Publishing in a Period of “Unprecedented Uncertainty”

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Scientific Publishing: What Does the Future Hold?
Lehigh University
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Where am I going this afternoon

• where are we now

• what are some of the issues

• one issue: preservation

• entering Stage Two

• another issue: disruptive technologies

• partnerships for the future
THEN -- PRE ELECTRONIC

• Authors seen as the main customer of a publisher
• Greatest competition was for the best authors and editors
• Little thought given to the reader/user (except for textbooks)
• Libraries viewed for decades as customers, but more in the sense of a distribution channel
• Little direct personal contact with librarians – sales via subscription agents and book wholesalers
• Competition came from other publishers of all sizes
NOW -- POST ELECTRONIC

- Authors still first priority – possibly even more essential to publish the best articles and books
- Meeting author and editor requirements is of competitive importance
- Needs of the reader/user essential in product and service design – “evidence-based development”
- Relationship with library and librarians much different – negotiation-based, one-on-one
- Competition from traditional and new players (ranging from Google to libraries)
Context: last 20 years for scholarly publishers

- **Strategy of the 1980s -- electronic experimentation for some, watch and wait for others**
  - CD-ROM is the answer; oophs, no it’s not

- **Strategy of the 1990s -- much clearer, but not easy**
  - get journals onto the Web, with increased speed of publication, access and functionality
  - find a way to try to survive with book publishing – or exit that business

- **Journals made this first transition**
  - Elsevier alone invested >$375 million in its e-journal service, ScienceDirect
  - moved from physical access in 100s of locations to >16 million authorized users worldwide
  - articles posted online as soon as they have been accepted and processed
Elsevier’s Web service for search and delivery of our journals, abstracting & indexing databases, books, web information

- > 7.2 million journal articles (vs 1.3 million in 2001)
- ± 1800 journals back to vol. 1, no. 1 (The Lancet, 1823)
  - reference links to >11,000 journals from other publishers
- 240 million full text downloads in 2005
  - average over 456 per minute every day of the year
- > 40 million abstracts
- more than 10 million regular users
- robust infrastructure: to ensure reliability
  - 400+ multi-processor Intel base servers
  - 40,000 gallon underground water cooling tank (enough cooling capacity to cool 2600 homes)
  - generator capacity to power a 60-story office building
- add more in 2 days than everything in MIT’s D-Space
NT servers
Storage in petabytes!
Generators
Chilled water plant
First shipment: four sea containers and two air containers

Millions of pages

$40 million for processing alone
The new factory – just for backfiles

2000 people
Can’t we now declare success?

After all:

- Access is nearly universal, including free access in the lesser-developed world
- Usage is continuing to increase at extraordinary levels
- The sheer amount of information readily available has enormously increased
- Speed of publication much faster
- Functionality incredibly improved
- Efficiency for the researcher much greater
- Rapidly falling cost per use, increased value

Researchers, librarians and publishers should be celebrating what has been accomplished.
Instead, heritage of twenty years of frustration

- Research output has grown at a steady 3%+ a year
- Cost of publishing:
  - Increase in number of articles
  - Increases in normal costs
  - Investments in new systems and technology
  - Cost savings (but print continues)
- Inflation is the wrong metric
  - List prices misleading; negotiated caps and long-term agreements
- Library budgets have not kept pace with the growth in research
  - For many years, library budgets actually declined as a percentage of university budgets
  - Libraries typically 3-4% of a university’s budget
  - Materials 35-45% of the library’s budget and serials 65% of that
  - Therefore, 0.65-1% of a university’s budget goes for serials
- Generation of finger-pointing and defensive responses,
  frustration on both sides
  - “Didn’t expect to spend my career downsizing my collection.”
Relationship of journals & researchers

R&D Workers, Journals and Articles

More researchers ⇒ more journals

Index (1981=1.00)

US r&d workers
journals
articles


1.6
1.2
0.8
Journal size and discipline

- STM titles publish up to ten times more articles per journal than social sciences and humanities
- Source: Tenopir & King
All publishers trying to find their way

- Society journal publishers, many of whom are relatively small and unsophisticated, have moved their publication processes into this new world
  - some (ACS, AIP, APS) have led the way

- University presses have struggled to publish monographs on a financially-sustainable basis

- Textbook publishers have thrashed in a changing world
  - used books, coursepacks, rising book prices and rising resistance, uncertainty as to how to maximize e-learning opportunities (or to understand what those opportunities really are)

- Many small, mid-sized and even large commercial publishers put themselves up for sale
  - they did not have the capital to continue as independent companies
  - Note: Elsevier did not initiate either of its significant acquisitions
Where are we now?

“We are in a period of unprecedented uncertainty.”

Paul Saffo, Institute of the Future
Board meeting of the Copyright Clearance Center
February 22, 2004

Incredibly apt description of the current state for scholarly publishers
Mission unchanged: Elsevier cares about science

• supporting and furthering scholarship, science and the research and discovery process
• attracting young people to scientific, technical and medical study
• ensuring that everyone who needs information has affordable access to it, including patients and other members of the public
• protecting the integrity of the publishing process, including refereeing, registration, distribution and permanent preservation

BUT THERE ARE MANY QUESTIONS AHEAD…
We are still in rather early days…

• The first large scale experiments with e-journals was in the early 1990s.

