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# Public Goods and Open Access

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# Public Goods and Open Access

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Of late, much has been spoken and written about the difficulties of the current scholarly communications system. Many have concluded that a complete revision is in order and have proposed several alternatives. Without a doubt, the scholarly communication system is broken. Scholarly information is denied to some and rationed to all on the basis of ability to pay. Even those who strongly support the notion of distribution of scholarly literature through the market system, have to be terribly concerned about distributing scholarly communications exclusively on the ability to pay. After all, almost all the underlying research supporting scholarly communications was generated by faculty and researchers whose time, research equipment, research facilities, and research subjects were paid for by members of the public. When the public pays for something, isn't there a right to public access?

Public archives, open access, and public goods-based modifications of the current system are some of the proposed solutions to the distribution problem. While each of these schemes could be employed simultaneously and might co-exist with the current journal system based on subscriptions, they are proposed as alternatives, not as complements or extensions of the existing system. I intend to examine how much of a revision of the current system is really desirable, but before moving to advocate a particular course of action, I want to share with you my vision of the future of scholarly communications. Because I am an economist, it is natural for me to use the forces of supply and demand to describe this future.

## Supply

Clearly the enormous volume explosion in both scholarly journal articles and scholarly monographs will continue, with the greatest growth occurring in digital-only materials. The doubling of National Institutes of Health funding in the United States has supported an enormous volume of research that will result in a flood of publications. The rapid emergence of sophisticated science throughout the world is obvious from an examination of the table of contents of any major journal. Some argue that up to two-thirds of the scholarly journal articles in the biological science areas now originate outside the United States. This enormous change will continue as universities in China and other countries once known as "developing countries" proliferate and become major research institutions.

Electronic archives are being developed on campuses around the world. The motivation for development varies, but I suggest that putting material into electronic forms will accelerate the growth in the volume of scholarly work by making working papers, grant final reports, dissertations, preliminary versions of published articles, databases, etc., readily available to scholars and to the public.

Refereed and non-refereed material increasingly will be available electronically for free, as faculty understand the utility of exposing their material to the largest possible audience. Thus, material that perhaps was always available but wasn't easily accessible, will become available as faculty understand that such material will have a much larger audience.

Finally, GoogleScholar's announced intent to digitize and index the collections of several world famous university and public libraries, if carried to fruition, will add to the flood of electronic information available. The recent announcement of governmental digitalization of major French library collections signals that Google's lead will prompt many followers. No reasonable person can doubt that the amount of scholarly material available will double, quadruple, quintuple in a very short period of time.

## **Demand**

Scholars and students increasingly will desire material in digital format and, I think, will come to place very little value on information that is not digital. This assertion can be illustrated by examining the patrons of our university libraries today. Where are those faculty members who were in the libraries on a daily basis only recently? They are sitting quietly behind their CRTs in their offices. When you ask them the form in which they want new material, they will tell you pretty quickly that they want it in digital form so that it can be delivered to their desktops. For the most part, today's trip to the library is either grudging or spurred by sentimental reasons.

University spending for information resources has increased more rapidly than overall university budgets, and this disparity will widen in the future. Thus, universities will add to the demand for scholarly material relatively more than they will add to the demand for other needed resources. I have reviewed the U.S. data for these expenditures by research universities, and they confirm this pattern in the past; I do not hesitate to suggest that it will continue in the future. Interestingly, universities cannot fully account for all of the information that they are now buying or the totals they are spending on this information since much of it is expended by individual scholars, research institutes, and administrative offices and not captured in central university information systems. This trend of disintermediation also will continue.

I confidently predict that journal prices are going to continue to rise at a more rapid rate than overall library budgets. This means that libraries will continue to reduce the number of journals to which they subscribe, just as they have done for the last 20 to 30 years. I see no force at present that will cause the market to fall into equilibrium. The result will be a kind of Darwinism such that we will have relatively fewer subscription-based journals in major research libraries. I hope the result is that the best of them survive. Clearly the system of scholarly communications now in existence is unsustainable. Knowledge is expanding more rapidly than universities can purchase it and that problem will continue.

In the United States, federal funding agency budgets are being squeezed, effectively causing reductions in the average size of grants. Fiscal stringency throughout the world appears to be creating much the same effect. While funding agencies almost universally are willing to permit principal investigators to expend portions of their grants to pay for publication in open source journals, a decline in the average size of grants will place greater stress on research budgets. Because research grant budgets are never large enough to cover all the demands placed upon them, the really essential items such as post docs, research assistants, supplies, and equipment will continue to be bought and relatively less money will be available to pay for open source journal publications. Thus, I predict that the demand for open source journals whose business plans are based on authors' fees will fall.

