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ABSTRACT

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EMERGING RESPONSES TO THE SCIENCE JOURNAL CRISIS

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Abstract

The continuing problem of the high cost of accessing scientific, technical and medical (STM) literature haunts both developed and developing economies. Maintaining access to significant research and scholarship at a time when both the volume and price of information have increased nearly three-fold in the last decade requires fresh strategies and new creative efforts.

This paper comments on the array of coping mechanisms adopted by US libraries including canceling lesser used titles, moving from ownership to access, resource sharing, and consortial purchasing. The paper will then look at the recently developed strategic responses aimed at addressing some of the root causes of the STM crisis: an imperfect marketplace, growing presence of commercial publishers, consolidation of STM publishers, and proliferation of titles. As a result of this economic analysis and legislative developments, the Academic community needs to consider dramatically different strategies for responding to the crisis. Some of the emerging strategies are noted in the paper.

Paper

Context:

Librarians are acutely aware of the dynamics in the market for academic journals. ARL has reported that between 1986 and 1997, the cost of scholarly journals increased an extraordinary

169%.[1] Over that same period, the cost of monographs increased by 64 percent. These dramatic increases do not have parallels elsewhere in the academy or the economy generally. For example, the consumer price index increased 46 percent during this same period. Even the price of health care increased by only 84%. The increase in the cost of journals is more than three times the rate of inflation and nearly twice the rate of growth in health care costs. These price trends for publications combine with the continuing growth in new knowledge and the creation of new formats for information that require investments added investments. The Washington Post recently described this as a vast uncharted ocean of information with 50,000 books published every year in America and over 400,000 journals published annually around the world[2].

It is apparent that the problem cost and availability is most acute among the science journals. Here the title costs range in the $5,000 to $20,000 annually. With limited use, there is an often an unjustifiable high cost per use. These items absorb a large share of total acquisitions and pressure other interests and needs within the academy.

The ARL studies the changing characteristics of library collections are complemented by a variety of supporting price studies. Recently, for example, a Cornell Faculty Taskforce completed a study on journal prices in agriculture and life sciences[3]. The purpose of the study was to investigate changes in journal prices, comparing 1988 prices with prices in 1994. This study revealed that commercial publishers had a much higher rate of increase over the period studied than the societies and association publishers. Furthermore, the most costly titles were the ones published by commercial publishers. Kraig Adler, Chair of the Faculty Taskforce on Journal Price Study and the Cornell Vice Provost for Life Sciences, is "...so alarmed that he is encouraging scientists not to submit articles to the most highly priced journals."[4]

This explosion in the cost and the quantity of science journals, however, is familiar territory; the phenomenon has been described and analyzed in conference after conference, report after report. Many in the academy have grown tired of the complaints and the numbers. Increasingly, there is a sense that the academy must do more than complain and blame. It is the time for careful thought and tough-minded strategic responses. These strategic responses must be based on a sound understanding of the causal factors contributing to the crisis.

Causes:

The central cause of the science pricing crisis is the imperfect marketplace that characterizes STM publishing. The imperfect marketplace is exploited by commercial publishers who have learned that if they control the supply they can dictate prices. The faculty, on the other hand, often view the work of research and scholarship as essentially a free good. And the act of publication constitutes what many have termed "gift exchange" among a community of devotees bound by a common interest; the giving of such gifts is intended to win the regard of other members of the community.

Yet increasingly, the intellectual property that is both an essential ingredient in the discovery process and an important outcome of research and scholarship is under the control of commercial publishers. This has happened because of a variety of factors including the complexity and difficulty associated with STM publishing as well as the skill of commercial publishers in wooing faculty with convenient publications, timely distribution, and credibility.

However, the operation of this gift exchange society creates an environment where the creators of knowledge experience none of the direct consequences of market failure. These contributors to a knowledge base who are faculty of universities or colleges expect their institution to provide the current information that makes possible their own engagement in a field. But universities having made an initial outlay in the form of salaries and infrastructure to support faculty research are then forced to pay exorbitant prices for the editing, production, and distribution functions that commercial publishers perform. With the growth in quantity and costs of new knowledge the university is finding it impossible to maintain a level of support deemed necessary. While members of the faculty regard publication as an exchange of free goods, the handful of publishers who are gaining control of intellectual property see opportunity for enlarged profits.[5]

In 1988, ARL contracted with the Economic Consulting Services (ECS) to conduct a serials prices study. ECS conducted an analysis of trends in average subscription prices and publication costs over time. They looked at four major publishing firms and proved the hypothesis that after adjustment for fluctuations in exchange rates, subscription prices paid by US libraries have risen at a rate greater than inflation in publishing costs, with the gap accruing to the publishers as incremental profit.[6]

In 1997, a twenty-year study of scientific journals by Tenopir and King[7] came to a similar conclusion and attributed an unknown but significant proportion of price increases to the pricing practices of commercial publishers. Studies within individual disciplines have time and again demonstrated higher costs per character and per page of some commercially published journals when compared to journal titles published by societies or other non-profit groups.

