

Chapter 1

From Open Access Publishing to Open Science: An Overview of the Last Developments in Europe and in France

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ABSTRACT

By facilitating and accelerating access to knowledge, the digital revolution and the development of the internet in the 1990s constituted a “disruptive” innovation that radically transformed the models and practices of scientific information transmission. It opened the way to open access in science, a novel and promising solution that promotes the sharing of publications and data, and new modes of research assessment. The COVID-19 crisis and the spread of fake news on social networks have shown how necessary it has become to provide scientific information that is controlled by the community and freely accessible to citizens. This chapter will focus on the processes that underpin the production of Open Science by examining the development of open access scholarly publishing in Europe, particularly for the social sciences and humanities.

INTRODUCTION

Open Access to the results of scientific research brings promising and democratic solutions to enlighten citizens. It may contribute to upgrade the quality of scientific information and to raise the level of acceptance of common scientific representations amongst the population. However, this is far from being systematic: in the same time when huge scientific progress enabled the making of a vaccine to resist the virus, the Covid-19 pandemic generated unprecedented amounts of pseudo-scientific information on the web, distilling doubt in scientific discoveries and putting in danger the health of the world’s population. It is becoming urgent to realize how Open Science models could help solve such a contradiction. Therefore,

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this chapter will focus on the processes that are at the roots of producing Open Science through reviewing the development of Open Access publishing in Europe, especially for Social Sciences and Humanities.

OPEN ACCESS PUBLISHING, A POLYSEMIC NOTION

Open Access appears to be a powerful incubator for the scientific community to gain autonomy by developing new scientific dissemination and publication practices, and also by allowing the sharing of a wide variety of often unknown data and works. Usually these scientific products are not published in journals or books, such as field notebooks, databases, open source tools, software, etc. They are commonly grouped under the concept of “bibliodiversity”. Sharing them through data interoperability protocols creates a new ecosystem that paves the way for reproducible science without financial barriers or restrictive copyrights. At the same time, it undermines the traditional systems of disseminating work via scientific journals published by large commercial publishers.

Physicists were the initiators of this movement with the launch of the first open archive site, ArXiv, in the early 1990s, offering unprecedented and free access to the discipline’s work. Subsequently, many countries and institutions have spontaneously developed open archive repositories in all disciplines to encourage scientists to self-archive their scientific work in order to promote free and rapid access to it. This model has been characterized as “green Open Access” by the Budapest Open Access Initiative (BOAI, 2002). The date of publication of results in an open archive allows for better security against plagiarism. It marks a new step in strengthening scientific integrity. Indeed, the deposit guarantees the copyright of the author.

Considering the rapid inflation of open archive sites, a collaborative European project between the University of Nottingham (UK) and Lund University (Sweden) began in 2005 to identify these directories, classified by country, institution and discipline. From just over 900 in 2008, there is now nearly 6,000 as of 2021. Europe also deployed successive census sites such as Driver with the objective to organise and build a virtual, European scale network of existing institutional repositories from the Netherlands, the United Kingdom, Germany, France, and Belgium. In 2009, OpenAire succeeded to Driver. “The Project aim was to support the implementation of Open Access in Europe. It provided the means to promote and realize the widespread adoption of the Open Access Policy, as set out by the ERC Scientific Council” (OpenAire).

With the advent of the Internet, the scientific community is also committed to the development of alternative models of independent scientific journals (Kosmopoulos, 2002), without subscription, at no cost either to the reader or to the author. In 2002, the Budapest Open Access Initiative marked Open Access journals with the color gold and grouped them under the heading “gold Open Access”.

Since the launch of the Internet in the 1990s, these two models of Open Access in scientific publishing - “green Open Access” and “gold Open Access” - have coexisted while following different and even contradictory dynamics. For the record, in the early 2000s, “Open Access (OA) literature is digital, online, free of charge, and free of most copyright and licensing restrictions. Open Access removes price barriers (subscriptions, licensing fees, pay-per-view fees) and permission barriers (most copyright and licensing restrictions) (...) In addition to removing access barriers, Open Access should be immediate, rather than delayed, and should apply to full texts, not just abstracts or summaries” (Suber, 2004).

The Directory of Open Access Journals (DOAJ), created in 2003, accounted for more than 3,000 journals in 2008 and more than 10,000 in 2020. However, in 2020, the DOAJ included journals whose

From Open Access Publishing to Open Science

Open Access model moved away from the original BOAI definition of “gold Open Access”. During these same years, commercial publishers invested massively in the digitization of their paper journals and created new subscription packages of digitized journals. From when the initiative was announced until 2012, the extension of Open Access to scientific publications badly threatened the financial interests of commercial publishers such as Elsevier (Kassab, 2015), Taylor & Francis, Springer etc. It led them to rethink their classical models of publication and their subscription policies. Unable to stop this emancipation movement, they have recovered by appropriating the “golden way” model and diverting it from its initial objective by introducing fees called Articles Processing Charges (APC).

These adaptations to the emerging models of Open Access on the part of traditional commercial publishers have led to the evolution of Open Access journal models in different colors and textures. They are now available not only in green, gold, but also in hybrid (subscription and APC), diamond, platinum, delayed Open Access with embargo etc. (Flamerie, 2015) imposing huge costs on taxpayers and citizens, knowing that these benefits do not go back to research. In the end, Open Access became a real growth opportunity for the scientific publishing industry (Kassab, 2021). A profound reorganization of the entire scientific publishing industry is underway, including new models for Open Access books such as “bronze” and “black” (Barnes, 2018). More generally the term Open Data should cover all types of Open Access productions of different colors including publications (Schuhl, 2020). The recent “transformative agreements”¹ establishing APC subscriptions for research Institutions and Universities aim to compensate for the progressive loss of subscriptions to journal packages by the scholarly libraries (Kassab, 2021). In Europe this formula resonated with a number of European countries who launched in 2014 the Efficiency and Standards for Article Charges Initiative (ESAC Initiative, 2014) following up on the 2013 international symposium organized by the Max Planck Digital Library and sponsored among others by Elsevier and Thomson Reuters.

The “gold” Open Access, the APC-based business model, is now well established in hard sciences and has begun to reach Social Sciences and the Humanities (SSH), notably via co-publications. “A whole system has been designed to force researchers to let their work be exploited for the benefit of certain publishers: the latter organize the dissemination of scientific information, whose reliability they guarantee thanks to evaluations (in principle unpaid) carried out by researchers. They charge authors and users for their services via journal subscriptions or APC, while proposing bibliometric measures intended for institutions that evaluate the production and regulate the researchers’ careers. Thus, quantitative evaluation scoring, measures based on reputation (altmetrics), or “professional” social networks, etc. have been set up to complete the system around these private distribution monopolies. They tend to impose a mode of operation on research that makes them necessary, while not offering the tools that would be best suited to understand the real impact and stakes of research. Numerical indicators alone lead to confusing data with the qualitative information, to relegate the meaning of research results to numbers with little meaning”. At the end, “the taxpayer pays huge subscriptions to major publishers to obtain bibliometric indicators on the productions they distribute, which are required in many countries for the granting of funding and career advancement of researchers, who are nevertheless the producers and volunteer evaluators of this research carried out on public funds” (Kosmopoulos & Pumain, 2018).

In fact, the impact factor of journals created by E. Garfield was a documentary tool that aimed to guarantee selected quality journals by studying the number of citations in the bibliographic references produced by researchers (Garfield, 1963). He rightly thought that indexing by non-specialist librarians was not adapted to scientific research, particularly in medical sciences, whereas bibliographic citations produced by researchers in their publications could facilitate documentary research. Well before the

Internet, it allowed researchers via the Current Contents to keep informed of research and publications in their fields, and to avoid the repetition of similar scientific works.