Finally, research libraries having been buying fewer monographs for some time. When confronted with the overwhelming price increases for serials librarians have chosen to cut monographs and substitute serials. Given my prediction that serial prices will continue to increase and given the tendencies of many humanists to view publication in journals as good substitutes for monographs, I predict that monograph purchases will continue to decline.

### **The Role of Institutional Digital Repositories**

Institutional digital repositories are not terribly common at present, but many of us at universities are building them. The University of Kansas has just announced the opening of its KUScholarWorks institutional digital repository and similar announcements appear fairly regularly in the academic press. These repositories presently are a curiosity, but I predict that they will shortly become a necessity if a university is to keep track of, make accessible, and preserve the born-digital scholarship of its faculty. These three tasks are absolute necessary due to the fiscal stringency faced by universities. The days are gone when universities were funded adequately because of the intrinsic value of the education they provide to students. We now compete for state funding with any number of other worthy causes.

An institutional repository can be a powerful way for a university to demonstrate to its funding public its productivity, importance, and worthiness. My university has several thousand faculty and researchers prolifically generating studies that range from the highly applied to the extraordinarily esoteric. At present, most of that research is in paper form, some published, some not. Members of the public have no way to access the corpus that is the research output of the KU faculty. Now, imagine an archive in which all that research is instantly available in digital form to the citizens of my state. I dare say there are very few subjects on which our faculty have not written something—probably something that Kansans might find accessible and useful. Given the prevalence of electronic access in the home, establishing an institutional repository and populating it with all of the work of our faculty members would soon cause people who believe nothing of importance happens at our university to change those beliefs.

Not all aspects of institutional repositories are good. I think that probably too many institutional repositories are being formed. There are considerable economies of scale to be gained in establishing shared institutional repositories and jointly maintaining them. I suspect that this potential for savings will lead in time to multi-institutional repositories.

### **Will Gresham's Law prevail?**

Sir Thomas Gresham declared, “Bad money drives good money out of circulation,” as an explanation for the prevalence of old worn coins and the absence of bright beautiful ones, a matter of concern to the Tudor monarchs. When new coins came into circulation, enterprising individuals got their hands on them as quickly as possible, placed them in little leather bags, beat them repeatedly against hard objects and knocked off as many gold flakes off as feasible—a process known as “sweating.” In the end, they had battered coins that could still circulate at face value, and many little flecks of gold in that bag that, collected over time, amounted to quite a lot. Thus bad coins drove good ones out of circulation.

Let me tie together some of the thoughts thus far. We have a greater supply of scholarly communication than demand for it—there is much more to read than any of us has time to read. Unfortunately, the average quality of the material available to us is declining and will decline, as unrefereed material or unrefereed versions of refereed material are increasingly accessible

through various digital archives. When one combines a vastly increased amount of material with reduced journal subscriptions and a decline in scholarly monographs purchased by libraries, one has to conclude that the proportion of the traditionally refereed scholarly material available to scholars and the public inevitably will decline. Many scholars will be able to access only the non-refereed versions of refereed material through the Internet. They will cite that material along with its URL and publish journal articles with those citations.

This situation is unfortunate because the free material cited from archives won't have the full authority that it would possess were it cited from refereed sources. I conclude that with the relatively abundant availability of free material and the increasingly reduced availability of refereed material, we may end up with a situation where bad scholarly communications will drive good scholarly communications out of existence.

What does it matter? Don't we care about the content of scholarly communication rather than its form, i.e., its presentation in a refereed scholarly journal? A little reflection will tell us that form locks an article's content into a package that carries value—the value added to the article by the refereeing judgment and the editorial work put into it. In addition, the ability of others to locate the works and to determine for themselves whether the interpretation given the work in the article in which it is cited is important. We don't always interpret the work of others in exactly the same fashion. Finally, the form in which the article is published conveys to the reader the opinion of the article's author at the time the article is published, putting that opinion into the proper historical context. Truth is relative to a specific time and it can change as the context changes. As one moves away from a refereed publication in a scholarly journal to a version in a paper that appeared on an institutional archive at a later time, one loses that historical context. Yes, clearly we care about both form and content.