Most recently, Mark McCabe, a former economist with the U.S. Department of Justice (DOJ) reported the preliminary findings of the DOJ's work to develop a new model for understanding the competitive impact of publisher mergers on the academic journals market.[8] Librarians' outcry at the proposed Reed Elsevier/Wolters Kluwer merger encouraged the DOJ to look beyond its established criteria for evaluating publishing mergers and to explore whether other dynamics were operating that would permit mergers of relatively modest size to cause competitive harm and higher prices. Staff in over 50 ARL libraries provided DOJ with data on the holdings of over 3,000 journal titles for a ten-year period. These data, combined with that collected elsewhere by the DOJ, allowed McCabe and his colleagues to develop and test models by comparing projected effects with the actual effects of previous mergers and acquisitions. Based on this testing, McCabe outlined his new portfolio theory of journal pricing suggesting that publisher mergers of relatively modest size can cause competitive harm. While the Reed Elsevier/Wolters Kluwer deal was ultimately abandoned by the companies, several other publisher mergers have come before the DOJ. McCabe will continue his research for the DOJ, therefore, even as he takes on a new position as an assistant professor at the Georgia Institute of Technology[9].

McCabe's work helps us to understand the dynamics of the marketplace in scholarly journals publishing. It provides an economic model suggesting that commercial publishers are employing the business strategies of consolidation and proliferation of titles to gain control of narrow subject portfolios. These strategies allow them to use exploitive pricing practices. It may lead the DOJ to some future action that will protect the academic community from the anti-competitive practices of some publishers. Most importantly, it will replace some of our speculations with fact, allowing us to develop even more effective strategies for challenging the status quo.

Brendan Wyly, a librarian in the Johnson Graduate School of Management Library at Cornell University, uses publicly available data to analyze the financial health of four major publicly traded companies that have significant scholarly publishing operations.[10] Wyly describes the measures of profitability found in these companies' annual reports and concludes that the profits of some of the major commercial publishers of scholarly journals are, in a word, exceptional. He also concludes that these profits confirm a lack of competition in the marketplace. His response is to call for a new system of scholarly communication, created primarily by universities, that provides the kinds of innovations that will lure authors away from commercial publishers and end reliance on journal purchasing in a non-competitive market.

Many believe the exploitative pricing practices of a few large commercial companies operating in a near monopolistic market are the fundamental cause of high prices. Changing the patterns of unreasonable price increases will require addressing the economic and behavioral issues that allow this to happen.

Current responses from Libraries:

Library responses to this growing body of research about the extent and nature of price increases for scholarly journals have been multifaceted. National and international library conferences have drawn attention to the research findings and explored possible solutions. On the local level, librarians have combined campus experience with the literature published about the research to help inform faculty and students about the financial challenges and choices inherent in managing serial collections. Over time, this process of informing and educating research library users, boards, and funding agencies has contributed to a broadening circle of awareness about dysfunctions in this marketplace. With this awareness has emerged a sense among the academic community that the entire system of scholarly communication is in danger of collapsing unless there is concerted effort by and within the community to promote less expensive channels for publication, dissemination, and archiving of scholarly research.

Beyond communication and education, libraries have made a number of concrete changes in operations as a result of these price trends. Libraries have had no choice but to cancel significant numbers of journal subscriptions and to reduce monographic purchasing, dramatically changing their traditional collecting practices. Increasingly short-term access to a wide range of required information is the institutional response rather than the more traditional approach of securing ownership of required knowledge resources with long-term access available as needed.

Libraries have directed significant energy toward improving document delivery models and designing better performing and less expensive interlibrary loan systems. Cooperative collection development and resource sharing is routine and commonplace among state and regional groups of libraries with the promise of broader access to required information at a reasonable cost. Regional buying groups are being formed for the purpose of organizing library markets to lease to electronic information resources. Increasingly site licenses are providing immediate access to networked information resources on a temporary basis.

Some universities have informed specific publishers that the total spending on their journals is fixed by current spending, so that if they raise prices, subscriptions will be canceled so that pubishers' revenue from that institution remains fixed. This response assures faculty from other disciplines that the science journal budget will not consume an inappropriate proportion of the libraries acquisitions.