With the explosion of bibliometric tools since the 2000s and the confiscation by commercial publishers of scientific evaluation based on opaque and scientifically unproven data, Open Access opens up new and transparent perspectives that better account for the richness and specificity of scientific productions according to disciplines and allows for a more qualitative analysis using text mining and semantic analysis methods. The San Francisco Declaration on Research Assessment² expresses the need for research assessment “to eliminate the use of journal-based metrics, such as Journal Impact Factors, in funding, appointment, and promotion considerations”. It recommends “to assess research on its own merits rather than on the basis of the journal in which the research is published” and to “consider the value and impact of all research outputs (including datasets and software) in addition to research publications, and consider a broad range of impact measures including qualitative indicators of research impact”(DORA, 2013). It also meets the ten principles on research assessment of the Manifesto of Leiden, The Netherlands (Hicks et al., 2015).

Indeed, Open Access journals have not modified the landscape of the scholarly communication alone. Open archives repositories opened the way to various content such as media, research notebooks, preprint, data, software etc., based on Open Access technologies. The protocols for interoperability and the exchange formats are the keys of data and metadata exchange. The interoperability of open data combined with such digital bibliodiversity offers new perspectives for statistical analyses that are broader and finer than bibliometric indicators and the impact factor (Kosmopoulos, 2015) within the web 2.0 environment. Documentary tools must above all serve the advancement of science³. The bibliodiversity available on self-archiving sites combined with Text and Data Mining tools appears to be a means of widening the scope of evaluation to all the productions of scientific research and to go beyond the impact factor.

FROM OPEN ACCESS TO OPEN SCIENCE IN EUROPE

Various European institutions have succeeded in paving the way for a wider acceptance of Open Access principles. This section recalls the stages of institutional construction in Europe of its Open Access model. It shows the convergence of the efforts of several institutions (the Commission, the research programs, the ERC). It also specifies in a concrete and technical way the means that have been implemented to satisfy all the actors and bring them to change. It will also show how some European countries have gone further than others.

Previously named “Science 2.0” in reference to web 2.0, the notion of “Open Science” was introduced by the European Commission in the early 2010s. “As other challenges need to be addressed such as infrastructure, intellectual property rights, content-mining and alternative metrics, but also inter-institutional, inter-disciplinary and international collaboration among all actors in research and innovation, the European Commission is now moving decisively from ‘Open Access’ into the broader picture of ‘Open Science’” (European Commission, 2014). Open Science is an extension of the Open Access movement, which it now encompasses. Favored by the digital revolution and the advent of the Internet, Open Access consisted of a movement to emancipate the scientific community and university libraries from the growing monopolies of private publishers (Swartz, 2008). Despite that Open Access means lower costs for the scientific community compared to the prices commercial editors charge to scholarly libraries and institutions, it also provides real benefits in terms of visibility and impact for the scholarly

From Open Access Publishing to Open Science

information through its widespread interoperable dissemination and social networking (Eysenbach, 2006; Harnad & Brody, 2004) and therefore also in economic terms.

The European Commission has been in favor of Open Access for scientific publications and data since 2007: “To improve current and future access to scientific information, the European Union (EU) will support experiments with Open Access in its recently-launched research program (by, for example, refunding the project costs of Open Access publishing)”. It also emphasizes the need to improve interoperability (European Commission, 2007). The prestigious Scientific Council of the European Research Council (ERC) advocated at the same time that a “free and efficient access to information, including scientific publications and original data, will be the key for sustained progress” (ERC Scientific Council Guide Lines for Open Access, 2007). The Seventh Research Framework Programme (2007-2012) of the European Union encourages the Open Access initiative: it develops policies mandating the deposit of scientific publications in an Open Access repository. In that case, the author is advised to deposit his or her final peer-reviewed manuscript (not the pre-print) after a certain embargo period, established in order to allow publishers to recoup their investment. The initiative covers approximately 20% of the budget of the Seventh Research Framework Programme, and applies to 7 areas, including Social Sciences and Humanities. In addition to funding programs like OpenAire, the European Commission made a visible commitment to Open Access in 2008 by launching Driver: The Networking European Scientific Repository, combining self-archives repositories from many different European countries, institutions and disciplines.

On 17th July 2012, the European Commission put forward a recommendation on access to and preservation of scientific information. Based on the assumption that access to publicly funded research is “speeding up scientific progress”, this text advocates that such research should be disseminated “as soon as possible, preferably immediately, and in any case no later than 6 months after the date of publication, and 12 months for Social Sciences and Humanities” (Art.1). Four years later, on 17th May 2016, the Council of the European Union recommended rolling out this model to all Member States in order to make Open Access a “default option by 2020” (Langlais, 2016).

Considering that “although Europe generates more scientific output than any other region in the world, in some areas we fall behind on the very best science. At the same time, there is a revolution happening in the way science works. Every part of the scientific method is becoming an open, collaborative and participative process” (Moedas, 2015). The European Commissioner for Research, Science and Innovation, Carlos Moedas, defines three priorities for his action: “Open Innovation, Open Science, Openness to the World”. “Open Science describes the on-going transitions in the way research is performed, researchers collaborate, knowledge is shared, and science is organized. It is driven by digital technologies, the globalization of the scientific community, and the need to address grand societal challenges” (European Commission, 2017, p. 16).

Driven by Science Europe⁴ and on the initiative of the European Commission, the cOAlition S⁵ launched a public debate on the issue of Open Access that led to the writing of the Plan S (2018). Built on the basis of ten principles, the Plan S requests from the scientists and researchers receiving public funding for their projects that they deposit their work by 2020 in Open Access journals or on open archive repositories. Although the Plan S excludes the hybrid journal model, whose cost to libraries and institutions appears to be uncontrollable, it includes in its principles the payment of APCs. It also addresses the issue of copyright and takes a position in favor of publications under the CC-BY license such as Creative Commons 4.0 (Creative Commons), which reinforces the inalienable rights of scientific authors. The Plan S led by Science Europe seems to offer a compromise with commercial publishers.

“However, to date, a lack of clarity has existed around our understanding of the extent to which publishers are responding to the Open Access policies of governments, funders and institutions to enable researchers to openly access and share their journal articles... In summer 2020 a research study was conducted in order “to explore copyright and licensing practices amongst the most prominent journal publishers in Europe and amongst European DOAJ journals” (Morrison et al., 2020). The study demonstrates that using CC BY or having zero-month embargoes or short embargoes for self-archiving, is far from being generally adopted by the scientific publishers. The report is accompanied by several recommendations for fostering the application of the Open Access licenses.

For many researchers in Europe, Plan S does not go far enough. They do not hesitate to openly call out Elsevier’s “anti-competitive” practices by referring the matter to the European Commission’s Directorate General (Des chercheurs dénoncent les pratiques “anticoncurrentielles” d’Elsevier, 2018). On the other side, logically, publishers’ associations and commercial scientific publishing companies are speaking out against this Plan that seems to threaten their interests. Supported by at least 1,700 European researchers in Europe an Open Letter (November 28, 2018) is addressed to the EU against Plan S (Reaction of Researchers to Plan S, 2018). In France, a tribune in *Le Monde* (« Publications scientifiques », 2018) was published against this same plan, without avoiding some confusion in front of the complexity of the different Open Access models. On July 20, 2020, the European Research Council (ERC), which joined the cOAlition S at its creation in 2018, announced its withdrawal, notably because of the exclusion of publications in hybrid journals, which would harm the careers of young researchers (ERC, 2020). For several European countries as well, this exclusion is not realistic; it would lead to the disappearance of a majority of journals that currently operate according to this hybrid model. The French Mathematical Society reminded that the implementation of Open Science should not be done at any price and warns against the perverse effects of the author-pays system⁶ (Société Mathématique de France, 2018).

However, the hybrid formula, which is very advantageous for private publishers, considerably increases the financial burden of libraries and institutions. It is often said that they ultimately pay three times: 1. the article of which work is publicly funded, 2. the subscription and, 3. the APC. For Jean-Yves Mérimondol, “the emergence of hybrid journals blurs the traditional boundaries between research and documentation expenses” (Mérimondol, 2020), which leads to the reorganization of budgets and the beginning of new negotiations in an area where the greatest opacity resides. OpenAPC operated by Bielefeld University Library displays interesting information on payments to commercial publishers, although it is limited to information provided by research institutions. In France, the Couperin Consortium, in charge of negotiations with publishers, reported in more than 5 million euros spent in 2017 by 61 institutions for the publication of 2,927 articles (OpenAPC, 2017). These APCs come in addition to subscriptions to journal packages and access to bibliometric databases (Elsevier’s Scopus, Clarivate’s WOS), the costs of which are negotiated and not made public (Kosmopoulos, 2019). Like journal subscriptions, remunerations for transformative agreements are made within the national, not European, framework. They vary across publishers, countries, and institutions, yet the amounts are not known and therefore not comparable.

