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# A Healthy Information Economy (In Memoriam Milton Friedman)



by **Howard Burrows** (Chair, Standing Committee for Commercial Development/Federation for Earth Science Information Partners (<http://www.esipfed.org>) and Senior Researcher, Autonomous Undersea Systems Institute (<http://www.ausi.org>) <[burrows@ausi.org](mailto:burrows@ausi.org)>

Could the well-intentioned practice of granting open access to scholarly literature and other intellectual property undermine the forces of a free market and thereby undermine a healthy economy for scholarly work? I argue here that open access in the absence of an open market may not be a good thing for scientists and scholars — or for learners.

Scholars, software developers, and scientists are encouraged, often mandated, to donate open access to their works by using **Creative Commons** or other open-content licenses that permit the unrestricted reading, downloading, copying, sharing, storing, printing, searching, etc. of those works. This has a myriad of repercussions, most not a good thing for the creators of the information products or for the industry in which information products are created. Are researchers getting a fair return from the value of their works? Is relying on politicians and charities the best way to raise and allocate research funds? Are the people who pay for open access the people who benefit? Or have we created a situation in which taxpayers pay, the drug, aerospace, and defense industries benefit, and the researchers are left out?

Currently, jobs in pure research or scholarly work, free from teaching and administrative responsibilities, may not be lucrative enough to draw the best workers, or stable enough to provide the security necessary to raise a family. I have the impression that we have created an industry in which it is almost impossible for an unsubsidized family provider, no matter how skilled, to participate in full-time, creative, intellectual work. In my experience, when a scholar's family member needs medical attention, the scholar leaves research to find a job that comes with appropriate health insurance.

On the surface, free access to books and information seems like a good thing. But, looking a little deeper, is it? Does it accomplish what we really want: application of knowledge — actual use — of the best information in each case of use? Does it provide natural incentives to improve existing information so we have more to choose from in each case of use? Could free access even constitute an unfair trade practice? Consider an analogy from business: large corporations have accepted losses in income to provide free or reduced-cost goods in order to gain market share. This serves to undercut a market and forces competitors, often individuals or small businesses, to close up shop. Does open access have the same consequences for independent, small-scale scholarly endeavors? Are we inadvertently setting up a situation in which the larger academic institutions and publishing houses are undermining a market at the expense of research and the researchers?

## The Supply Chain

The rapid growth in information technologies allows us to envision a time when we can offer each individual the exact information to fit their unique needs, interests, and abilities. But how do we pay for the work that will be required to accomplish this? Can we expect the current funding model to finance it?

To make personal information available on demand requires an extensive supply chain: raw data is needed; those data may need to be gathered from scratch or dug out of an archived repository by technicians; such data then may need to be aggregated or composited across several data centers and analyzed by scientists, possibly using a fresh approach; the results need to be communicated to users, users who may be foreign to the specialty area and therefore may need the results interpreted for them. This interpretation may require educators or application specialists. And finally, decision makers may be needed to affirm proper precedent for each use. For any one datum or processing chain to become recognized as appropriate for any given case of use, it would have to have been advertised and, usually, promoted vigorously by stakeholders to see that it competes favorably against alternatives.

This describes a multifaceted enterprise costing trillions of dollars. The information such a supply chain would provide may well be worth those trillions of dollars, if we consider the value scholarship, science, and software provides. But even if the parties benefiting from the information were willing to pay the cost, would our current model allow them this opportunity?

## Incentives

The library is the de facto marketplace for science and scholarly work. In my own experience with Earth observation data and digital libraries, there currently isn't money available to pay scholars and scientists for proposed work that is deemed valuable by peer review boards and that is sorely needed by society. This indicates a market failure.