### **How do we alter this view of the future?**

What I have described is not a pleasant view of the future. It's a view in which scholarly communication may be continually degraded by cheaper and less valuable alternatives and in which market-based rationing of refereed material makes it increasingly dear. We clearly have moved a great distance from the circle of gifts notion. That notion, with which scholarly communications began in the 1650s, contained two basic tenants. The first is that scholarship is a public good and second, that refereeing is critically important. I suggest that if we embrace those notions again, we can change this future. Let me elaborate. If funders of research were to adopt two restrictions, one on those they funded and the second on journals in which the work of their grant recipients was published, we would restore the original circle of gifts notion. Let me spell out those two conditions. Condition one: research funders should specify to researchers that exclusive copyright to works arising from the funded research can be given to scholarly journal publishers for a six month period only. Condition two: scholarly journal publishers must submit the resulting article, in the form in which it was published, to the funders publicly-accessible archive six months after the date of publication. I call the system resulting from the application of these restrictions, "the public goods model."

This proposal is similar to the U.S. National Institutes of Health policy but is not identical to it. Let me spell out how these two differ.

- Copyright cannot be given permanently to a journal in the public goods model. NIH now permits such permanent transfer.
- Public goods specifies that the journal itself must submit the article to the funding agency's portal, while NIH requests that the author submit a version of the article.

- Under public goods, the funding agency portal would contain the article in the form in which it was published, while NIH's conditions may have the article appear in some other form other than the one published in the portal.
- Public goods requires that the article be deposited in the portal six months after publication, whereas, NIH requests submissions to their portal 0-12 months after publication.
- Under public goods the funding agency portal would contain all articles published while under the NIH conditions, the portal would receive only those articles authors chose to submit or the publishing journal permitted them to submit.

If the public goods model were implemented, what would follow? I suggest that journals and refereeing would survive; journal price increases would be mitigated; large, comprehensive public archives maintained by funding agencies would emerge; universities would focus their scarce resources on repositories of unpublished materials; libraries would remain an essential part of the scholarly communications process; and finally, Gresham's Law would not prevail in the scholarly communications realm.

Let me define some terms. First, what do I mean by funding agencies? Clearly, I mean government funders of research. This category includes the National Institutes of Health, the National Science Foundation, the Department of Energy, the Department of Education, etc., in the U.S. The private non-profit foundations are also included. Much great work comes from institutions such as, Ford and Wellcome, for example. Non-profit research institutions, such as, the CATO Institute or the Brookings Institution are prolific producers of research. Even private for-profit funders are willing for basic findings from their research to be published. They only wish to withhold the applied fruits of the research, which they can directly exploit, so they should be included. Finally, universities themselves are funding agencies. This is perhaps the most controversial funding agency that I have mentioned, because most universities, while basically funding the research done by their faculty members generally have chosen to exercise no control over the products of research that are published in scholarly journals. Clearly, universities need to begin conversations with their faculty about whether the circle of gifts, the public goods model, should apply to the research that they produce or whether that research should continue to be withheld permanently from those who cannot pay for it.

### **Why not rely on a voluntary system?**

There are many who argue that it is in the authors' self-interest to populate publicly accessible archives and that if we simply leave them alone, they will do so. This argument implies that journal prices should be of no concern to scholars, as all scholarly materials will soon be available for free on the web. I believe that this view is only partially true. Many faculty members will choose never to take the additional step necessary to put an article in a public archive, even if it is a very easy step. Other faculty members worry about permission to place material in the archive and don't seem to know that 92% of journals permit placing material in archives at some point. Many faculty will place material in the public archive, but it won't be in the form in which the article was published and it will thereby promote Gresham's Law. But finally, and perhaps most important, voluntary archiving of material to make it accessible to other scholars and the public, can be defeated by publisher restrictions. There are journals today, 8% according to Project Romeo, that simply won't permit their authors to archive the material they published. You can be certain, that when--and if-- there is sufficient growth in the prevalence of archiving so that one doesn't have to rely upon subscriptions to obtain material, more journals

will choose this course. Thus, I simply don't believe that authors' self-interest will or can ever promote sufficiently populated archives that can be relied upon by scholars.

