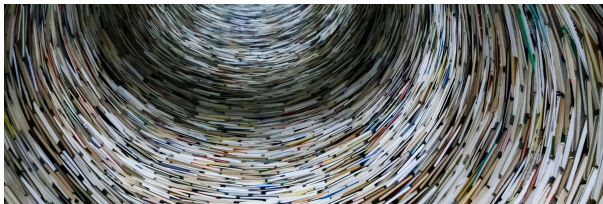


Making scientific knowledge freely accessible to everyone

By Frank , 16 July 2026

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By Frank Dumon

The publication of scientific research is a particularly lucrative industry. The most recent estimates suggest it generates an annual turnover of approximately 19 billion US dollars (or 16.67 billion euros), [with margins of around 40 percent](#). These staggering figures largely reflect the fact that the ["Big Five" commercial publishers](#), such as Elsevier, Springer Nature, Wiley, Taylor & Francis, and SAGE, profit from work that is largely funded with public money.

This monetization occurs by making a scientific article accessible for a fee (via a paid subscription), or by having authors pay for publication in open access for readers. Yet, [most of the work required for publication](#) – notably the writing, peer review, and a large part of the editorial work – is carried out free of charge by researchers. The direct consequence is that the wealth of an institution or a country still partly determines access to scientific knowledge.

Paywalls

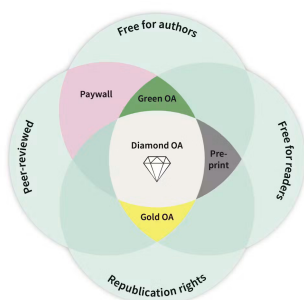
For decades, the vast majority of research was published behind paywalls. This means that scientists, their institutions, and the general public must pay to access scientific findings. An individual can purchase access to a specific article for a few dozen or sometimes hundreds of euros. Research institutes, on the other hand, pay for subscriptions that often run into millions of euros for thousands of scientific

journals, so that their researchers have access to these articles.

In retrospect, before the advent of the internet and the widespread publication of journals in electronic format, it was understandable that producing scientific articles involved very high costs, particularly due to the printing process and delivering journals to university libraries. Today, this justification no longer holds.

Production costs may have dropped sharply thanks to the digital distribution of articles, but [publication costs](#) have risen dramatically. In response to this privatization of knowledge, Aaron Swartz published the [Guerrilla Open Access Manifesto](#) in 2008, aiming to raise awareness and highlight the lack of access for countries in the [Global South](#).

Against this backdrop, Alexandra Elbakyan launched [Sci-Hub](#) in 2011, a platform that provides access to a vast number of scientific publications and has become one of the largest leaks of scientific knowledge of our time. While this initiative is based on an ethical argument for universal access to knowledge, it remains illegal and is condemned in many countries. Therefore, it cannot be a sustainable solution to the problem of access to scientific knowledge.



Venn diagram showing the three main routes to Open Access (OA): green, gold, and diamond, along with their advantages and limitations. Edited from Vaucher & Thomas, 2026: 'Diamond is the new Green—Why Green Open Access is not a sustainable long-term model for scientific publishing'

Today, as Open Access has become the norm, several models coexist that do not address the issue in the same way.

The three main approaches are Green OA, Gold OA, and Diamond OA:

- **Green OA** involves publishing in a traditional, often commercial journal, after which an accepted but unformatted version of the manuscript is deposited in an Open Access archive or institutional repository.

- **Gold OA** makes the final article immediately accessible to everyone, but incurs publication costs (the so-called *Article Processing Charge*, APC) of several thousand euros, paid by the authors or their institutions.
- **Diamond OA**, finally, allows authors to publish content free of charge and gives readers free access, thanks to journals supported by scientific communities, university libraries, or non-profit organizations.

The Green and Gold Open Access models remain dependent on commercial publishers and often involve hidden costs for researchers, institutions, or funding agencies. Diamond Open Access, on the other hand, is community-driven, free for both authors and readers, and retains research as a "public good" rather than a source of private profit. Although [Green Open Access](#) improves access in the short term, it can also slow down deeper structural changes by perpetuating the existing system.