If it is true that market failure is occurring in the library, then it is in the library that we should act to fix it. Perhaps we who value intellectual effort should seek means to create a fair and open market and test the possibility that the value of intellectual work would be better compensated if allowed to compete in it. Have we folded too early in response to **Vannevar Bush's** "Endless Frontier" — the marriage of research and state funding? Assumed that only an elite group (like us) values scholarly work enough to pay for it, and then thrown ourselves on the mercies of government grant-making agencies and charitable bureaucracies as the

only sources of funds to finance that work?

What benefits might accrue to scholars, software developers, and scientists in an open market? Clearly, this will depend on how we structure that market. If we want to distribute cash returns across the entire chain of industries that create intellectual value, we might do well to examine other industries that require a long chain of value-adders and in which the intermediate products have little value. Think of bread, for example. How does money trickle back to pay the people who plant the wheat or design the tractors?

Could we extend benefits of the free market to learners? Cash might become available to establish better learning opportunities and incentives. Sports teams have learned to spread money to local athletic facilities and farm teams to assure a stream of fresh talent. In a properly structured market, this benefit would exist not only for those learners who promise to become the skilled personnel for cash-rich industries, but for others as well. Would people be willing to pay to assure that certain segments of the voting public had read and understood the platforms of certain candidates? Would people be willing to pay certain people in power to read and demonstrate understanding of some particular text?

Another benefit of the open market would be that market forces could help rank the vast supply of Web content. In an open market, quality, speed, choice, and style become valuable. Each of us could benefit by having better answers to our nagging questions: Should I eat **Atkins** or macrobiotic? Should I sleep more, or less? Should I carry an umbrella today? Plant corn or soybeans this year? Let market incentives lure the best researchers to the areas in which answers are in the highest demand.

With a healthy economy, could we feed many new workers at all points in the information value chain? Could we trigger investment and capitalize extensive new scientific and intellectual ventures? Could an improved economic outlook elevate the social status of scientists and librarians, or create whole new market segments for yet-unimagined categories of knowledge workers? Would the possibility of a lucrative career provide incentives for better students to enter the knowledge industry?

## Transition from the Current Model to a Free Market

A fair market for intellectual work will need to be highly structured to assure that those who benefit (financially) pay for the full chain of services they receive. How do we transition to an information marketplace that efficiently provides a balance in entitlements,

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cash distribution, and returns on effort and risk to encourage knowledge growth and assure that knowledge reaches all members of society?

First, before we mandate open access to all scholarly work, perhaps we should ask existing funding sources to study the possible advantages of a free market for software, science, and other creative work. To get a vision of the scale of changes that might be supported by new information technology, consider this: to best serve people in their quest to satisfy their unique needs, interests, and abilities, just providing access is not enough. We need to promote choices aggressively. Individuals need to become aware of and properly appreciate and understand their options. For this to happen, the information industry will need to conduct market analyses and actively “sell” the options that any given individual should be considering. Such sales cost money.

How much would such promotion cost? Consider **Coca Cola**. Its 2005 annual report documents spending \$8.7 billion on “selling, general and administrative expenses” ([http://www.thecoca-colacompany.com/investors/pdfs/10-K\\_2005/Coca-Cola\\_10-K\\_Item\\_06.pdf](http://www.thecoca-colacompany.com/investors/pdfs/10-K_2005/Coca-Cola_10-K_Item_06.pdf)). Note that this is about twice the entire budget for the **National Science Foundation** for that year. How much interest, use, and additional funding might we generate if we could spend that amount to sell users on the potential of our next scholarly project?

Innovation is the sine qua non for new industry to emerge to drive the growth of the economy. Our greatest innovations, the paradigm shifts, come from basic research, yet basic research also has the greatest risk. We need to restructure the market for scholarly and scientific work to promote investment in intrinsically risky pursuits. Could we mitigate risk in such investments by packaging high-risk, high-payoff endeavors with those considered to have lower risk and lower payoff — a mutual fund for research?

### A Role For Libraries and Others

Such investments depend on information about information itself to reveal investment opportunities. Could the indexes and catalogs already created by the library industry be used to generate this sort of information? Librarians already assess the “market” for acquisitions. Reference librarians and catalogers already study how best to “advertise” library holdings in response to patrons’ interests.