Since 2008, the European Union has deployed successive census sites such as Driver or OpenAire to promote access to Open Access documents according to the protocol of interoperability. Simultaneously in partnership with CERN, UE launched in 2013 its own European self-archiving platform named Zenodo. At the end of the 2000s, OpenAire Explore provided access to more than 120 million Open Access publications and 856K datasets interlinked with publications. The issue of open data in compliance with FAIR principles (Wilkinson et al, 2016), which are either deposited on dedicated repositories such as Zenodo with a Digital object identifier (DOI), or associated with “data papers” whose publication

From Open Access Publishing to Open Science

is validated by peers like any scientific article, is emerging as an economic necessity for the Commission. In its 2018 report, the Commission concluded that “research expenditures in Europe amounted to €302.9bn in 2016. While the minimum true cost of not having FAIR can be seen as only 3% of all research expenditures, €10.2bn per year is 78% of the Horizon 2020 budget per year and ~ 400%, of what the European Research Council and European research infrastructures receive combined. To top this, figures for the open data economy suggest that the impact on innovation of FAIR could add another €16bn to the minimum cost we estimated” (European Commission. Directorate General for Research and Innovation. & PwC EU Services., 2018).

In 2014, the European Research Council (ERC) created an Expert Group on Monitoring and Evaluation of funded scientific programs to establish performance indicators adapted to the new context of shared data and Open Access. A report on quantitative performance evaluation in SSH (Kosmopoulos, 2015) describes the special status of SSH and the variety of its scientific productions which are not mainly journal articles. It helped to map out the practices of scientific evaluation, the problems encountered with bibliometrics or social altmetrics, and claimed a new generation of metrics applied to the bibliodiversity combined with peer review. The new Framework research program Horizon Europe is precisely accompanied by the deployment of a constellation of scholarly publication services dedicated to bibliodiversity, control and discovery (OpenAire Nexus) with the goal to integrate those services into the European Open Science Cloud (EOSC)⁷.

The National Policies: The Example of France

The commitment to Open Science set out in the Horizon Europe framework program (2021-2027), along with the recommendations of the funding agencies grouped together in cOAlization S, is referred to the national actions of each European country. These actions must not only be in line with the legal framework of the country, but also consider the economic stakes that this change implies for all the actors of scientific publishing, public, private, and learned societies. Beyond the European research framework program Horizon Europe, some countries are going further. This is the case of France. According to the largest national research institution, the French National Centre for Scientific Research (CNRS), “France must conform to the values and rules emerging in supranational and foreign bodies and legislation, otherwise French science risks being marginalized. Among other things, Open Science must ensure protected authors’ rights, common ethical rules, adapt to the different practices of scientific communities, etc.” (Direction de l’Information Scientifique et Technique - CNRS, 2016).

Following a national consultation (2015-2016), the Law on Digital, in accordance with European recommendations, was enacted in 2016⁸. It defines the conditions of dissemination of a number of works of researchers funded by public funds. The obligation is to load one’s articles on a self-archiving repository within a minimum of six months and within a maximum of 12 months for articles in SSH. The debates were lively in the media (Collectif, 2016) but also against the CNRS and its Institute of Human and Social Sciences (INSHS). Described as “mortifying” by some people, this law would, according to them, confiscate the rights of researchers to have their work and the quality label provided by private publishers. Moreover, the obligation to load in open archives repository could lead to state control of scientific publications (Valluy, 2017). There is also for a part of the journals in SSH, the fear of their programmed disappearance. Indeed, some of them only survive because of their paper subscriptions and have yet to switch to digital.

A Monitoring Committee for Publishing was set up in France in 2017 by the Ministry of Higher Education, Research and Innovation (MESRI)⁹. It brought together private and public actors involved in scientific publishing. Its objective was to measure in a concerted manner the effects of the digital law (2016) on the economics of publishing and to provide support for an evolution towards a genuinely Open Access model with licenses with a minimum of restrictions. Starting from the observation that “since 2016, because of the law but also because the mandatory filling is one of the criteria for the evaluation of laboratories, attention has been focused on the filling of articles in open archives, even though “the continuous decrease in subscriptions reflected a structural crisis in scientific publishing and a real danger of atrophy of the French publishing fabric” (Renoult D. (Comité de suivi pour l’édition scientifique), 2019, p. 3), a support plan for journals of 16.4 M€ for the period 2017-2021 is committed¹⁰.

However, many questions still remained: what would be the real cost of moving to Open Access for journals operating on old models? (« Publications scientifiques », 2018); How do we avoid the monopolization by APCs of research budgets at the expense of open archive sites? Where does the privatization by commercial publishers of open archive and research data repositories take us? etc. As an example, the purchase in 2017 by Elsevier (RELX Group) of the open archive platform Bepress (Berkeley Electronic Press), created in 1999 by two American academics, for an estimated amount of 100 million euros, was indeed not reassuring about the future of “green Open Access”.

At the same time, the agreement between Elsevier and the French national consortium of scholarly libraries Couperin¹¹, in charge of the renewal of a national license for journal subscriptions, was controversial. The agreement provided for a price cut of nearly 13% over 4 years, with a 25% discount on APCs and a compensatory clause if the APC price increase threshold was exceeded, limited to 3.5%. In addition, it provided the possibility of automatic access after 12 months to the “accepted author manuscript” (AMA) or postprinted in streaming directly on Scencedirect, the Elsevier platform, as well as a record in the national open archive HAL of the CCSD (MESRI, 2019) that should point to this streaming. After 24 months, the pdf file of this manuscript would be directly uploaded on HAL¹², thus curtailing the embargo periods written in the law on digital technology and the principles stated in Plan S. The reactions came quickly, rejecting the Couperin/Elsevier agreement in principle and new proposals for a more democratic and transparent procedure for negotiations with publishers (Bulletin des bibliothèques de France, 2019).

The argument that APCs favors “predatory publishers” through Open Access journals based on publication fees (Ajones, 2017) works to the disadvantage of this model. In practice, the predatory publishers are start-ups (mainly from China, India but also Africa) that adopt journal names close to the names of renowned journals to create confusion. They charge APCs and publish the articles with very light and rapid scientific validation. Jeffrey Beall’s list of potentially predatory journals and publishers in Open Access served as a benchmark until its removal in 2017. In 2014 more than 3000 fraudulent publishers were identified by Beall for nearly 10,000 journals (Shen & Björk, 2015). It has become increasingly difficult to distinguish legitimate journals from illegitimate journals using the APC model. A new research front is emerging that aims to define predatory journals and shed light on the risks that the gold APC-based business model poses to Open Access research (Boukacem-Zeghmouri & et al, 2020).

However, for Minister Frédérique Vidal, if “the time has come to invent a new world, where the free circulation of knowledge will become the norm...” and for France to commit “so that the results of scientific research are open to all, researchers, companies and citizens, without hindrance, without delay, without payment” (Vidal, 2018) the difficulty lies, nevertheless, in defining the strategy and modalities for the adoption of economically sustainable model. The National Open Science Plan was launched in

From Open Access Publishing to Open Science

France in 2018, followed by a new Plan in 2021 that place scientific information at the heart of the Open Science revolution. Structured around several axes, the plans are broken down into the generalization of Open Access to publications, the structuring and opening of research data, the inclusion in a sustainable, European and international dynamic, the openness and promotion of source code and the evolution of the practices (MESRI, 2018, 2021).

