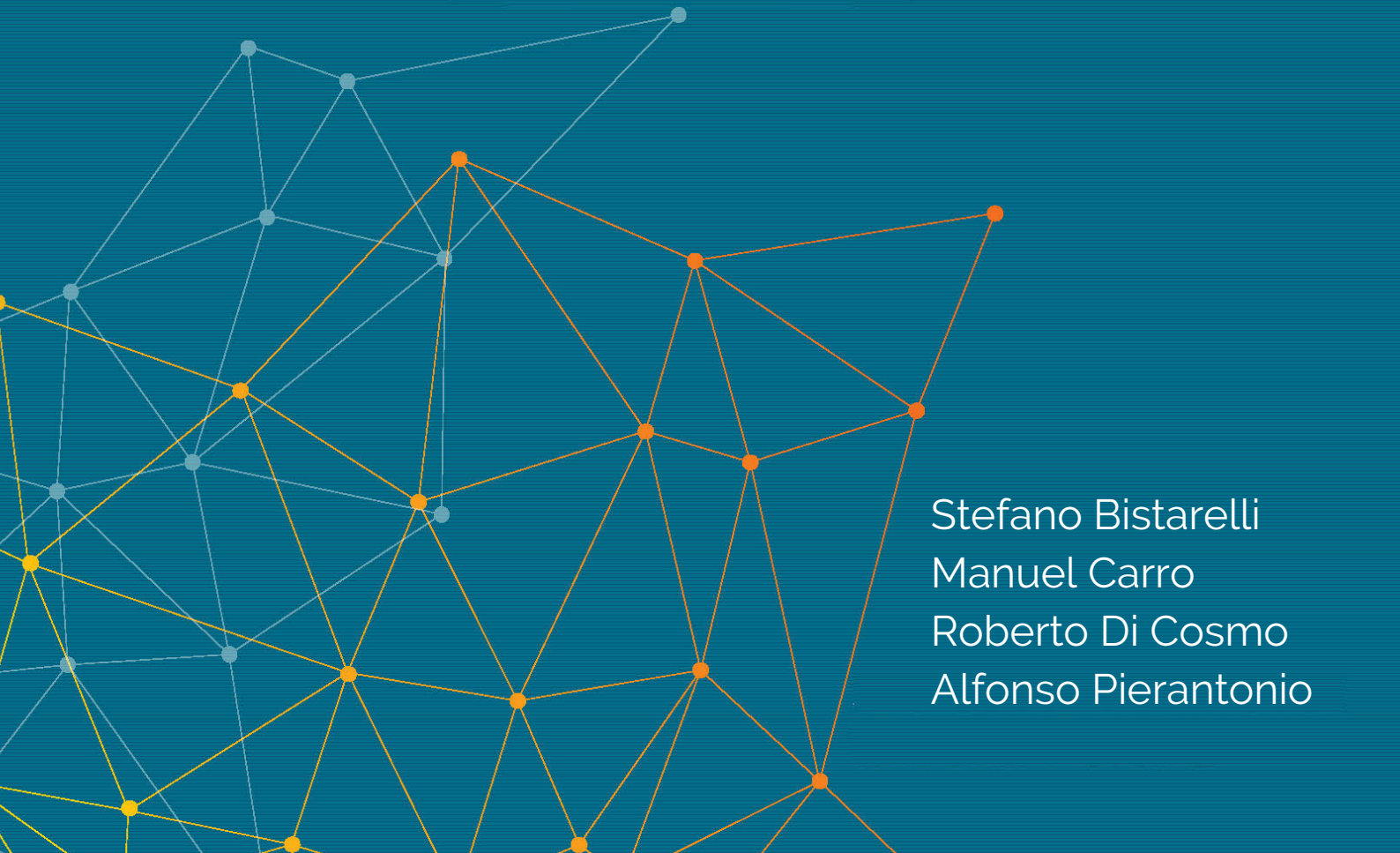




INFORMATICS
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OPEN ACCESS: STATUS AND RECOMMENDATIONS

An Informatics Europe report



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Open Access: Status and Recommendations

An Informatics Europe Report

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Executive summary

This document summarizes the evolution of scientific publication models towards providing open access to research results and makes recommendations from an academic standpoint on future action paths.

