

How Electronic Publishing Changes the Production and Distribution of Scholarly Journals?

by

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Abstract:

Information technology has had a great effect on the flow of scholarly communication, the research community and scholarly publishing. It is now practically universally accepted that scholarly journals will have to be available in digital formats. What is not settled is whether they can be much less expensive than print journals. Most traditional print publishers still claim, just as they have claimed for years, that switching to an electronic format can save at most 30 percent of the costs, namely the expenses of printing and mailing. In this paper first we talk about evolution of scholarly publishing and economics of electronic journals. Then, we will discuss how electronic publishing changes the production and distribution of scholarly journals.

Key Words: Electronic publishing, Scholarly Journals, Journals costs

Background

We are in a period of important debate about the character of scholarly publishing systems. It can be said that the verb “publish” has special meaning in the scientific community. Scientific research is paid for by the public, private industry or donors; the results, essential to the advancement of knowledge and the investigators’ careers, are reviewed by peers and shared with the larger scientific community primarily through their publication as articles in journals. Once published (the copyrights having been signed over by the authors), journal articles become a commodity that can be sold by publishers to a nearly captive market: university libraries. In recent years this market has experienced, ironically, both a proliferation of product and a dramatic spiraling of prices—the prolonged “crisis” during which libraries have canceled subscriptions and forgone book purchases to pay for the most essential journals. In a world brimming with new knowledge and new ways to find it, there have appeared pockets of information poverty and local hardship [1].

On the Web, publishers are now beginning to charge for access to journal articles on-line through subscriptions, site licenses and “pay-per-view” plans. These toll-gate approaches are an extension of the current economic structure of scientific publishing and are being developed largely (though not exclusively) by the organizations that benefit most from that economic structure. Many of those who do the research and write the articles do not share these economic interests, nor do many of the disciplinary societies to which they belong. Those who pay for and do the research generally do not want the published results to become a commodity resold at high cost.

The Evolution of Scholarly Publishing

In 1665, the Royal Society of London published the first issue of the first scholarly journal. The journal’s purpose was to disseminate the results of members’ research, allowing scientists to reach a wider audience than they would by exchanging private letters. Journals soon became a means of establishing priority for new discoveries, were accepted as the permanent record of research and were archived by libraries. Peer review of all or most articles was instituted as a means of screening and improving what was published. Citations to earlier articles provided a way to weave previous research into the fabric of the new [1].

For nearly 300 years, the numbers of journals grew steadily, mostly as investigators founded new societies to promote new or newly important scientific disciplines. These societies helped members publish their research results by sponsoring one or more journals. Until the 1960s, most societies recovered publication costs largely from members’ dues, which included a journal subscription. The number of articles published by each author was relatively small, and many members did not publish at all. Library subscriptions were not a major source of income for publishers. Although scientific societies published most science journals, some were published by other nonprofit institutions such as universities, museums and governments. Commercial publishers were generally not attracted to the field because there was little potential for profit.

The increasing number of researcher and Ph.D.’s awarded led to competition for publication after 1960s. After all, an important indicator of research success is the number of papers

published, and investigators seeking jobs, grants, tenure and promotion wanted to improve their chances in an increasingly competitive environment.

Societies soon faced the problem of having to reject good manuscripts and to delay publication of accepted manuscripts because their journals and their ability to subsidize members' publication were at capacity. Granting agencies faced the dilemma of paying for research that could not be published in a timely fashion or at all.

There has been an economic crisis in scholarly publishing since the late 1980's due to the costs of scientific journals rising much faster than both inflation and the growth of library budgets [2, 3, 4]. During the 1990s, some academic research libraries have unsubscribed to numerous journals, sometimes numbering in the thousands – across many disciplines. Many scholars suspected that the costs of publishing electronic journals would be substantially lower than the costs of publishing paper journals. Further, some have argued that electronic publishing would enable not-for-profit organizations, such as universities, to assume the responsibilities of publishing a substantial fraction of the corpus of scholarly journals at relatively lower costs than “for profit” (trade) publishers.

There have also been concerns about the integrity of peer review processes in traditional scholarly publishing. Some analysts hope that new electronic journals (e-journals) would enable review processes to be fairer or clearer. In addition, other analysts see electronic publishing as offering opportunities for more rapid communication, broader access to scholarly literature, new documentary forms (hypertext), and richer modes of scholarly communication (e.g., the addition of extensive appendices of data, executable algorithms, photographs, audio/video clips). These debates are fueled by a combination of problems with some aspects of the existing publication regimes and the beliefs (by some) that various forms of electronic communication may significantly resolve these problems.

Economics of Scholarly Journals

It is clear that the scholarly journals have played a very prominent role in the scholarly communication system. They have a tradition of purpose and structure dating back to several centuries, with little change. Since the last three decades, two major forces have challenged their pre-eminence:

1. The Spiraling Cost
2. Transmission to Electronic Medium

The high and fast-rising cost of journals has had a devastating effect on the flow of scientific communication, the research community and the library collections.