But how do we transform current library activities so they contribute to market structure itself? Citation analysis may not be quite enough to fairly allocate research cash returns down the service chain. We may need more emphasis on the dependencies between texts and especially on the causal relations between the concepts that they contain. Especially during the transition period, we will need to segment users. Perhaps in all cases users should be paid when they make the effort to take in the latest and greatest information. And who should pay them? The parties who benefit from an

## against the grain people profile

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George Howard Burrows

**BORN & LIVED:** Born 10-4-49 in El Paso, Texas. Lived in Ithaca, NY; Oberlin, OH; Dallas, TX; Washington, DC; but mostly since first grade in Durham, NH.

**EARLY LIFE:** In Ithaca while my dad did PhD in Wildlife Conservation, I spent most of my time in a big pile of sand named “Montezuma” after the wildlife refuge my dad was studying.

**FAMILY:** Two children **Tom** and **Lizzie** both serious trouble from day one. Wife of 27 years **Deborah** who I’m pretty sure is the root of all the trouble. Very large extended family in Vermont, Texas, Nova Scotia, New York, Georgia...

**EDUCATION:** **Chrambach’s** lab at **NIH**, **Marshall Nirenberg**, **Lou Sokoloff**. Prepped with **Edie Hendley** at **UVM** medical school and **John Porter** at **UTHSCD Park Lawn Hospital** in Dallas.

**FIRST JOB:** Zoology summer job at **UNH** studying baby oysters in Great Bay, NH.

**PROFESSIONAL CAREER AND ACTIVITIES:** I worked professionally on **NASA/NSF** contracts for nearly five years as part of a small company named **STX (Science and Technology eXcellence)** during which time it was purchased by **Hughes Aircraft** and then sold to **Raytheon**.

**IN MY SPARE TIME I LIKE TO:** Read widely, program in Python, hike, play soccer, and now ski.

**FAVORITE BOOKS:** “*Ulysses*” (the new one by **Joyce**), winds of time series by **Robert Jordan**, “*Women, Fire, and Dangerous Things*” by **George Lakoff**.

**PET PEEVES/WHAT MAKES ME MAD:** Open access, highly paid administrators.

**PHILOSOPHY:** “Shut up and do your work!”

**MOST MEANINGFUL CAREER ACHIEVEMENT:** Health coverage.

**GOAL I HOPE TO ACHIEVE FIVE YEARS FROM NOW:** Hope to build an “exchange” to support scholarly work.

**HOW/WHERE DO I SEE THE INDUSTRY IN FIVE YEARS:** Things seem to be aligning pretty well: I see good things for librarians and publishers. There will be a consortia for knowledge industry research similar to MCC for computer industry research. Academia, publishing houses, and libraries will combine efforts to develop and promote new economies and economics for knowledge growth and use. 🌱



informed information customer. In many cases, the users themselves will earn money from what they learned. Monitoring and charging for this may entail additional scholarly work to understand and allocate value across all the elements leading to monetary gain. New roles for copyright and patent legislation may become appropriate. Alternatively, we may want to extend the way we charge users for not learning the best options, suggesting possible new roles for malpractice lawyers.

Current government funding agencies, publishing houses, and academic institutions will still be necessary in an open market. Clearer attention to information costs and benefits to these institutions will naturally bring them into the new economy, likely playing roles very similar to those they now play. The hope

is, however, that those institutions’ roles will command a much smaller share of the market as people move into lifelong learning across the spectrum of life activities. It is also likely that additional legislation and government monitoring will be required to combat unfair trade practices in an open market for information and scholarly work.

Everyone benefits when people learn something that allows them to make a more informed decision, but people benefit disproportionately. A final question to reflect upon is, How might a new information economy take that fact into account, charge those who gain financial benefit fairly, and use the monies raised to spur increased growth of knowledge and increased use of the best of what is new? 🌱