The goals of open access include achieving wider knowledge dissemination and accessibility, fostering additional opportunities for interdisciplinary research, and ensuring transparency. However, existing proposals, rooted in the traditional publishing model, have not reached these objectives. Among the reasons we can cite: current schemes include the exclusive transfer of copyright to publishers; publishing costs have been shifted from readers to authors of the research, which together with career evaluation based on purely numerical indicators creates an explosive mix that endangers academic integrity and foster the emergence of predatory journal practices; and, in some cases, the free access to articles is delayed. In addition, the investment required for digital transition has caused market concentration in a few, large players, favoring a monopolistic structure accompanied by largely undisclosed pricing policies.

We review some of the alternatives that have been proposed by the academic community to refocus on the original goals of Open Access and speed up their achievement. We conclude with a set of recommendations, namely: evaluate agreements, avoid exclusive copyright transfer, favor publishing by scientific societies, encourage the use of platforms that ensure transparent procedures, perform quality-based research evaluation, and be active in forums focused on Open Science and Open Access.

Digitization and Open Access: A Convenient Marriage

The advent of the internet and digitization has profoundly transformed scholarly publishing in several dimensions that are worth summarizing briefly to understand the current situation. The shift to digital publishing in the 1990s revolutionized the life cycle of publishing products in a way perhaps only comparable to the introduction of movable type printing in the 15th century. In particular, the proportional costs of printing and distribution have disappeared in its most part and became fixed costs thanks to digital formats and (cheap) Internet distribution. This paradigm shift was expected to bring several benefits in the line of *democratization of research in science and technology* that would result in a noticeable and profound impact in the society at several levels:

- Greater pervasiveness of knowledge dissemination on a global scale.
- Accessibility of research products for those who do not have access to subscription-based distribution systems.
- Interdisciplinary research and knowledge transfer.
- Increased adoption of research results in school curricula and teaching.
- Greater transparency to the taxpayer.

Notwithstanding, the promise of wider, faster, and cheaper dissemination of knowledge brought about by this transformation has not been fully materialized for several reasons. The traditional publishing model, based on the sale of subscriptions that covered production and distribution costs, was not aligned with the free and immediate access to articles that is possible, for example, through platforms such as [ArXiv.org](https://arxiv.org), and it was expected to undergo a radical transformation, like many other activities impacted by the digital transformation [1]. Unfortunately, the publishing model did not evolve towards reducing the overall cost. Instead, the widespread practice of imposing clauses transferring the exclusive assignment of copyright on articles and the ownership of the name of journals and conferences by publishers has allowed the latter to maintain their economic model by preventing or delaying the free distribution of articles on the Internet, against the interest of all other actors: the authors, the researchers, the research funding bodies, and the society as a whole [2].

The initial investments required for the digital transition have driven a market concentration in the hands of a few large players who have gradually absorbed smaller publishing houses [3]. As a result, the advantages inherent to economies of scale have been turned into private profits instead of being enjoyed by the scholarly community. A number of unintended effects have emerged from the new technological possibilities: the creation of monopolistic pricing policies, which siphon billions of euros each year from public funds dedicated to research [4]; a proliferation of titles enabled by digital publishing; a growing pressure to publish induced by the increasing importance given to numerical indicators in the evaluation of researchers (impact factor, h-index, etc.), at the expense of critically analyzing the relevance of the research results; an undue credit given to catalogs of titles and citations managed by private interests (Scopus, Web of Science, etc.); the appearance of predatory journals, attracted by the profit opportunities offered by publishing articles at the author's expense [3] and propelled by the need of authors to have papers published; and the imposition by publishers of packages binding together several products (e.g., subscriptions to journals that cannot be bought separately), against which librarians cannot argue any more that they occupy the precious and limited space in a physical library, and which significantly increase the costs for the users.

These critical elements have prompted growing requests from the scientific community to reform the scientific publication ecosystem in several aspects. First, there is a strong demand to make research production free from rising costs and formal barriers, as outlined in the Budapest Open Access Initiative [5] in 2002 and in the Berlin Declaration [6] in 2003. Second, as an answer to the use (and abuse) of rankings of publication venues to evaluate researchers, there is a more recent demand to return to a

qualitative rather than quantitative evaluation of research outputs, as initially highlighted by the San Francisco Declaration on Research Assessment (DORA) [7], and now strongly pushed forward by the Coalition for Advancing Research Assessment (COARA) [18].