In 2019, the CNRS Roadmap set in stone the main lines of the scientific policy for the production, dissemination and evaluation of scientific information according to the principles of Open Science¹³ and DORA¹⁴. Contrary to the choices made by some European countries, among them Germany and Austria, France and the French National Centre for Scientific Research (CNRS) support genuine Open Access and oppose as much as possible the payment of APCs. Especially, they fight the “transformative agreements” that place the cost of Open Access on research institutions that are mostly publicly funded in France. Indeed, in front of journals claiming to be Open Access in which authors are required to pay APC to be published and of hybrid journals (partially by subscription and partially with APCs), “diamond” models such as episciences and Freemium are imposing themselves as alternatives controlled by research actors who respect authentic Open Access, particularly in SSH. The French National Research Agency (ANR), which funds public and partnered research, launched an action plan to “promote the open dissemination of research data” and requires a Data Management Plan (DMP) for any project it funds after January 1, 2019. In May 2021, Institut Pasteur (IP, 2021) has set itself the goal of reaching, by 2021, 100% of the year’s publications in Open Access under the CC-BY license and without embargo, either in a native Open Access journal, or by depositing their publications in the HAL-Pasteur open archive.

THE SPECIFIC ROLE OF THE SOCIAL SCIENCES AND THE HUMANITIES IN THE EVOLUTION OF OPEN ACCESS MODELS

The Social Sciences and the Humanities (SSH) have played and continue to play an important role in the democratization of access to scientific works and with regard to developing countries that cannot afford expensive journal subscriptions. For the humanities and social sciences, for which funding is often very difficult to obtain, the choice of Open Science, in particular the alternative Open Access models produced by the scientific community, has been a very important step in the organization and dissemination of their scientific work. Facing the onslaught of commercial publishers and their Open Access costs, the objective was indeed to find solutions that would preserve basic research in SSH from excessive spending on subscriptions to packages of journals. With the initiatives launched by the world scientific community (Freemium, e-journals) and the open archive repositories, it is progressively proven that there are viable, sustainable, and equitable alternatives to commercial models of Open Access publishing at very low costs that favor investment in research (Kosmopoulos & Pumain, 2018). SSH mobilizes interesting Open Access initiatives in various areas such as open methods for scientific translations, data sharing, new generation of metrics including quality assessment, semantic impact analysis promoting the emergence of new fields of research etc.

Alternative uses of Internet for truly Open Access scientific publication are possible and sustainable such as attested by the example of *Cybergeog: European Journal of Geography* (Cybergeog, 1996-). Choosing *Cybergeog* may appear anecdotal but is rather representative of the energy and ability of anticipation that are required to develop viable alternative solutions. This pioneered entirely digital journal was launched as early as 1996. Without any cost to the author or the reader since its creation, *Cybergeog* is a

scientific journal open to all themes and school of thoughts in geography and related disciplines, with a multilingual content and a trilingual interface. It ensures a worldwide diffusion of research whose quality is guaranteed by several international reading committees. The double anonymization of the peer review system (texts, codes, data etc.) respects the highest scientific and ethical criteria. To promote cumulative, reproducible, and open geographic science, the journal launched a Model papers section in 2014 and a Data papers section in 2017. To our knowledge, this is the only journal in geography to this date that publishes this type of article. Each of these two sections has an editorial board of about 20 experts in the field, who evaluate the articles and accompanying supplementary material.

Cybergeo is multilingual since the beginning in 1996, with an interface in French, English and Spanish. Papers are published in different European languages (English, Spanish, Italian, German, Greek, Hungarian, Swedish...). The journal enlarged its editorial policy for international publication, including the translation into English and Spanish of all metadata. Since 2011, a program of translation of selected articles into English and Spanish has been launched. In 2018, Chinese translation of metadata (titles and abstracts of recent articles) was inaugurated, provided by volunteer researchers and contract workers. In 2019, the CybergeoNet project funded by the French Ministry of research was initiated to reinforce the multilingualism of the journal and to develop with other Open Access journals a sharing low-cost, innovative, and efficient translation method¹⁵.

Regarding its economic model, Cybergeo joined the alternative Freemium publishing model independent of commercial publishers and launched in 2012 by the French platform OpenEdition. OpenEdition hosts several hundred SSH's journals that have adopted this "diamond" model. This model offers a subscription, at variable cost depending on the PIB's country, to the Freemium member journal bouquet at universities and research centers the world in exchange for a whole range of services. Freemium is entirely controlled by research actors and respects authentic Open Access to peer-reviewed scientific publications without cost for the author or the reader. Founded a few years before the creation of OpenEdition, Cybergeo is the oldest French Open Access digital journal in SSH (Kosmopoulos, 2002). Cybergeo's publishing policy is declared in Sherpa-Romeo under a CC-BY license (each journal on OpenEdition is independent in the choice of its copyright). It is supported by libraries all around the world subscribing to Freemium, but also by the investment of researchers associated for 25 years in the editorial and reading teams to ensure the scientific quality of an international journal, as well as the support of the laboratory Géographie-cités and the French National Centre for Scientific Research (CNRS).

The estimated cost of the entire editorial service, from submission on a platform, through peer review, to posting an article online in an Open Access journal such as Cybergeo is estimated to be around 600–700 Euros per article¹⁶, far from the rates imposed for APCs by private publishers that are currently many times higher. Thanks to the interoperability, the journal is now referenced on dozens of academic sites around the world¹⁷. The downloads of its articles multiply to exceed one million per year since 2014. With over 1,200 publications and a worldwide readership, particularly in Latin America and Africa, Cybergeo is a success story (Kosmopoulos, 2016).

With a significant increase in the citation rate across disciplines, text and data mining, Open Access fosters cross-disciplinary fertilization and the emergence of new interdisciplinary fields. Web scrapping and semantic mapping for detecting paradigmatic similarities, convergences or intellectual niche creation could become a compulsory step not only when starting new research but all along the research process (Zhuang et al., 2020). Moreover, new publication strategies could become driven by the observation of these scientometric networks such as revealed by analyzing successful scholar trajectories: "these papers share remarkable boundary-spanning traits, marked by exceptional abilities to connect disparate and

From Open Access Publishing to Open Science

topically-diverse clusters of research papers” (Sebastian & Chen, 2021). It is likely that in a near future such exercises will be part of all states of the art reviews in any domain, provided that scholars keep the monitoring of the required data mining and analytical processes according to their own scientific values and criteria.

The Impact Factor and the bibliometrics provided by the WOS or Scopus turned out to be particularly inadequate for SSH (Dassa et al., 2010; Kosmopoulos & Pumain, 2007). For all fields of SSH, the pioneering tool JournalBase (Journalbase, 2010), that gathers in a regularly updated table all journals existing in WOS (Thomson Reuters), Scopus (Elsevier) and ERIH (European Science Foundation) data bases, enumerates (after eliminating redundancies and inactive journals) about 15,000 international journals in SSH. By cross-referencing the different sources, it appears that not only none of them is representative of the publications in SSH, but that the indicators generated by the WOS and Scopus on the base of their indexes are biased and can lead to suspicion towards the SSH. A recent study focused on geographical journals (Dassa & Kosmopoulos, 2018) demonstrated that Scimago was not representative in comparison with the publications referenced by the French scientists in the academic database “RIBAC” for the SSH (CNRS). Including bibliodiversity, RIBAC allows to characterize and quantify the activity of the CNRS’s researchers in SSH from different aspects. The increase in the visibility of scientific work via the Internet over the last three decades has intensified the spirit of competition exacerbated by the race for research funding (the “publish or perish” rule) and the attractive strategies of publishing platforms and scientific social networks. According to the CNRS ethics committee, a new awareness is emerging through Open Science (COMETS). It calls as well for a profound reform of the research evaluation system in the spirit of the Jussieu Call (2017) in Paris (France).. The Call, launched by a French group of researchers and scientific publishing professionals claims the recognition of bibliodiversity and the promotion of Open Access articles without APC.