In 1997 Tenopir and King presented evidence showing that the average institutional price of a scholarly journal subscription has increased from \$39 in 1975 to \$284 in 1995, a factor of 7.3 in just twenty years. Based on these figures, Tenopir and King conclude that: “ It is clear that traditional scholarly publishing is in serious economic difficulty” [5].

General inflation and increase in size of the journals account for only 52 percent of the price increase. Tenopir and King explain the remaining 48 percent by pointing to the dramatic decrease in personal subscriptions, which started in the late seventies.

Publishers have apparently addressed this fall in revenue by increasing institutional subscription rates, thereby causing a vicious circle of cancellation and further increase in institutional rates.

This phenomenon also known as the “serials pricing crisis” in the library community. When this pattern is combined with the funding cuts faced by universities and the skyrocketing increases in monograph and journal prices, it is not surprising that university libraries are hard pressed to maintain collections in support of their teaching and research functions.

The Production and Distribution of Scholarly Journals

Tenopir and King (1996) have provided a comprehensive overview of the economics of journal production. According to their estimates, the “first-copy” costs of an academic article are between \$2,000 and \$4,000. The bulk of these costs are labor costs, mostly clerical costs for managing the submission, review, editing, typesetting and setup costs [6].

Odlyzko (1995) estimates that “first-copy” costs between \$900-\$8700 to produce a single math article. 70% of the cost is editorial and production, 30% is reproduction and distribution [7].

The marginal cost of printing and mailing an *issue* of a journal is on the order of \$3. A special-purpose, non technical academic journal that publishes 4 issues per year with 10 articles each issue would have fixed costs of about \$120,000.

It can be said that information goods such as electronic journals have two defining characteristics. The first and most important is low marginal (incremental) cost. Once the content is transformed into a digital format, the information can be repackaged and distributed at almost zero cost. Nevertheless, information goods often involve high fixed ("first copy") costs of production. A production facility and distribution server must be in place in order to take advantage of the low costs of distribution. For a typical scholarly journal, most of the cost to be recovered by the producer is fixed. The same is true for both publisher and distributor in an electronic access environment. With the cost of electronic "printing and postage" essentially zero, nearly all of the cost of distribution consists of the system costs due to hardware, administration, and database creation and maintenance -- all costs that must be incurred whether there are two or two million users. On the other hand, the variable costs of printing and mailing for print journals would be about \$12 per year. Such a journal might have a subscriber list of about 600, which leads to a break-even price of \$212 [8].

Of course, many journals of this size are sold by for-profit firms and the actual prices may be much higher: prices of \$600 or more are not uncommon for journals of this nature. If the variable costs of printing and shipping were eliminated, the breakeven price would fall to \$200. This illustrates the following point: fixed costs dominate the production of academic journals; reduction in printing and distribution costs due to electronic distribution will have negligible effect on breakeven prices.

Of course, if many new journals are produced and distributed electronically the resulting competition may chip away at the \$600 monopoly prices. But if these new journals use the same manuscript-handling processes the \$200 cost-per-subscription will remain the effective floor to journal prices.

Nevertheless, electronic access offers new opportunities to create and extract value from scholarly literature. This additional value can benefit readers, libraries, distributors and publishers. For distributors and publishers, additional value can help to recover the high fixed costs. Increased value can be created through the production of new products and services (such as early notification services and bibliographic hyperlinking). Additional value that already exists in current content can also be delivered to users and, in part, extracted by publishers through new product bundling and nonlinear pricing schemes that become possible with

electronic distribution. For example, journal content can be unbundled and then rebundled in many different ways.

Bundling is an interesting concept. A print-on-paper journal is, in itself, a bundle of issues. Each issue, on the other hand, contains a bundle of articles, each of which is again a bundle of bibliographic information, an abstract, references, text, figures and many other elements. In addition, the electronic environment makes possible other new dimensions of product variations. For example, access can be granted for a limited period of time (e.g., day, month, and year) and new services such as hyperlinks can be incorporated as part of the content. Permutations and combinations are almost limitless. Bundling enables the generation of additional value from existing content by targeting a variety of product packages to customers who value the existing content differently.

Conclusion

It can be seen that electronic publishing has been changed the production and distribution of scholarly journals in different ways. Most traditional print publishers still claim, just as they have claimed for years, that switching to an electronic format can save at most 30 percent of the costs, namely the expenses of printing and mailing. Prices of electronic versions of established print journals are little, if any, lower than those of the basic paper versions. What publishers talk about most in connection with electronic publishing are the extra costs they bear, not savings [9].

Nevertheless, electronic publishing offers new opportunities to create and extract value from scholarly literature. This additional value can benefit readers, libraries, distributors and publishers. For distributors and publishers, additional value can help to recover the high fixed costs. Increased value can be created through the production of new products and services (such as early notification services and bibliographic hyperlinking).

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