• The real opening of the WWW with the introduction of the Mosaic browser was in 1993.

• Yahoo and Amazon started in 1995 and Google‘s founders met for the first time that year.

• But is it 10, 12 or 15 years or a lifetime? For today’s undergraduates, effectively a lifetime.
For e-journals, ending Stage One

- got the current journals online with smoothly running, reliable systems
- added backfiles
- primarily replicates paper
- added basic search, navigation and linking tools
- used transition business models
- worked with libraries on permanent access policies, preservation archiving
Preservation in the paper world

- broadly understood and accepted
- buy and keep
- fairly stable medium, long-lived formats
- backfiles in great libraries
- scholars visiting to consult
- awkward, but understood
Preservation in the paper world

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Preservation in the paper world

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- backfiles in great many libraries
- scholars visiting to consult
- awkward, but understood
- does not involve the publishers AT ALL
Preservation in the electronic world

- new, unknown and volatile environment
- licensee and access
- unstable medium, changing formats
- backfiles where?
- data does the travelling
- awkward and not understood at all
- a decade of discussion and experimentation
- has to be library / publisher partnership
Significant progress on establishing official archives

- Elsevier agreement in 2002 with the National Library of the Netherlands to be the first official, permanent archive of Elsevier e-journals
  - following several years of experimentation

- agreement in 2005 with Portico to join this new initiative
  - sibling of JSTOR, Mellon seed-funding

- in discussion in Japan and New Zealand with their national libraries
New challenges and needs – entering Stage Two

- need to seriously rethink the organization of information and make it more suitable for data and text mining
  - Clifford Lynch: we are still writing for human readers, without adequately providing for machine readers

- need to deal much more with data sets
  - management of large data sets now getting much more serious attention
  - generally as been left to authors: not permanent preservation
  - publishers have no experience or expertise here: also not clear how costs would be recovered
  - institutional repositories: suggestion that these may become one home for data sets
Stage Two (continued)

• need to enable the manipulation and use of all types of information
  – to quote Cliff again: “We really have very little experience in developing economic and legal and business agreements that allow computation, extraction, derivation, reuse, correlation, reintegration into other databases.” (2003 Elsevier Digital Libraries Symposium)
  – Google Library issues

• need to understand where there is economic value that is realizable
  – PC analogy – expect functionality each year for the same or less money
  – which features and functionalities are only bells and whistles, which have monetizable value
Stage Two (continued)

- need to create new economic models
  - i.e., access to everything under a database rather than a title-by-title subscription model
  - doing now with corporate and small college markets
  - need to find a model to offer options to larger academic and government customers

- need to look to new markets
  - Only 15% of scientific, technical & medical professionals in academia
  - Only 25% of journal readings occur within academia
  (Source: research by Donald King, Univ. of Pittsburgh)

- need to commit to continued investment
  - it is increasingly hard to look beyond 2-3 planning horizon
  - but major projects require a longer investment perspective
  - Boeing: made investments a decade ahead of knowing whether their vision of the future was correct
  - new for publishers and takes a culture change
“A disruptive technology is a new technological innovation, product, or service that eventually overturns the existing dominant technology in the market, despite the fact that the disruptive technology is both radically different from the leading technology and it often initially performs worse than the leading technology according to existing measures of performance.”

Wikipedia
How disruptive technologies win

“A disruptive technology comes to dominate an existing market by either filling a role in a new market that the older technology could not fill … or by successively moving up-market through performance improvements until finally displacing the market incumbents.”

Wikipedia
“The Innovator’s Dilemma”

Book by Clayton Christensen (1997)

“…firms that succeed in one generation of innovation almost inevitably become hamstrung by their own success and thus doomed to lose out in the next wave of innovation”

“The Blood of Incumbents”
The Economist, Oct 28th, 2004
“Sustaining” innovation is what incumbent firms engage in to sell ever better, more profitable, products to their most attractive and demanding customers

- reach a point where no appetite for more bells and whistles
- numbing complexity
“Disruptive” innovation targets the least demanding customers or “non-consumers” and offering something simpler or cheaper or both

- newcomers crush the incumbents because of different financial incentives and corporate cultures
Today’s “disruptive” innovators

Google and other search engines

and

those providing tools to support “user-generated content”

“From Netscape to the Next Big Thing”
Financial Times Aug 5, 2005
Partnerships

- key to all of the Stage Two needs -- and to cope with disruptive technologies -- is for the publisher to work in close collaboration with other stakeholders in the scholarly community
  - researchers
  - other information consumers (e.g., health professionals)
  - students
  - librarians
  - academic administrators

- despite “disruption,” we are in an evolution, not [quite] a revolution, and those who listen, adapt and work co-operatively stand the best chance of survival
In conclusion

- the future is too important to all researchers and scholars to leave to chance

- we need new initiatives that bring all parties to the table – researchers, funding bodies, librarians and publishers, including commercial publishers

- need a more balanced analysis of the present system and situation and the desired outcome for the future.

- Elsevier stands open for any discussion or working group that is willing to engage with publishers and librarians.
Thank you

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