Concrete Proposals towards Open Access

The response by scientific publishing companies to these demands has been instrumented through several schemes to implement Open Access, each with its own cost model [8]:

- **Golden route**, which involves *full open access* journals, where articles are published on platforms managed by the publishers themselves, and *hybrid open access*, or subscription journals, where open publication is possible. In both cases the golden route requires authors or their institutions to bear the costs of publication, known as Article Processing Charges (APCs). A wide range of arrangements are possible, including per-paper APC or contracts that provide a fixed price during a predefined term, taking into account the amount of production, as in [ACM OPEN](#) [12].
- **Green route**, where publications (in most, if not all cases, in pre-editorial or off-embargo versions) are made accessible through institutional repositories (e.g., [ArXiv](#), [HAL](#), or [IRIS](#)).
- **Diamond or Platinum route**, where publications are made accessible through Open Access or *overlay journals*¹ or platforms borne by institutional organizations or funders and scientific societies, without the authors incurring publication costs (e.g., [LIPICS](#), <https://psy.imirx.org> and <https://www.episciences.org>).

Regardless of the model chosen, Open Access aims to bring at least some of the benefits that were expected to surface with the transition to digital publishing. In the current state of affairs, these benefits are not yet apparent and more changes are arguably necessary.

In order to accelerate the adoption of Open Access, in 2018 a consortium consisting of institutional funders and national research agencies launched Plan S [9]. This initiative, supported by the European Commission and the World Health Organization, represents a real plan of attack (the "S" stands for "shock"), articulated on 10 principles according to which researchers receiving funding from public institutions commit to publish their articles in open repositories or Open Access journals starting in 2021.

A pivotal element of Plan S are the *transformative agreements*: contractual instruments that are often the result of centralized bargaining, sometimes done by national / regional bodies or agencies, the terms of which are then signed by individual academic or research institutions. Such agreements are presented as instrumental in transforming the underlying business model of the scholarly publishing industry to move from a subscription-based model to one in which *publishers* are remunerated **fairly** for the services offered for Open Access publication. According to Plan S, hybrid journals will be supported only during a transition period finishing at the end of 2023, provided that the publishers involved have signed a transformative agreement.

Unfortunately, to date, most of these agreements represent non-homogeneous proposals characterized by a strong fragmentation from which it is not possible to discern any attempt to re-establish a more equitable and balanced remuneration of publishers through some form of cost mutualization [10]. However, the essence of the bargaining has been focusing on the price of APCs, rather than on how to achieve democratization of the publishing of research results. Cases stand out in which the contracts strive to preserve a predefined multi-year increase in overall revenues for publishers [11], to the point

¹ An overlay journal is a type of open access academic journal that does not produce its own content, but selects from texts that are already freely available online (source of definition: Wikipedia).

that one may wonder whether the purpose of these agreements is really to put scholarly publishing back at the service of research, or, instead, to protect the existing economic model, now endangered by the increasingly widespread availability of unauthorized repositories (for example via SciHub), which reduce the interest of subscriptions.

Risks and Challenges

Beyond these general considerations, blindly following the *golden route* dictated by publishers by simply shifting the costs of publication from readers to authors risks creating concrete problems for which the scholarly community may be unprepared. The challenges that already appeared, clearly caused by the financial bias generated by the commercialization of the act of publication, are, specifically:

1. The creation of a strong economic incentive for publishers to publish more articles and compress the time of the review process to increase throughput, limiting or foregoing the quality of research certification, effectively approaching the predatory journal model.
2. Billing authors, their departments, or their institutions for APCs, which may discourage or prevent the publication of quality research results when the necessary funds are lacking. It also creates an incentive for authors with limited economic resources (particularly young researchers or poorly funded doctoral students) to seek co-authors in less economically-challenged institutions on strictly utilitarian, non-scientific grounds (i.e., due to the availability of research funds or to their affiliation with institutions that have the ability to sign transformative agreements).
3. One of the fundamental motivations for Open Access is to suppress barriers to access knowledge, which have in the past penalized those researchers who did not have access or had delayed access to scientific publications.² The move to the APC model instead of true cost mutualization poses a new risk: not all nations or institutes will be able to bear the rising costs, creating real subclasses of researchers who, despite having legal access to the body of scientific publications, will in practice have little chance of publishing their results.
4. The focus on the economic aspect of Open Access, although understandable given the amounts involved, can make one forget that the mission of research, before the publication of the articles that disseminate it, is the production of quality knowledge. An inspection of the methods to certify research results proposed by the recently started Open Research Europe [4] initiative, an Open Access journal that complies with Plan S and can be used without cost by all participants in European projects, regardless of their research domain, raises some legitimate concerns: "*[...] articles are published rapidly as soon as they are accepted, after passing a series of prepublication checks [...] Peer review by invited experts, suggested by the authors, takes place openly after publication.*" This leaves a time window during which it is not clear whether some research has or not deemed valuable by the author's peers. Moreover, the suggestion of reviewers by the authors also gives rise to possible conflicts of interest.

