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INSIGHT

Public Access to Scientific Publications Resulting from Federally Funded R&D

November 16, 2022

The federal government invests approximately $160 billion each year in research and development (R&D) to address a broad range of national interests from advancing public health and protecting the environment to strengthening U.S. competitiveness. The dissemination of data and results from R&D activities through scientific publications is often considered to play a critical role in the production of innovative products and services.

According to the Office of Science and Technology Policy (OSTP), U.S. researchers contributed approximately 464,000 of the 2.9 million peer-reviewed scientific articles published in science and engineering journals worldwide in 2020, representing about 16% of total output. OSTP estimates that between 195,000 and 263,000 of these articles were the result of federally funded R&D. According to the International Association of Scientific, Technical, and Medical Publishers, the global scholarly publishing market contracted slightly in 2020 to $26.5 billion due to the coronavirus pandemic, and is expected to return to its pre-pandemic value of $28.0 billion by 2023. The U.S. publishers' share of global market revenue is 40%.

A number of groups, including nonprofit organizations and research libraries, have advocated for increased "open," or public, access to scientific publications and data resulting from federally funded R&D. The potential benefits of such access include increased transparency and rigor in the conduct of science; broader and more inclusive dissemination of scientific knowledge; more rapid innovation; and the creation of new products and services for public benefit. Potential challenges include the economic consequences for commercial and nonprofit scholarly publishers and the shifting of publishing costs from journal subscribers to researchers and the federal agencies that fund them.

In 2013, OSTP directed federal agencies with annual R&D expenditures over $100 million to develop and implement plans to support increased public access to the results of federally funded R&D. The OSTP memorandum required, among other things, the use of a 12-month post-publication embargo period before making scientific publications publicly available. Currently, more than 20 federal agencies have public access plans.

While there is general support for ensuring that unclassified basic and applied R&D is widely available for use by the public, the scientific community, and industry, the 12-month embargo period has been an

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IN12049

area of contention. Critics of the embargo period argue that it requires American taxpayers to pay twice—once to fund the conduct of research and then again to view the results, which are often behind scientific journal subscription paywalls. Some commercial and nonprofit scientific society publishers argue, however, that the embargo period is critical to ensure the generation of subscription revenues that support editing and production costs. They also argue that immediate public access would "effectively nationalize the valuable American intellectual property that we produce [i.e., copyrighted journal articles] and force us to give it away to the rest of the world for free."

In 2020, national governments, the scientific community, publishers, and nonprofit organizations came together to provide immediate access to the results of Coronavirus Disease 2019 (COVID-19) R&D to aid in the global response to the pandemic. Free and immediate access to scientific results, publications, and data is considered central to the rapid development of COVID-19 vaccines, treatments, and testing.

Citing, in part, the benefits of immediate public access to COVID-19 research, in August 2022, OSTP issued a memorandum that directs all federal agencies to develop a new, or update an existing, public access plan with new requirements. First, the memorandum requires scientific publications resulting from federally funded R&D to be publicly accessible immediately upon publication without an embargo or delay. The memorandum also requires that scientific data underlying such publications be made freely available and publicly accessible at the time of publication. In addition, the memorandum directs federal agencies to develop approaches and timelines for sharing federally funded scientific data not associated with publicly accessible scientific publications. Federal agency public access plans must be implemented by December 31, 2025.

Some Members of Congress and others, however, have questioned how the policy will be implemented and its potential impacts, including possible publishing cost increases that may be shifted to authors (i.e., researchers) and the federal agencies that fund them. Shifting publishing costs to researchers may create equity concerns in which an early-career scientist or a scientist from a less well-resourced institution may not be able to afford the cost of publishing or may be forced to choose between publishing and other professional development opportunities. Barriers to publishing could also affect tenure or promotion decisions. Questions have also been raised about the adequacy of the current infrastructure for providing public access to scientific data and the need for new federal funds to create and maintain data repositories. OSTP estimates the total cost to American taxpayers of public access at between $390 million and $789 million annually. It is important to note, however, that there is limited data on the exact amount of per-article publication costs and revenues as publishers consider such information proprietary.

Some in the scientific community have questioned the potential impacts of an immediate public access policy on the quality of scientific publications, suggesting that mandated *open access* business models based on author publication fees may create an incentive for publishers to increase the number of papers they accept regardless of their quality.

OSTP contends

> While ... such social costs might expand under a zero-embargo policy, considerable offsets—including the availability of more research available through public access at no cost, a greater number of grant and workforce development programs aimed at reducing inequalities in research, and the ability to charge publication costs to grants, awards, and contracts—would counteract their effect. OSTP expects that a change toward a zero-embargo public access policy would accelerate these incentives and further alleviate the concerns about social costs of such a change. On balance, OSTP estimates that the potential financial and social gains realized from increased access to federally funded research ... greatly outweigh the potential costs.

Congress may conduct oversight on implementation of the new public access policy and its potential impacts on cost, the scientific and engineering workforce, and the publishing industry.

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