

Rise of the platforms

Journals are evolving into information platforms. This development provides a key to understanding recent trends in science publishing, and raises important questions about its future.

As much as it is a cliché to say that the volume of academic papers grows exponentially, it is nevertheless sobering to recall that this statement is, in fact, an empirical fact. A notion first popularized by the physicist turned scientometrician Derek de Solla Price¹, the inexorable expansion of the scientific literature has continued to accelerate into the twenty-first century. Indeed, the deluge of scholarly data now available digitally is such that the study of the practice of science itself, particularly the dynamics underpinning the process of scientific discovery and collaboration, has emerged as a quantitative discipline in its own right².

This explosion of information has resulted in a concomitant boom in the number of available journals and the financial success of their publishers. This is not how it was meant to be — at least not according to the early pioneers of the Internet. As Michael Clarke memorably put it nearly a decade ago³: when Tim Berners-Lee created the Web in 1991, it was with the aim of facilitating scientific communication and the dissemination of scientific research. The extent to which the Web hasn't disrupted the scientific publishing industry (while, at the same time, dramatically reshaping nearly all other retail services) is therefore surprising.

In the context of academia, the issue of knowledge dissemination is framed in terms of a transition to open access (OA) publishing — a catch-all term that, broadly, reflects the ideals of a free and inclusive Internet as originally envisaged by Berners-Lee, including the removal of all barriers of access to publicly funded research. Real changes have come about in this regard, and it is fair to say that OA publishing is now part of the institutional fabric of science: prominent initiatives such as Plan S are spearheaded by the most influential funding agencies in the world, and endorsed at the highest levels of policy making.

Nevertheless, a sense of frustration permeates the scientific community: many feel that journals are a relic of the past, running an unaccountable peer-review system that has an outsized influence on the careers of researchers. Moreover, after

years of above-inflation price increases and high profits, the economic sustainability of the subscription-based model of journals is increasingly being questioned. These concerns are entirely legitimate. All too often, however, they are conflated, giving rise to what we might call OA solutionism: the idea that given the right technologies and institutional mandates, all of scientists' problems can be solved by OA.

A more powerful framework for grappling with these issues emerges when thinking in terms of platforms. These are tricky to define — essentially, a platform is a networked business model that brings together different groups of users that can both create and consume value — but they are easy to identify. Facebook and Google connect advertisers, businesses and everyday users. Uber connects riders and drivers. And the online platforms of major journals connect scientists that may variously act as authors, readers and reviewers.

Data are the basic resource that drives the platform economy, so platforms are optimized for extracting and using these data by providing the infrastructure and intermediation between the different groups that they serve. It is only recently that the profound nature of this shift has become appreciated⁴; it suffices to say that the wider implications for the manner in which economic, political and cultural power is accumulated and wielded by technology firms are seismic⁵. An interesting upshot of this development, however, is that organizations outside the technology sector are also adopting platform elements. And in this regard, scientific publishers have perhaps been more adept at navigating change than they have been given credit for.

This is not to say scientific publishing isn't ripe for disruption. But by breaking down the services provided by journals viewed as platforms, it becomes easier to see how. Traditional functions such as the dissemination and registration of scientific knowledge have already been disrupted by a platform physicists set up over a quarter of a century ago: arXiv, the preprint server that has now been replicated in most other academic disciplines.

The validation and filtration of scientific knowledge, which principally occur through the process of peer review, have proven more difficult to replicate. But even here, the leaves are stirring. In physics, platforms such as quantum (<https://quantum-journal.org/>), researchers.one (<https://www.researchers.one/>) and, perhaps most impressively, SciPost (<https://scipost.org/>) are experimenting with innovative approaches such as transparent peer review, user comments and even doing away with the concept of accepting or rejecting papers entirely. Their editorial and business models also differ, but are predicated on the idea of being controlled by fellow scientists, open access and not for profit. Whether or not these services can, to use the parlance of tech, be made to scale under these conditions is an open question. But there is no doubt they are gaining traction.

There is much more to be said about a final service provided by journals, which is that of designation. The relentless focus on scientists' publication record in career advancement decisions has led to the unintended consequence that, in effect, academics have outsourced the allocation of resources such as jobs and funding to journals. This development requires a much more honest debate, one that doesn't project scientists' own frustrations onto the related, but distinct problem of creating a sustainable publishing ecosystem.

Ultimately, the question we are grappling with is: what is the purpose of a journal today? It is easy to come up with a glib answer. Recognizing that journals are changing into information platforms providing a range of services to different constituencies is likely to provide greater insights into their future evolution. □

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