But, these responses seem to be short-term fixes of value largely to the local institution. The responses serve to inform and mobilize the staff, administrators and faculty but so far, they are not resulting in a moderation of the price trends experienced over the last several decades.

New strategic responses:

In December 1997, a group of academic leaders met at Johns Hopkins to think about strategic responses to the science journal pricing problem. Sponsored by the Association of Research Libraries and the Association of American Universities, it was convened by the Pew Higher Education Roundtable[11]. These discussions concluded that now was the time for action based on a tough-minded understanding of the market for academic publications and a readiness to seize the opportunities new information technology offer. These leaders put forward five broad strategies requiring collaboration and concerted action to address the science pricing crisis.

The first strategy advanced by the Pew Roundtable discussions is to find ways to separate the notions of quantity of publication from the quality of the publication in the tenure review and promotion processes within the academy. The concern here was that numbers of journal articles created by a faculty member may sometimes misrepresent successful intellectual productivity and contribute to the pressure to build and maintain large collections of resources that may be little used.

The second strategy is to promote the notion that Research Libraries should better define the market place and act as collective buyers of needed information products. The idea here is that more systematic purchasing on a local, regional, and national basis may provide savings and more influence in the market place. The third strategy is to redefine the way universities manage the intellectual property rights created as a result of the faculty working within the support structures of a the academy. The intent here is to gain faculty support for taking back some of the rights to the intellectual property demanded by commercial publishers.

The fourth strategy is to exploit electronic publishing on the web to provide the academy with the means of announcing and certifying new research results. The Pew roundtable explored levels of distribution on the web including announcements, pre-prints/drafts, and fully referred publications. At some later point in the publication process, print versions would become available. The fifth strategy was for higher education institutions and their faculty to redefine the process by which the scholarly community communicates advances in knowledge and to create an electronically mediated peer review process as a full complement to journal publication. This peer review process should be managed by the scholarly and scientific societies not by commercial publishers.

These several strategies as put forward by the Pew Roundtable are experiencing thoughtful responses from the community. For example, the library community is seriously considering the call to redefine acquisitions decision-making moving from comprehensive collecting to value-received based acquisitions systems.

Value-based acquisition systems are seen as a useful and distinct strategic response. In this approach utility of a title in relation to its price creates a ratio that helps determine whether the item should be purchased. Thus utility rather than other subjective criteria such as prestige or faculty preferences serve as the determinants for purchase. According to Louisiana State University Library's Stanley Wilder, regardless of what we may think about their price, commercial publications are of less value to faculty than society publications when measured against the revenue they generate. Wilder presents the specific case of chemistry where he finds that commercially produced journals account for 74% of the revenue generated by a core set of chemistry titles but contribute only between 22-35% of the value. The response? He calls for a change in philosophy of those academic librarians who currently pursue comprehensiveness in collecting scientific and technical journal literature. He recommends instead placing value at the heart of scientific and technical collecting and relegating lower value literature to more cost-effective document-on-demand acquisition[12].

The Scholarly Publishing and Academic Resources Coalition (SPARC) was formed by ARL to create another strategy among many for addressing the complex issues involved in the current scholarly publishing system. SPARC is an alliance of libraries that fosters expanded competition in scholarly communication. Launched with support from membership of the ARL, SPARC creates "partnerships" with publishers who are developing high-quality , economical alternatives to existing high-price publications. By partnering with publishers, SPARC aims to: create a more competitive marketplace where the cost of journal acquisition and use is reduced, and publishers who are responsive to customer needs are rewarded; ensure fair use of electronic resources, while strengthening the proprietary rights and privileges of authors; help apply technology to improve the process of scholarly communication and to reduce the costs of production and distribution. SPARC is influencing the marketplace positively by encouraging publishers to enter markets where the prices are highest and competition is needed most - primarily in the science, technical, and medical areas. Through it activities, SPARC reduces the risk to publisher-partners of entering the marketplace while providing faculty with prestigious and responsive alternatives to current publishing vehicles.

To accomplish this, SPARC: solicits and encourages the introduction of new publications of high quality and fair price; guarantees a subscription base and markets new products to potential subscribers privileges start-up capital; and generates support for SPARC projects from distinguished faculty, educational organizations, professional societies, and scholarly publishers. To date three partnerships have been established and more are planned[13].

As a second set of activities, SPARC plans to award grants that stimulate and accelerate creation of new university-based "scientific information communities" serving users in key fields of science, technology or medicine ("STM") (i.e., "discipline-based server model").