Examples of diamond open access

Thanks to recent technological advances, it is easy to share computer code. The scientific community, supported by public funding agencies, has come together to create [Open Journal Systems](#) (OJS): a ready-to-use software package for managing the entire editorial process of a scientific journal (from manuscript submission via peer review, editing, publication, to dissemination).

Today, the system is used in 148 countries worldwide and allows scientists themselves to manage the editorial side of journals free of charge. These journals include [Sedimentologica](#), founded in November 2022, which will soon publish its fiftieth article in the field of sedimentology, and [Planetary Research](#), which will publish its first article in the field of planetology this month; these are two journals that we helped establish.

Other initiatives, organized as platforms, such as [Sci|Post](#) (originally rooted in physics) or [Episciences](#), now offer models that extend to all scientific domains, including the humanities and social sciences. At the more local level of institutions and universities, new academic publishing projects are emerging, such as [POPS](#) at Université Paris-Saclay.

Scientists have also proposed alternative ways of publishing, breaking away from the most common codes of conduct. Publishing on the arXiv of [Cornell University](#), a vast, free archive with 2.4 million articles, or on its French equivalent, [HAL](#), for example, makes it possible to share manuscripts without peer review (so-called 'preprint' articles). The only criterion for access is that the contributor must have an institutional email address or be [recommended by their peers](#) (a recent requirement, needed to filter out artificial intelligence-generated fake articles). Scientific quality control therefore remains relatively limited, but the advantage lies in immediate dissemination to everyone.

Many highly influential and frequently cited works, for example in the field of artificial intelligence, are accessible in this way without ever having undergone a peer-review process. In most cases, however, articles submitted to arXiv are subsequently published in scientific journals after a peer-review process. In such cases, arXiv primarily serves as a platform for rapid dissemination and scientific exchange, complementing rather than replacing the traditional editorial process.

Some learned societies have long offered Diamond Open Access journals, such as the *Comptes Rendus de l'Académie des sciences* or certain publications of the American Mathematical Society. Unfortunately, the Diamond Open Access business model can sometimes be difficult to achieve, but innovative solutions are being proposed. For example, the *Bulletin de la Société mathématique de France* uses a 'Subscribe-to-Open' (S2O) model. Under this model, readers pay an annual subscription fee, but once the break-even point is reached, all articles published in the journal become freely accessible *ad vitam aeternam* (forever). The counter is reset to zero each year.

Another way of publishing is to open a free discussion about the article after it has been published. This type of approach has the advantage of allowing the article to be evaluated, but so far no sustainable, large-scale solution has emerged. However, interesting options do exist. *Peer Community In*, for instance, currently includes 21 thematic journals with peer review, publishes articles free of charge once the peer-review process is complete, and leaves it to the authors to decide whether or not to submit the article to a traditional journal.

Future dangers, but also opportunities

Scientific publishing is currently under pressure from the capitalist logic of large commercial publishers, who benefit from an aura of prestige and respectability that is in fact created by the scientists themselves. Breaking this system remains difficult, as the most renowned scientists are sought after by the most prestigious journals, which helps maintain this model. Moreover, the major publishing groups control a

significant portion of the tools used for searching, indexing, and linking scientific articles, further increasing the visibility of their own journals.

In addition, these players play an active role in producing scientometric pseudoscience by proposing quantitative metrics, such as citation counts, impact factors, and so on. Although the limitations and pitfalls of these metrics have been extensively documented, and despite the existence of initiatives such as DORA, which advocates for a reform of research evaluation, many government policies still rely exclusively on these indicators to assess science (where quantity of articles takes precedence over quality). Researchers' careers are therefore still largely judged on the perceived prestige of the journals in which they publish.

In the face of authoritarian tendencies and the promotion of 'alternative' facts, science must more than ever preserve its independence and maintain public trust. Against a backdrop of budgetary constraints, collectively regaining control over the infrastructure for scientific publishing, in a more efficient, less costly, and more sustainable way, represents a major challenge for the scientific community.

Outside academia, open access to knowledge also benefits the general public, teachers, organizations, decision-makers, and the private sector by facilitating access to the latest scientific advances. Finally, making science more accessible does not simply mean disseminating more knowledge: it also helps to strengthen transparency, critical thinking, and the collective capacity to discuss and respond to current challenges in an informed and reasoned manner.

<https://www.youtube.com/watch?v=JTJT1YL24Zs>