The application Cybergeonetworks (2016) launched in collaboration with four young researchers¹⁸ illustrates this process rather well. The scope was to explore Cybergeonetworks’s relationships and impact through citation network and by analyzing the semantic content. This Open Access application performs statistical and semantic analyses of data extracted from Cybergeonetworks’s peer-reviewed articles and online data associated with the journal (search engines, tweets, citations and publications). It allows, for example, to locate the authors of the journal’s articles, the countries studied and cited in an international dimension, both cartographically and statistically, and to reveal emerging themes, as well as citation and dissemination networks (Raimbault et al., 2019). Cybergeonetworks supplies an alternative tool for analyzing the position of a journal in the scientific field as well, more precisely and more exhaustive than the quantitative bibliometrics of the WOS, Scopus and Scimago.

Facing the public costs of a few major private publishers, a European initiative from OPERAs in a consortium including the DOAJ has consolidated the Diamond Open Access model for the SSH. This “authentic Open Access”, is proposed to qualify and distinguish the choice of free access without cost for readers and authors. According to a recent survey (Becerril et al, 2021), there are 12,000 journals in all scientific disciplines in Diamond Open Access, whereas the DOAJ itself on its website announced (at the end of March 2021) that an identification number has been given to some 16,232 Open Access journals among which 11,674 without APCs, representing almost 6 million articles in 80 languages and 125 countries. Thus, Open Access is widely diffused but not yet all over the world. SSH may continue to have a leading role to play in sustaining and developing these models. SSH journals that embrace the alternative peer-reviewed publication models of Open Access are engaging in a humanistic move-

ment that provides access to scientific publications to the global community, particularly to developing countries that are denied access for economic reasons to traditional and expensive journal subscriptions.

THE FUTURE OF OPEN SCIENCE IN EUROPE

The capacity for innovation shown by the scientific community since the advent of digital technologies to seize new opportunities and develop entirely new usage models such as Open Access is to be commended. It is at the origin of the strong impulse in favor of Open Science at the European level and of the will to adopt a global policy. Indeed, Open Science is no longer a trend, but a priority clearly expressed in the Framework research program Horizon Europe (2021-2027).

Based on eight ‘ambitions’ (European Commission, 2020): 1. Open Data: FAIR and open data sharing, 2. European Open Science Cloud (EOSC), 3. Future of scholarly communication, 4. Rewards, 5. Research integrity, 6. Education and skills, 7. Citizen science and 8. New Generation Metrics, Horizon Europe aims at harmonizing and effectively framing the diverse and heterogeneous initiatives which have flourished for several decades in different countries and institutions, and particularly within disciplines and research laboratories. In fact, the future of Open Science under Horizon Europe will depend on its capacity to gather the main Open Access initiatives to build a new sustainable ecosystem that is conducive to scientific progress.

The changes in practices and world vision are so profound that they make Antoine Petit¹⁹ say that “Open Science is a revolution”. The Commission is confronted with the complexity of the new ecosystem and its scientific and economic challenges. The choice of Open Science involves all public and private stakeholders and requires numerous consultations and a common strategy. The Commission must consider approaches and interests that seem sometimes incompatible, as evidenced by the example of the ERC’s departure from cOAlitionS in July 2020 (ERC, 2020) due to its disagreement with the ban on hybrid journals as of January 1, 2021. “The ERC Scientific Council is working closely with the Commission services in order to find solutions that allow the rules related to Open Access under Horizon Europe to follow the legislative proposal and apply across all parts of the Programme, including the ERC” (ERC, 2020). Precisely one of the goals of Horizon Europe is to develop an Open Access publication portal, while the heterogeneous Open Access models (diamond, gold, hybrid, green, etc.) are still in conflict with each other, as described in this chapter. Which model(s) will win the support of a majority?

The opening and sharing of data are also a crucial issue for the European Commission. Although open data has been strongly promoted over the past two decades, resulting in the creation of hundreds of scientific open data repositories²⁰, one of the biggest challenges remains to make their reuse possible by humans and machines. It therefore requires research data to be FAIR i.e. findable, accessible, interoperable and reusable²¹ according to common open protocols, norms and standards in terms of format, metadata, licenses, identifiers, copyright etc. The European Open Science Cloud (EOSC) is the flagship project of Horizon Europe. The aim is to finalize the development of a federated and open multidisciplinary environment where European researchers will be able to publish, and more generally where innovators, companies and citizens will find open data (including publications), tools and services for research, innovation and education. It goes to meet the idea to “engage and involve citizens, civil society organizations and end-users in co-design and co-creation processes and promote responsible research and innovation” (European Commission, 2020).

From Open Access Publishing to Open Science

However, the implementation of open data still generates many issues about the definition of standards and norms, their durability, their reproducibility, their evaluation, the applied licenses, etc. as well as global recommendations about data management and data stewardship practices. Apart from technical challenges in the areas of open data (including publications), other practical questions are still on hold such as employment, costs, income, training, skills, etc. No precise cost estimates for implementing FAIR data have been produced by the Commission yet. It however assumes that if “the additional costs allocated for data management are up to 2.5% of all research expenditures, this would leave a positive balance of ~ €2.6bn per year from the implementation of the FAIR principles. Moreover, not all the costs for implementing the FAIR principles would be recurrent. Once the proper infrastructure in place, one could expect the net benefits from the FAIR principles to increase. We are confident that the true cost of not having FAIR research data is much higher than the estimated €10.2bn per year.” (European Commission. Directorate General for Research and Innovation. & PwC EU Services., 2018).

Open Science also raises questions about the intellectual property rights on the research outputs such as publications, and all other digital objects produced by scientist such as data bases, software, methods etc. Many open licenses are proposed, but they are not all written in the same terms depending on whether they are issued by the research community or by private scientific publishers. The open licenses of commercial publishers such as Elsevier, for example, contain restrictions that are not yet in line with the ambitions of Open Science, which claims creative commons 4.0 type licenses.

Open Science is also a springboard for profound reforms in terms of assessment and rewarding researchers as well as the evaluation of European projects. The intention is clearly to abandon the impact factor of journals and to bring true recognition to the “bibliodiversity” meaning all types of scientific outputs. In front of the devastating principle “Publish or perish”, the aim is to encourage scientific production of all kinds and to favor a qualitative assessment rather than the current impact factor. The development of open archives and FAIR data repositories are the pillars of the implementation of this new evaluation system. As an example, in July 2021, the ERC announced its “formal endorsement of the San Francisco Declaration on Research Assessment (DORA), in line with its long-standing adherence to the highest standards of research assessment. The ERC is convinced that the broad implementation of research assessment procedures that integrate the DORA principles is the key to an equitable transition to Open Science.” (ERC, Work Program for 2022).

Simultaneously in France, starting in 2021, CNRS researchers must provide 10 flagship productions including not only research articles but also any type of data, source codes, videos, interviews, patents etc. accompanied by a self-evaluation according to the eighteen DORA commitments. The “Open Science and evaluation practices” meeting held in Paris at the end of 2021, brought together experts from the European Commission, funding agencies and academic and institutional leaders. While echoing the ambitions of Open Science, they recognized the difficulty of the transition. Questions remain regarding peer reviewing such as the adaptation of criteria according to scientific fields, the assessment of interdisciplinary themes, the time and skills needed by experts to examine all types of productions, the risk of falling back into a new system of quantitative indicators etc.

CONCLUSION

The development of the Internet has been a “breakthrough” innovation to facilitate and accelerate exchanges, which has renewed models and practices for transmitting scientific information. It has returned to

the true meaning of scientific knowledge in the service of mankind. The Covid-19 pandemic showed the necessity to find a balanced agreement between all the protagonists of scientific publishing to equitable freed up research results, accelerate information sharing and facilitate scientific progress (UN, 2020).

The variety of Open Access models highlights not only the economic and financial tensions that are at play on all sides, but also the innovative strength of the academic community. Considering that articles in journals are no longer the only means of sharing scientific information, Open Science offers access to a plurality of research contents and promotes new methods of dissemination and data sharing, including new approaches to the calculation of the impact. By improving our ability to write, publish and disseminate in different languages, Open Science will fully promote universal access to scientific outputs. Nevertheless, one should not forget that what determines the value of scientific knowledge, as opposed to opinion or ideology, is the possibility of its reproduction, its repetition and definitely its validation by “peers”. Peer review is of fundamental importance; this remains one of the many challenges in ensuring the certification of diverse high-quality Open Science.