In this initiative, SPARC will enable projects that:

- offer a promising strategic response to addressing and overcoming Inefficiencies and inequities in the current, traditional scholarly Communication process, and
- Warrant our support because of solid potential to transform the STM Information market, particularly as applies to the dissemination of research, to the benefit of science, academe and society at large.

The University of Kansas Provost David E. Shulenburger advances another strategic response to the science journal-pricing crisis. He proposes to solve the journal crisis by creating the National Electronic Article Repository (NEAR), a centralized, public-domain server that would manage the intellectual property rights associated with faculty publications. He argues that when a manuscript is prepared by a faulty member and is accepted for publication by a scholarly journal, a portion of the copyright of that manuscript be retained for inclusion in a single, publicly accessible repository after a lag following publication in the journal. At present, essentially all scholarly journals require that all rights to copyright pass from the author to the journal when a manuscript is accepted for publication. In this proposal, only the exclusive right to journal publication of the manuscript would pass to the journal. The author would retain the right to have the manuscript included in the NEAR ninety days after it appears in the journal[14].

Shulenburger argues that by requiring authors' works to be submitted to NEAR within 90 days of publication, publishers would be forced to reassess the value they add and reduce prices accordingly. Shulenburger noted that he "no longer believes that solutions that fail to deal with ultimate ownership of scholarly communication, i.e., copyright, are viable." He notes that scholarly articles have market value, as demonstrated by the pricing practices and extraordinary profitability of commercial publishers. He is concerned that non-profit scholarly societies also recognize this market value and, judging by data collected at Kansas, have begun to exploit it, as well. Shulenburger believes that limiting the rights that faculty authors can transfer to publishers (which would be required for the establishment of NEAR) limits the ability of publishers to control and exploit all possible value from journal articles.

Yet another academic leader, Charles E. Phelps, Provost of the University of Rochester has offered ideas. He notes that the most important step in achieving effective competition for existing journals is to create an alternative mechanism to provide the refereeing/certification process now provided uniquely by the editorial boards of print journals. He observes that digital technologies allow the complete separation of the certification process from the other publication processes (reproduction, distribution, indexing, archiving, etc.)

Phelps proposes taking advantage of these new electronic capabilities to separate functions currently performed by the system of journal publication. He believes that by paying scholarly societies to conduct peer evaluation of manuscripts, functions such as publication and dissemination can be left to other entities, e.g., discipline- or university-based servers. This separation, or "decoupling," of functions breaks the link between the peer review process, which is essential to the academic enterprise, and the publication of a work, a link that is exploited by many publishers, as evidenced in their pricing practices. He characterizes the issue as "not whether the journals provide valuable services, they do without question, but rather whether the terms of trade are appropriate." Phelps suggests several steps that the university community should take: bringing faculty more closely into the collection decision mechanisms; creating criteria for libraries that reward access and consortial activity; evaluating faculty scholarship on the basis of quality, not quantity; and modifying the usual practice of total assignment of property rights. But he concludes that "the issues of journal pricing can only be resolved by systematic and widespread introduction of vigorous competition into the world of publishing...." Phelps believes that it is up to universities to introduce this competition and sees the decoupling proposal as one possible alternative[15].

Conclusion

The studies cited in this paper illustrate the issues librarians and researchers face in efforts to efficiently disseminate information; specifically through scholarly journals. In exploring the rising cost of journals from a variety of vantagepoints, each study similarly concluded that exploitive pricing practices do exist among commercial publishers and that it has had a monopolizing effect on the academic journal market altogether. The Economic Consulting Service reported in 1989 that increased costs of production and the growing size of journal titles do not fully justify the increase in prices charged by major commercial publishers. The twenty-year study conducted by Tenopir and King in 1997 attributed price increases to the pricing practices of commercial publishers. Mark McCabe reported in 1998 that the DOJ's work to develop a new model for understanding the competitive impact of publisher mergers on the academic journals market concluded that publisher mergers, even those modest in size, can cause competitive harm, allowing commercial publishers to use exploitive pricing practices.

The fundamental issues causing the science journal pricing problems can only be addressed by systematic and widespread introduction of vigorous competition into the world of STM publishing. These responses demonstrate that ibraries and researchers are increasingly exploring alternative strategies that would do this. Some key strategies being implemented to promote competition in the scholarly journal market include: the Pew Roundtable Recommendations; value-based acquisition systems; the Scholarly Publishing & Academic Resources Coalition; the National Electronic Article Repository; and the "decoupling" of functions between the peer review process and the publication of a work. Libraries, scholars, and publishers are working together to increase competition and bring prices down within the scholarly journals market.

Endnotes:

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15. ARL: A Bimonthly Newsletter of the Association of Research Libraries Issue 202 (p. 5), February 1999

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