What can be done about it? The movement toward Open Access seems irreversible, and the impact of Plan S is likely to be long-lasting, triggering a momentous change in research activity whose conduct should not be considered solely from the perspective of the economic interests at stake.

Some Constructive Actions

In light of the risks identified, it is essential that our scientific community mobilizes to reaffirm the principles of *fairness, rigor, and impartiality* that should guide our scientific activity and work to *make*

² Sites such as SciHub were created in response to these distortions, effectively reducing differences in access to knowledge, albeit outside legal frameworks.

research results as widely available as possible and to scale back the excessive role that numerical indicators have taken over the in-depth analysis of research quality.

Concretely, the following strategies are proposed to the community:

1. Raise awareness among colleagues and ask Departments and Universities to ensure that the signing of *transformative agreements* is systematically subjected to an **evaluation by a committee of experts** to determine the appropriateness of such agreements and adherence to principles such as (a) encouraging the migration of the scholarly publishing market from the subscription model to the open access model; (b) favoring the mutualization of production costs over setting of unit prices per article [10]; or (c) at least preferring models that, like ACM OPEN [12], provide for a reduction in APCs based on increasing volumes.
2. Raise awareness on the issues discussed in this document among colleagues and young researchers, in particular about the importance of **avoiding exclusive transfer** of copyrights on their articles to publishers. The dissemination of the "rights retention" strategy recently published by Coalition S, which involves making the accepted manuscript immediately available under a CC-BY license in institutional repositories [13], may be of particular relevance.
3. Incentivize initiatives that encourage the development of quality Diamond / Platinum Open Access journals **by societies or scientific communities** hosted in self-managed platforms, based on the observation that many such journals already exist and offer an intrinsic quality that is sometimes superior to that of commercial Gold Open Access initiatives.
4. Promote the use of platforms and services that conform to criteria of excellence such as **openness and transparent management** [14], and whose cost can be mutualized. The French HAL/CCSD infrastructure, and its Episcience Journals, and the Dagstuhl conference series Lipics, which provide such a service, are models that can be followed. The community should also define requirements and protocols that ensure better editorial and review processes: for example, imposing reduced review time or billing supplements for additional pages when no real service justifies it are practices that should be stigmatized.
5. Adopt and openly support **research evaluation practices based on quality** and not only on numerical indicators [12], and identify, where possible, institutional repositories and transparent rankings suitable for the discipline as an alternative to catalogs and journal rankings owned and maintained by commercial stakeholders.
6. Participate in **international activities** on the emerging issues of Open Data and Open Source in research; disseminate **best practices** for archiving, identification, description, and citation for software produced by researchers using open and mutualized infrastructures such as Software Heritage [15]; contribute to the ongoing international reflection on the evaluation of software production in career progression and funding allocation, avoiding as much as possible to reproduce the errors incurred in scientific publishing [16], such as the misuse of numerical indicators (e.g., the number of commits made on a project).

The scientific community is facing many challenges, some of which are epochal. It is essential to acquire greater awareness [17] of the impact of choices and policies that are being and will be adopted at all levels, from individual institutions to international consortia via regional and national governments. This awareness will make it possible to influence decision-making processes and to govern a matter that is ultimately the responsibility of the scientific community: the process of transformation towards a truly openly accessible digital research ecosystem.

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³ <http://www.grin-informatica.it/opencms/export/sites/default/grin/files/documentoDiLavoroSuOpenAccess.pdf>

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