REFERENCES

- Ajones. (2017). Predatory Publishing: The Dark Side of the Open-Access Movement. *ASH Clinical News. Online*. <https://www.ashclinicalnews.org/spotlight/predatory-publishing-dark-side-open-access-movement/>
- ANR. (n.d.). *French National Research Agency*. <https://anr.fr/en/>
- Barnes, L. (2018). *Green, Gold, Diamond, Black – what does it all mean?* Openbook Publisher Blog. doi:10.11647/OBP.0173.0089
- Beall, J. (n.d.). *Beall’s List – of Potential Predatory Journals and Publishers*. <https://beallslist.net/>
- BecerrilA.BosmanJ.BjørnshaugeL.FrantsvågJ. E.KramerB.LanglaisP.-C.MounierP.ProudmanV.Red-headC.TornyD. (2021). OA Diamond Journals Study. Part 2: Recommendations. Zenodo. doi:10.5281/zenodo.4562790
- BOAI. (2002). *Budapest Open Access Initiative*. <https://www.budapestopenaccessinitiative.org/>
- BosmanJ.FrantsvågJ. E.KramerB.LanglaisP.-C.ProudmanV. (2021). OA Diamond Journals Study. Part 1: Findings. Zenodo. doi:10.5281/zenodo.4558704
- Boukacem-Zeghmouri, C. (2020, Sept. 17). La prédation dans le champ de la publication scientifique : Un objet de recherche révélateur des mutations de la communication scientifique ouverte. *HAL- CCSD - Open Archives*. <https://hal.archives-ouvertes.fr/hal-02941731>
- Bulletin des bibliothèques de France. (2019). *Une modeste proposition – Pour des négociations collectives de nos licences nationales*. <https://bbf.enssib.fr/contributions/une-modeste-proposition-pour-des-negociations-collectives-de-nos-licences-nationales#1>
- Call, J. (2017). *Jussieu Call for Open Science and bibliodiversity*. <https://jussieucall.org/jussieu-call/>
- Coalition-S (2018). “Plan S” – Accelerating the transition to full and immediate Open Access to scientific publications. <https://www.coalition-s.org/>

From Open Access Publishing to Open Science

Collectif. (2016, Jan. 12). Non à l'étatisation des revues de savoir françaises! *Le Monde.fr*. https://www.lemonde.fr/idees/article/2016/01/12/non-a-l-etatisation-des-revues-de-savoir-francaises_4846027_3232.html

Cornwel University. (1991). *ArXiv.org e-Print archive*. <https://arxiv.org/>

Creative Commons. (n.d.). *Creative Commons—Attribution 4.0 International—CC BY 4.0*. <https://creativecommons.org/licenses/by/4.0/>

Cybergeo. (1996). *European Journal of Geography*. <https://journals.openedition.org/cybergeo/>

Cybergeo. (2016). *CybergeoNetworks*. <https://analytics.huma-num.fr/geographie-cites/cybergeonetworks/>

Dassa, M., & Kosmopoulos, C. (2018). Géographes, que valent vos articles? Les bases de données commerciales en question. *La Lettre de l'InSHS*, 2018(55). <https://www.inshs.cnrs.fr/fr/lettres-de-linshs-0>

Dassa, M., Kosmopoulos, C., & Pumain, D. (2010). JournalBase—A Comparative International Study of Scientific Journal Databases in the Social Sciences and the Humanities (SSH). *Cybergeo: European Journal of Geography*. doi:10.4000/cybergeo.22862

de l'Information D. Scientifique et Technique - CNRS. (2016). *Livre blanc—Une Science ouverte dans une République numérique*. OpenEdition Press. <https://books.openedition.org/oepr/1548>

Des chercheurs dénoncent les pratiques “anticoncurrentielles” d'Elsevier. (2018). <https://actualitte.com/article/16427/distribution/des-chercheurs-denoncent-les-pratiques-anticoncurrentielles-d-elsevier>

DORA. (2012). *The Declaration on Research Assessment*. <https://sfdora.org/read/>

EOOSC. (n.d.) *EOOSC Portal*. <https://eoosc-portal.eu/>

Episciences. (n.d.). *Episciences—Home*. <https://www.episciences.org/?lang=en>

ERC. (2007). *Scientific Council Guidelines for Open Access*. https://erc.europa.eu/sites/default/files/document/file/erc_scc_guidelines_open_access.pdf

ERC. (2021). *ERC Plans for 2022 announced*. <https://erc.europa.eu/news/erc-2022-work-programme>

ERC. (2020). *ERC scientific council calls for Open Access Plans' to respect researchers needs*. <https://erc.europa.eu/news/erc-scientific-council-calls-open-access-plans-respect-researchers-needs>

ESAC. (2016). *ESAC Initiative*. <https://esac-initiative.org/>

European Commission. (2007). *Scientific information in the digital age: Ensuring current and future access for research and innovation*. https://ec.europa.eu/commission/presscorner/detail/en/IP_07_190

European Commission. (2014, June 26). Open Science (Open Access). European Commission. <https://ec.europa.eu/programmes/horizon2020/en/h2020-section/open-science-open-access>

European Commission. (2017). *Horizon 2020 Work Programme 2016—2017. Part 16. Science with and for Society* (C (2017) 2468 of 24 April 2017; p. 75). https://ec.europa.eu/research/participants/data/ref/h2020/wp/2016_2017/main/h2020-wp1617-swfs_en.pdf

European Commission, Directorate General for Research and Innovation, & PwC EU Services. (2018). *Cost-benefit analysis for FAIR research data: Cost of not having FAIR research data*. Publications Office. <https://data.europa.eu/doi/10.2777/02999>

European Commission. (2020). *Open Science*. European Commission. https://ec.europa.eu/info/research-and-innovation/strategy/strategy-2020-2024/our-digital-future/open-science_en

Eysenbach, G. (2006). The Open Access Advantage. *Journal of Medical Internet Research*, 8(2), e921. <https://doi.org/10.2196/jmir.8.2.e8>

Flamerie, F. (2015). *Les modèles économiques du libre accès. Semaine internationale du libre accès 2015* [Formation]. Semaine internationale du libre accès 2015. <http://fr.slideshare.net/BUPMCformD/les-modles-conomiques-du-libre-accs>

Garfield, E. (1963). Science Citation Index. *Science Citation Index*, 1961(1), V–XVI.

Harnad, S., & Brody, T. (2004). Comparing the Impact of Open Access (OA) vs. Non-OA Articles in the Same Journals. *D-Lib Magazine: the Magazine of the Digital Library Forum*, 10(6). <http://www.dlib.org/dlib/june04/harnad/06harnad.html>

Hicks, D., Wouters, P., Waltman, L., de Rijcke, S., & Rafols, I. (2015). Bibliometrics: The Leiden Manifesto for research metrics. *Nature*, 520(7548), 429–431. <https://doi.org/10.1038/520429a>

Institut Pasteur. (2021) *Open Science—Research*. <https://research.pasteur.fr/en/open-science/>

JournalBase. (2010). *A bilingual platform for searching journals in the SSH*. <https://journalbase.cnrs.fr/en/index.php>

Kassab, S. (2015). *Perceptions de l'Open Access par les marchés financiers*. Les 6èmes journées Open Access. https://www.canal-u.tv/video/fmsh/les_6emes_journees_open_access_sami_kassab.19545

Kassab, S. (2021). *La transition d'Elsevier vers l'Open Access du point de vue de la bourse*. Journée d'étude: Publication scientifique, stratégie des grands éditeurs et consentement à payer. <https://jestrategies.sciencesconf.org/resource/page/id/1>

Kosmopoulos, C. (2002). Cybergeog and the Electronic Scientific Journals. *Cybergeog: European Journal of Geography*, 218, 10.

Kosmopoulos, C. (2015). *Study on the quantitative assessment of performance in Social Sciences and Humanities* (Research Report Final report assigned by the ERC Expert Group for Programme Monitoring and Evaluation). ERC. <https://hal.archives-ouvertes.fr/hal-01853406>

Kosmopoulos, C. (2016). Christine Kosmopoulos. Cybergeog, revue européenne de géographie, une success story de l'accès ouvert. *La Lettre de l'InSHS. INstitut des Sciences Humaines et Sociales*, 42, 17–20.