### **Why a six-month delay?**

I hope we all agree that it is important that subscription-based journals survive. I really hope that is the case, because we don't have any alternative at this point. Less than 5% of journals are open source and unless that percentage changes dramatically, and I do not think it will, we have to continue subscription-based journals. Now, journals must have something to sell if they are to survive and be able to fund refereeing. Journals have nothing to sell if the content they contain can be obtained immediately for free elsewhere, and that is exactly what immediate deposit means—no need to subscribe! I have promoted a six-month publication delay simply because it gives journals a decent, and I think a sufficient, period in which to market their product. I think six months is a sufficient amount of time in which a well-run journal can cover its necessary expenses. By “necessary,” I mean to include refereeing, editing, technology services needed to get the material on the net, and staff costs to manage marketing and distribution. At the same time, I don't think six months is so long that it will permit journal publishers to behave as though they have permanent monopoly control over the material and set prices accordingly, as many do now. That is, with the six months delay, the material becomes available in sufficient time that very high prices for the journals will drive out marginal subscribers who will wait until the material is available for free. A publication delay of six months will cause journals to temper their pricing and I think will make scholarly material in subscription-based journals more available both in the short and long run.

### **Why not open access journals?**

Please do not interpret my remarks as being in complete opposition to open access journals. I think the notion of having material available immediately for free is wonderful. However, that notion becomes much less wonderful if the funder of the journal is, in fact, the author of the article it contains or the funder of the research produced by those authors. Author or research agency-funded journals shift the full cost of producing journals onto research universities and other funding agencies. Such cost shifting exempts teaching schools, private firms, research institutes, etc., from the share they now contribute to keep journals in business, in many cases a substantial share. The American Physical Society estimates that nearly half of its journal subscriptions comes from such sources at present. Under an author-funded scheme, the authors and their research institutions, their funders, may pay twice what they pay at present for journals. This is silly economics. These institutions are strapped now and are reducing journal subscriptions under present journal pricing arrangements. I cannot imagine an economic rationale that suggests that research institutions should devote a larger proportion of their budgets to paying for research publications than they now pay. Alternately, I cannot imagine why private firms or research institutes should believe that they ought to have access to research at no cost when they benefit mightily from that research. Cost shifting to research universities or funders will result in a reduction of monies available to do research. This is not a desirable end.

Fundamentally, the author-funded journals permit an opening for for-profit firms to take larger shares of the market away from societies that might sponsor them. Such was the case during the 1970s, when society-based journals began to impose author charges. Commercial firms saw this as an opening and offered subscription-based journals with no author charges as an alternative. Authors flocked from society journals to commercial journals. The societies were left with withered subscriber bases as the for-profit firms exploited this market vacancy. Those private

firms broke the constraints of the circle of gifts and began charging increasingly larger subscription fees for their journals. I do not think we wish for this cycle to be repeated.

### **Practical constraints**

We tend to make the perfect the enemy of the good. That's exactly what we have done by arguing that free immediate posting of journal articles must occur and arguing that posting after six months is undesirable. Clearly, immediate free posting would be desirable if it did not threaten the economics of journal publication and refereeing, but it does. Indeed, the demand for immediate free posting so threatens journal publishers that they have thrown enormous efforts into opposing any legal requirement of free posting, regardless of whether it is immediate, after 60 days or after one year. The result is the very much watered down depository policy that NIH just adopted. As a community we have to learn to get past making the perfect the enemy of the good because we end up with essentially nothing when we do so.

### **Conclusion**

I am calling for a revolution, a very modest one. We don't have to discard the very serviceable subscription-based journal system that we have now and start from scratch. The future that I envision is one in which both profit and not-for-profit society-based journals can and should continue. It is a future in which open source journals can come to flourish as well. It is a future in which institutional digital repositories play a vital role. To get to this end, we do have to accept the two propositions that I stated above: scholarship is a public good and refereeing must continue. The public goods nature of scholarly communication is undeniable. The volume of scholarly output would wither dramatically if public funding for it stopped. Both scholars and the general public understand this public goods nature and will collaborate to compel governments to legislate to make sure the fruits of publicly funded research are publicly available. Private foundations already understand the public goods argument and they will follow the same policies. Ironically, the biggest problem that we may face in moving toward this future may be with scholarly societies, who appear to value the preservation of their internal bureaucracies more than the lofty objectives of their societies.

I call for getting on with this public goods model. The steps are simple. We need to contact legislators and public funding bodies and let them know where we stand. We need to contact foundation boards; we need to begin discussions within universities about the legitimacy of mandatory requirements that all faculty journal articles become publicly available after publication; and we need to regain control of our scholarly societies.