12 Open Research: Past, Present, and Future

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Open Research is essentially free, online, digital information. Open Access (OA) allows for the free and legitimate reuse of scientific results by abolishing financial and legal restrictions. OA documents can be downloaded, copied, shared, and printed with citation of the original source. The origins of the Open Access movement can be traced back to Paul Ginsparg, who installed the arXiv server at the Los Alamos National Laboratory (LAN-L), making manuscript preprints related to physics research freely available.

The enhancement of visibility and impact of scientific publications is probably the most significant benefit of Open Access publishing. Visibility refers to the likelihood with which the document can be found, relating to the extent of its reach. The results of this extended reach are the enhanced discernibility of research by other scientists and the incorporation of our results into scientific communication. This visibility of results also contributes to the global awareness related to the authors and their institutions. Open Access facilitates easier access to manuscripts over the Internet. Global availability leads to the more robust use that could increase the number of citations. Several studies confirmed that some Open Access publications may reach up to three times higher citation counts, depending on the field of research, and they will be cited much earlier. Open Access can also aid in giving precedence to authors by preprinting. While publications may be rejected by a journal, the publication of the manuscript in preprint form provides guarantees, for example, in a dispute regarding the order of materials published or a patent.

Digital documents are available directly and at any time, they are easily stored, copied, forwarded and printed, thus, they can be the basis of new scientific achievements. They are not subject to restrictions of length (unlike for articles published under the classical publishing platform), with the additional opportunity to refer to other materials (e.g., audio and video content, supplementary documents, raw data files, software) that serve the documentation, illustration, and credibility of the results. The publication speed of digital documents is also significantly faster, since in Open Access publications, managing editors usually set a short deadline for publishing an accepted manuscript. Digital documents facilitate joint work and enable web-based collaboration in producing research reports.

Open Access supports the supply of information from a technical perspective—since the opportunity for direct access means that data procurement and related time loss is not an issue anymore—on the other hand, with the increasing number of openly accessible documents, the acquisition of information is simpler, faster and more authentic. Long-term archiving of documents on servers is guaranteed, which is not always the case when sharing research data on personal or institutional websites. The permanent availability of texts is assured by identifiers (such as the Digital Object Identifier system), whose accuracy is independent of the actual storage location of the document.

Since the 'Serials Crisis', there are fewer journals available in university libraries due to the high subscription costs. As a result, libraries are forced to cancel their long-standing subscriptions. For example, the costs of some journals in medicine, science and technology have quadrupled over the past twelve years, while the budget of libraries has remained practically unchanged. Open Access publishing may offer a solution to the resulting lack of information. The results of publicly funded research are freely available to the public to access, and there is no need for the scientific institutions (e.g., universities, National Academies of Sciences) to buy or repurchase them from the journal publishers. Criticism is often heard that the public must fund research three times: scholars paid from public funds perform research and publish, their results are evaluated by scholars in the peer review process, who are also get paid by the public sector, and institutions need to buy from publishers to close this scientific 'communication circle'.

Interconnecting scientific information sources fosters the internationalization of science, and Open Access has a key role in this process. The globally free access to OA content enables less fortunate countries to access relevant and up-to-date scientific information for research purposes, but also for their everyday lives. The Open Access movement helps to overcome the 'digital divide' and contributes to all countries having access to research results in the world's scientific community. Texts written in the national languages continue to play a leading role in the field of humanities and social sciences. However, if a foreign language text is available online for free, there is a growing chance that someone will notice it, even if it doesn't have an abstract in English. The simultaneous international presence of scientific documents leads to an increased chance of collaboration between scientists and accelerates the process of research itself, as authors can receive instant feedback from their respective peers. Open Access also promotes interdisciplinary cooperation, since it allows for scientist to notice current information coming from other areas that they may not encountered in articles published under the classical publishing platform. In an increasingly

complex world, with multi-layered questions in science or otherwise, Open Access publishing gives the ideal framework for joint solutions to hard-to-answer research questions and problems.