Kosmopoulos, C. (2019). L'accès ouvert, un espoir qui donne le vertige... [Billet]. *Cybergeog conversation*. <https://cybergeog.hypotheses.org/462>

Kosmopoulos, C., & Pumain, D. (2007). Citation, Citation, Citation: Bibliometrics, the web and the Social Sciences and Humanities. *Cybergeog: European Journal of Geography*. doi:10.4000/cybergeog.15463

From Open Access Publishing to Open Science

Kosmopoulos, C., & Pumain, D. (2018). Humanities and Social Sciences (HSS) at the head of Open Access as demonstrated from Cybergeog's experience. *Cybergeog : Revue européenne de géographie / European journal of geography*, 681. doi:10.4000/cybergeog.29251

Langlais, P.-C. (2016). *Critical study of the new ways of "editorialising" Open Access scientific journals* [Research Report]. Bibliothèque Scientifique Numérique. <https://hal.archives-ouvertes.fr/hal-01399286>

Mérindol, J.-Y. (2020). *L'avenir de l'édition scientifique en France et la science ouverte—Comment favoriser le dialogue? Comment organiser la consultation?* MESRI. <https://www.enseignementsup-recherche.gouv.fr/cid148896/www.enseignementsup-recherche.gouv.fr/cid148896/les-pouvoirs-publics-et-l-edition-scientifique-en-france.html>

MESRI. (2018). *National Plan for Open Science*. Ministère de l'enseignement supérieur, de la recherche et de l'innovation. <https://www.enseignementsup-recherche.gouv.fr/cid132529/le-plan-national-pour-la-science-ouverte-les-resultats-de-la-recherche-scientifique-ouverts-a-tous-sans-entree-sans-delai-sans-paiement.html/>

MESRI. (2019). *Accord avec l'éditeur scientifique Elsevier : Un marché introduisant une baisse de prix inédite dont les économies alimenteront le Fonds national pour la science ouverte*. <https://www.enseignementsup-recherche.gouv.fr/fr/accord-avec-l-editeur-scientifique-elsevier-un-marche-introduisant-une-baisse-de-prix-inedite-dont-46840>

MESRI. (2021). *Deuxième Plan national pour la science ouverte (2021-2024)*. <https://www.ouvrirlascience.fr/deuxieme-plan-national-pour-la-science-ouverte>

Moedas, C. (2015, June 22). *Open Innovation, Open Science, Open to the World*. European Commission. https://ec.europa.eu/commission/presscorner/detail/fr/SPEECH_15_5243

Morrison, C., Secker, J., Vezina, B., Juan, I. L. I., & Proudman, V. (2020). *Open Access: An Analysis of Publisher Copyright and Licensing Policies in Europe, 2020*. Report. Zenodo. doi:10.5281/zenodo.4046624

OpenAIRE. (n.d.a). *OpenAIRE History*. <https://www.openaire.eu/history>

OpenAIRE. (n.d.b). *Find and Share research*. <https://explore.openaire.eu/>

OpenAIRE. (n.d.c). *Nexus project*. <https://www.openaire.eu/openaire-nexus-project>

OpenAPC. (2017). *France*. <https://treemaps.intact-project.org/apcdata/openapc/#institution/country=FRA&period=2017>

OpenEdition. (n.d.a). *OpenEdition Journals*. <https://journals.openedition.org/?lang=en>

OpenEdition. (n.d.b). *The OpenEdition Freemium programme*. <https://www.openedition.org/14043>

Publications scientifiques : Les pièges du "Plan S". (2018). *Le Monde.fr*. https://www.lemonde.fr/sciences/article/2018/10/09/publications-scientifiques-les-pieges-du-plan-s_5366576_1650684.html

Raimbault, J., Chasset, P.-O., Cottineau, C., Commenges, H., Pumain, D., Kosmopoulos, C., & Banos, A. (2019). Empowering Open Science with reflexive and spatialised indicators. *Environment and Planning B: Urban Analytics and City Science*. doi:10.1177/2399808319870816

Reaction of Researchers to Plan S. (2018). *An Open Letter from Researchers to European Funding Agencies, Academies, Universities, Research Institutions, and Decision Makers*. <https://sites.google.com/view/plansopenletter/home>

Renoult, D. (Comité de suivi pour l'édition scientifique). (2019). *L'Édition scientifique de revues : Plan de soutien et évaluation des effets de la loi du 7 octobre 2016*. Rapport à madame la Ministre de l'Enseignement supérieur, de la recherche et de l'innovation et à monsieur le Ministre de la Culture. <https://www.enseignementsup-recherche.gouv.fr/cid148318/l-edition-francaise-revues-scientifiques-plan-soutien-evaluation-des-effets-loi-octobre-2016-pour-une-republique-numerique.html>

RIBAC. (n.d.). *A compilation of information for an observatory of research activities in humanities and social sciences*. <https://www.inshs.cnrs.fr/en/ribac>

Schuhl, A. (2019). *Notre objectif : 100% de publications en libre accès*. CNRS. <https://www.cnrs.fr/fr/cnrsinfo/notre-objectif-100-de-publications-en-libre-acces>

Schuhl, A. (2020). *CNRS : Un plan ambitieux pour des données accessibles et réutilisables*. <https://www.cnrs.fr/fr/cnrsinfo/cnrs-un-plan-ambitieux-pour-des-donnees-accessibles-et-reutilisables>

Sebastian, Y., & Chen, C. (2021). The boundary-spanning mechanisms of Nobel Prize winning papers. *PLoS One*, 16(8), e0254744. <https://doi.org/10.1371/journal.pone.0254744>

Shen, C., & Björk, B.-C. (2015). 'Predatory' Open Access: A longitudinal study of article volumes and market characteristics. *BMC Medicine*, 13(1), 230. <https://doi.org/10.1186/s12916-015-0469-2>

Société Mathématique de France. (2018). *Tribune—Open access et système auteur-payeur* | Société Mathématique de France. <https://smf.emath.fr/node/27798>

STI. (2015). *Leiden Manifesto for Research Metrics*. <http://www.leidenmanifesto.org/>

Suber, P. (2004). *Open Access Overview (definition, introduction)*. <http://legacy.earlham.edu/~peters/fos/overview.htm>

Swartz, A. (2008). *Guerilla Open Access Manifesto (making a copy for public access and personal record)*. Gist. <https://gist.github.com/usmanity/4522840>

UN News. (2020). *UN agency chiefs appeal for 'Open Science' beyond COVID-19, citing dangers of secrecy and denial*. <https://news.un.org/en/story/2020/10/1076292>

Valluy, J. (2017). Libre accès aux savoirs et accès ouvert aux publications. *Revue française des sciences de l'information et de la communication*, 11, Article 11. doi:10.4000/rfsic.3194

Vidal, F. (2018) *First Open Science Days JNSO*. CC-Webcast. <https://webcast.in2p3.fr/video/frederique-vidal-ministre-de-lenseignement-superieur-de-la-recherche-et-de-linnovation>

Wilkinson, M. D., Dumontier, M., Aalbersberg, I. J., Appleton, G., Axton, M., Baak, A., Blomberg, N., Boiten, J.-W., da Silva Santos, L. B., Bourne, P. E., Bouwman, J., Brookes, A. J., Clark, T., Crosas, M., Dillo, I., Dumon, O., Edmunds, S., Evelo, C. T., Finkers, R., ... Mons, B. (2016). The FAIR Guiding Principles for scientific data management and stewardship. *Scientific Data*, 3(1), 160018. doi:10.1038/sdata.2016.18

From Open Access Publishing to Open Science

Zhuang, L., Ye, C., & Lieske, S. N. (2020). Intertwining globality and locality: Bibliometric analysis based on the top geography annual conferences in America and China. *Scientometrics*, *122*(2), 1075–1096. <https://doi.org/10.1007/s11192-019-03325-3>

ADDITIONAL READING

Abbot, A. (2015). Greek scientists lose access to digital journals. *Nature*. Advance online publication. doi:10.1038/nature.2015.17908

