considered the golden standard of accessibility. This includes publications under CC BY and derivative licenses, data in repositories with permanent identifiers, pre-registration of research, and publicly available reviews. Simple language is also important – at least in abstracts, which are meant to be comprehensible to non-specialists.

The optimum is the CC BY license, as it allows data or works to be used with an indication of their source. CC BY-SA is also acceptable; the main difference is the requirement for further distribution under

the same license. Restrictive NC (non-commercial) licenses inhibit innovation and transfer of knowledge to the economy. From a practical perspective, if someone wants to, for example, take an article, use it as a chapter in a book, and make a profit from it – then good riddance; let it happen. Scientists generally do not make money from publications anyway, with fame and citations being their currency, and these grow when a publication is widely disseminated. I would be happy if someone republished my works without asking, provided that they retained my name on them.

## Profits and Risks

The advantages of open access are numerous and include accelerated scientific progress, greater impact of research on society, democratization of access to knowledge, the ability to verify results, savings for libraries, and support for researchers from developing countries. It is a win-win situation for everyone – except for rentier publishers.

The benefits for the development of societies and the economy are huge. Pharmaceutical companies can develop drugs faster, start-ups can accelerate innovations, and journalists verify fake news promptly. It is estimated that open access can increase GDP by 0.1–0.3% and, according to McKinsey research, the free flow of data could increase global GDP by as much as USD 250–450 billion per year. We're talking billions of Polish zlotys or euros.

Open science also carries certain risks. The main ones are: the possibility of misinterpretation by laypeople, “theft” of ideas (although in science the priority of publication counts), the use of data by someone before an article is officially published, and over-competitive distortion of the OA model by scientific journals. The latter, like normal OA journals, charge for open access but at the same time do not maintain scientific rigor and publish anything that comes their way.

However, these risks are outweighed by the benefits. Education – especially that of young researchers – is crucial to avoid unethical situations. Preprint



systems, research registration, timestamping (i.e., external confirmation of the time of hypothesis creation, data acquisition, etc.) are also helpful. As for misunderstanding, the risk of misinterpretation is better than the lack of access. Disinformation is combated with more information, not with censorship.

The ideal model for financing publications available under OA is the so-called diamond OA – institutions finance publishing, while readers and authors do not pay. Alternatively, it could be APC (article processing charges) could be included in grants, ensuring payment for open access under scientific funding. The current model, in which libraries pay hefty sums for access to publicly funded research, is a pathology.

Open science is the key to improving the quality of research. Publishing data allows for replication. Open reviews eliminate behind-the-scenes connections. Pre-registration of research prevents p-hacking, which denotes post-hoc manipulation of results when the original research question fared only moderately well. Transparency makes it harder for academic paper mills to operate, as it is more difficult to conceal poor-quality work when everything is public.

## Times Have Changed

State institutions should play a key role. The so-called Plan S, proposed by an alliance of European grant

institutions and requiring OA for publicly funded research, is a step in the right direction. What is needed is infrastructure (repositories), financing, and, above all, a shift in the evaluation criteria – toward rewarding quality and openness, not the number of publications. The EU should also create and support a large, high-quality publication and peer review system to encourage journals to adopt free-access models. The recent open access policy of the Ministry of Science and Higher Education aligns with this trend.

The Polish Academy of Sciences is taking specific measures. It maintains a repository of journals and other publications, implements an open access policy, and offers training courses for its employees. Significant changes are also underway in support for scientific journals, as they will soon have their own open platform. This will allow truly modern management of the publication and peer review process, as well as improved content discoverability. However, more resources are needed to make our journals not just good, but outstanding and ambitious. Open science is a marathon, not a sprint.

The approach to open science is changing radically. For 20 years, this topic remained a niche, but today it is mainstream. Young researchers expect it. Grantmakers require it. The public demands access, especially after the pandemic. The question is no longer “if” but “how quickly” we will transition to full openness. ■

Further reading:

*Plan S*, <https://otwartanauka.pl/plan-s>

*The Policy of Open Access to Publicly Funded Research Data*. Information from the Ministry of Science and Higher Education, <https://www.gov.pl/web/nauka/polityka-otwartego-dostepu-do-danych-badawczych-finansowanych-ze-srodkow-publicznych2>

Digital Repository of Scientific Institutes, <https://rcin.org.pl/dlibra?language=pl>