

# A Publisher, a Citation Index, and an Unequal Global Research Economy

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## Abstract

The roots of today's unequal global science communication system trace back to the aftermath of World War II. US government funding for basic research generated a flood of scientific papers, opening up opportunities for commercial publishers. New information management tools were created, including the first scientific citation index. Commercial publishing infrastructures became a foundation for the globalization of higher education and research. A more equitable future depends on a different model of ownership and control.

Today most science communication is mediated by the data and publishing infrastructures owned by commercial publishers and data analytics companies. Why is this a problem for the world's universities? Because government and research funding pays for journal subscriptions, data services, and author processing charges, and these costs continue to increase. To understand the role that universities have played in shaping this system, one has to return to the entrepreneurial ambitions of Robert Maxwell and Eugene Garfield. Both set up companies in the early 1950s that reshaped academic publishing and the global circulation of scientific knowledge. Despite being bitter business rivals, their fortunes were intertwined.

The end of World War II saw a massive increase in government funding for research. Maxwell, a wartime refugee from Czechoslovakia, fought for the British Army, and then was employed as a military intelligence officer in Berlin. Making the most of his business savvy, he helped the German publishing house Springer relaunch, shipping a consignment of journals to Britain under cover. In 1951, he bought the UK distribution rights for six science journals and two textbook series, marking the launch of Pergamon Press. Within a decade, Pergamon was distributing 59 scientific journals and rapidly expanding. Seeking out high-profile scientists and gaining their trust, Maxwell helped them launch prestigious journals in emerging scientific fields. Doubling the company in size every few years, Maxwell realized just how profitable scientific publishing could be, and that there were seemingly no limits to the possibilities for expansion. While some were skeptical about the commercialization of publishing, Maxwell's academic editors made the most of the editorial freedom and technical efficiency Pergamon promised, speeding up publication cycles, attracting ever more submissions and subscriptions. They were wooed with generous editorial fees, extravagant parties, and travel allowances. In return, these editors remained loyal to Maxwell, and helped ensure his return to Pergamon five years after he lost control in a takeover battle. While Maxwell's reputation was later trounced by his fraudulent use of the Mirror newspaper pension funds, Pergamon forever rewrote the rules of scientific publishing, making it a globally profitable business.

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## What Difference Does an Index Make?

This rapid expansion of scientific knowledge production, partly driven by the commercial ambitions of Pergamon and Elsevier, created a new problem: managing the concomitant increase in information flow. Eugene Garfield, self-styled "information scientist," came up with influential solutions. His first solution was called *Current Contents*, a subscription service based on photocopying and collating journal contents' pages, helping people keep up with the latest research in their field. Its commercial success led him to establish his "Institute for Scientific Information" (ISI). With the help of United States Air Force funding, in 1963 he launched the first Science Citation Index (SCI), a database of all the citations from 560 of what he defined as the most important "core" scientific journals. 70 percent of these journals were published in the United States or United Kingdom, and nearly all the rest were from Europe. It was a US-centric view of global science publishing, dominated by the commercial publishers and their subscription income. Only 7 percent of the indexed journals were published in Germany, despite its prewar scientific dominance. No African journals were indexed, and only two from China. The index grew rapidly. By 1968 it covered 2000 journals, a number that doubled

again by 1979, but the academic geography of a Euro-American publishing economy remained hard-wired into the index.

The index began to define “reputable” academic knowledge. Inclusion mattered, and commercial publishers were best placed to meet the technical thresholds and pay the requisite subscription fees. Like Maxwell, Garfield was skillful at public relations and marketing, promoting sales of SCI and other ISI services across the world, including in the Soviet Union. Attempts to question the index’s coverage, such as statistical evidence of SCI’s discrimination against “Third-World” journals, led to strong ripostes by Garfield.

As Robert Merton predicted, the index’s measures became targets. Universities, academics and publishers began to use the index to compete. Citation data allowed users to rank researchers on their citations and journals on their “impact factor.” Garfield had created the tools for academic game-playing and institutional performativity.

For many years the index was subsidized by income from *Current Contents*. One obituarist described Garfield, who died in 2017, as “visionary” rather than “book-keeper.” With digitization its full commercial potential was realized. The first global university rankings in the early 2000s used SCI citation data to assess academics. Increasingly journal meta-data (such as citations) are a key source of revenue for companies such as Elsevier, which set up a rival index (Scopus) in 2004. In 2011, Thompson sold Garfield’s original business for USD 3.5 billion to Clarivate.

### What Does the Future Hold?

70 years since Maxwell founded Pergamon, academic journal publishing has been transformed into a profitable global industry. Increasingly, data analytics are more profitable than journal publishing. Today, scholarly reputation and status is measured by journal rankings, “impact factors” and “h-indexes.” The power of the citation indexes has been amplified by digitization and financial investment, inevitably prioritizing Euro-American academic networks and commercial interests.

Despite calls to decolonize open access and promote what independent publishers call bibliodiversity, the two commercial citation indexes cast a long shadow across academic publishing in the Global South. Non-Anglophone and regional journals are rendered invisible by exclusion from these citation indexes, reinforcing the stratification of academic geographies, and undermining long-established regional knowledge ecosystems. Unindexed journals face constant questions about their legitimacy across most of the non-Anglophone world.

European advocates of “diamond” open access envision a more equitable global research system built on community-owned publishing infrastructures and technical standards. Yet a “diamond” open access publishing model that is free to author and reader needs significant investment and in-kind support. If this vision is to travel beyond well-resourced European universities, governments and higher education systems across the globe will need to fund the necessary research infrastructures. There is a lot to do to unmake the world created by Maxwell and Garfield. ▲

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