AncionZ.Borrell-DamiánL.MounierP.RooryckJ.SaenenB. (2022). Action Plan for Diamond Open Access. doi:10.5281/zenodo.6282403

Barber, M. (2021). Strengthening research integrity : The role and responsibilities of publishing. *International Science Council*. <https://council.science/wp-content/uploads/2020/06/2021-11-Research-integrity.pdf>

Eve, M. P. (2014). *Open Access and the Humanities : Contexts, Controversies and the Future*. Cambridge University Press. doi:10.1017/CBO9781316161012

Grudniewicz, A., Moher, D., Cobey, K. D., Bryson, G. L., Cukier, S., Allen, K., Ardern, C., Balcom, L., Barros, T., Berger, M., Ciro, J. B., Cugusi, L., Donaldson, M. R., Egger, M., Graham, I. D., Hodgkinson, M., Khan, K. M., Mabizela, M., Manca, A., ... Lalu, M. M. (2019). Predatory journals : No definition, no defence. *Nature*, *576*(7786), 210–212. doi:10.1038/d41586-019-03759-y PMID:31827288

Jahn, N., & Tullney, M. (2016). A study of institutional spending on open access publication fees in Germany. *PeerJ*, *4*, e2323. doi:10.7717/peerj.2323 PMID:27602289

Knöchelmann, M. (2019). Open Science in the Humanities, or : Open Humanities? *Publications*, *7*(4), 65. doi:10.3390/publications7040065

Koepsell, D. (2010). Back to Basics : How Technology and the Open Source Movement Can Save Science. *Social Epistemology*, *24*(3), 181–190. doi:10.1080/02691728.2010.499478

Krawczyk, F., & Kulczycki, E. (2021). How is open access accused of being predatory? The impact of Beall's lists of predatory journals on academic publishing. *Journal of Academic Librarianship*, *47*(2), 102271. doi:10.1016/j.acalib.2020.102271

Laakso, M., & Björk, B.-C. (2016). Hybrid open access—A longitudinal study. *Journal of Informetrics*, *10*(4), 919–932. doi:10.1016/j.joi.2016.08.002

Smith, A. C., Merz, L., Borden, J. B., Gulick, C. K., Kshirsagar, A. R., & Bruna, E. M. (2022). Assessing the effect of article processing charges on the geographic diversity of authors using Elsevier's "Mirror Journal" system. *Quantitative Science Studies*, *2*(4), 1123–1143. doi:10.1162/qss_a_00157

Suber, P. (2016). *Knowledge Unbound. Selected Writings on Open Access, 2002–2011*. MIT Press. <https://mitpress.mit.edu/books/knowledge-unbound>

Wilkinson, M. D., Dumontier, M., Aalbersberg, I., Appleton, G., Axton, M., Baak, A., Blomberg, N., Boiten, J.-W., da Silva Santos, L. B., Bourne, P. E., Bouwman, J., Brookes, A. J., Clark, T., Crosas, M., Dillo, I., Dumon, O., Edmunds, S., Evelo, C. T., Finkers, R., ... Mons, B. (2016). The FAIR Guiding Principles for scientific data management and stewardship. *Scientific Data*, 3(1), 160018. doi:10.1038/data.2016.18 PMID:26978244

KEY TERMS AND DEFINITIONS

ANR: French funding agency of research projects.

Article Processing Charge (APC): A publisher's fee paid by an author (or their lab or grant) that is used to support the process of publishing a journal article. The result is usually gold (immediate) open access to the research output.

CNRS: National Center for Scientific Research (France).

Data Management Plan (DMP): It is a synthetic document that aims to help in the management of a research project data by describing all the steps of the construction of the data.

Data Paper: A scientific article that describes and freely shares the datasets produced by the authors.

DOI: Perennial and unique identifier that allows to reference, cite, and provide a stable link to the online publication.

Embargo: Some publishers reserve a period of exclusive distribution. The European Union recommends a maximum embargo of 6 months and 12 months for the SSH.

FAIR Principles: Best practice principles to enable academic open data to be Findable, Accessible, Interoperable, Reusable.

Horizon Europe: New Framework Programme from the European Commission. It will run from 2021-2027.

Hybrid Journals: Journals that require a subscription but in which the author can choose to publish an article in open access for a fee.

Licences: The licenses specify the rights of distribution and reuse of publications and data. - On the commonly used international licenses (excluding software source codes): Open Source Initiative: <https://opensource.org/licenses>; Creative Commons licenses: <https://creativecommons.org/choose/?lang=en>.

Predatory Publishers: Publishers who charge authors for an open access publication but offer no expertise (no scientific committee, poor or non-existent review process).

ENDNOTES

¹ “Transformative agreement” is an umbrella term describing those agreements negotiated between institutions (libraries, national and regional consortia) and publishers in which former subscription expenditures are repurposed to support Open Access publishing, thus transforming the business model underlying scholarly journal publishing, gradually and definitively shifting from one based on toll access (subscription) to one in which publishers are remunerated a fair price for their Open Access publishing services....These agreements are a significant departure from the previous standard in subscription license agreements, as they bring the two transactional sides of subscrip-

From Open Access Publishing to Open Science

based journals, reading access (subscription fees paid by libraries) and Open Access publishing (“hybrid” APCs predominantly paid by authors), under one centrally negotiated agreement” (*ESAC Initiative*).

2 Launched in 2012 at the annual meeting of the *American Society for Cell Biology* in San Francisco, DORA has been signed so far by more than 20 000 Institutions and Universities.

3 “It should be emphasized that the basic purpose of the project is not to take a statistical inventory of scientific production. That is, indeed, an important byproduct of the work. The main objective, however, is to develop an information system which is economical and which contributes significantly to the process of information discovery – that is, the correlation of scientific observations not obvious to the searcher. Citation Indexes can provide new insights impossible through descriptor-oriented systems.” (Garfield, 1963)

4 Science Europe is an association of scientific organizations, based in Brussels, which also contributed to the coordination of the Open Science plan.

5 Funder cOAlition S from about 15 European countries.

6 Declaration of the three French learned societies for Mathematics. *Open Access: a warning on the inherent flaws of the « author pays ».*

7 EOOSC is a ‘federated ecosystem of research data infrastructures’ to share and process publicly funded research results and data across borders and scientific domains.

8 3 mai 2016, Art. L. 533-4.-I.

9 Ministère de la culture et Ministère de l’enseignement supérieur, de la recherche et de l’innovation.

10 “With a budget of €16.4 million for the period 2017-2021, the publishing support plan includes the multi-year consolidation of journal purchasing policies, coordinated at the national level (€13 million), and subsidies for the platforms that distribute them (€2.45 million). It also includes studies on journals and distribution platforms (€0.26 million), as well as support for translation (€0.7 million). The journal order pools took effect in 2017, while the modalities for expanding Open Access were only put in place at the end of 2017 for EDPScience, from 2018 for Open Edition, and only in January 2019 for Cairn.” (Renoult D. (Comité de suivi pour l’édition scientifique), 2019).
11 represents several hundred higher education and research French institutions.

12 The multidisciplinary national open archive HAL is intended for the deposit and the diffusion of scientific articles of research level, published or not, and theses, emanating from French or foreign teaching and research establishments, from public or private laboratories.

13 “Our goal: 100% of publications in Open Access” (Alain Schuhl, 2019, deputy director general for science at CNRS); “CNRS: an ambitious plan for accessible and reusable data” (A. Schuhl, 2020)

14 The CNRS signed DORA in 2018.

15 The final report will be published in 2022.

16 This price includes the salaries of the researchers and evaluators paid by the public service.

17 Curious as it may seem, some libraries could not make a free journal available to their readers without a subscription invoice for that journal.

18 Pierre-Olivier Chasset, Hadrien Commenges, Clémentine Cottineau, Juste Raimbault

19 General President and Director of the CNRS in France.

20 Re3data is a global registry that indexes all research data repositories.

21 The term FAIR was launched at a Lorentz workshop in 2014, the resulting FAIR principles were published in 2016.

