

The Challenge of Scholarly Communication in the 21st Century

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Outline

- character of scholarship in the digital age
 - new tools, genres, heterogeneity
 - digital preservation gap
 - commercialization, toll-access
- review article lifecycle cost studies
 - global and national
- consider institutional impacts
- *The Challenge?*

Scholarship in the digital age

- journal publishing continues apace (3.5% growth per year)
- venues (faculty/researcher webpages, institutional and subject repositories)
- variety (datasets, blogs, learning objects,...)
- all disciplines (humanities computing examples Bamboo and INKE)

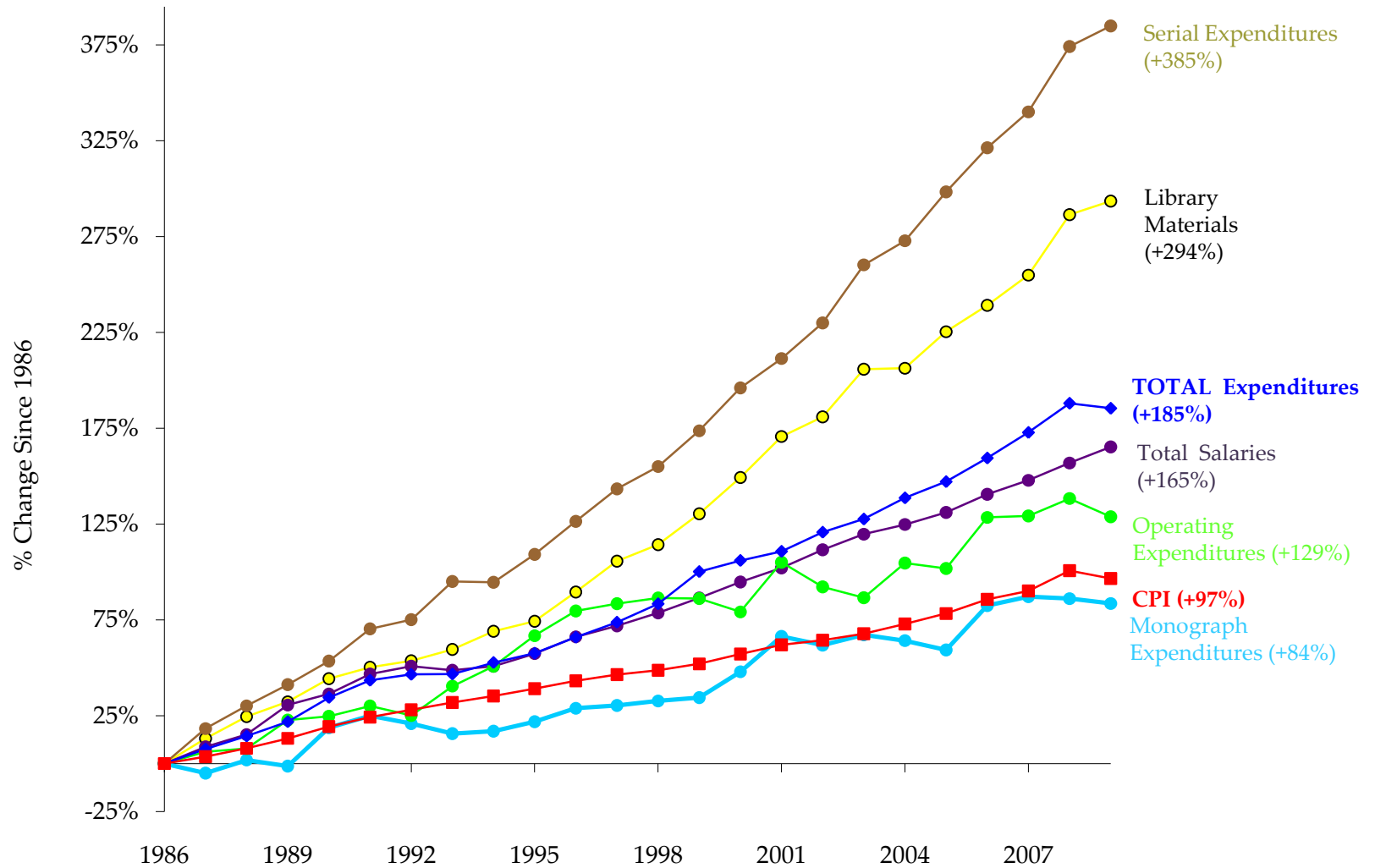
Beyond the book

“...One of the interesting things that happens when you get really high quality visual data is that there are aspects of an ancient inscription that you have to deal with that you’ve never dealt with before. For example, we now have the ability to photograph an ancient inscription in such a way that you can look at it from any light angle in real time. It’s like you have a virtual light. You can turn it around and look at a text from all angles...And how do you convey to people that material? You try to put that on a printed page, but they can’t understand because they can’t see the dynamism of it. So the biggest crisis, and I use the word advisedly, that we face right now is I don’t know how to publish anymore...The World Wide Web is not up to handling the material yet...You try to manipulate a 150-megabyte image over the World Wide Web. It’s not so easy...If we’re trying to show how we put the material together in terms of publication, there is, as of yet, no software that I’m aware of that adequately conveys what it is that I need to show. And I have no doubts that the software will catch up with us, but right now I can’t show people what it is they need to see. It’s really a funny thing: You’ve got these wonderful technologies, but the technologies don’t translate into books anymore. “
(archaeologist, interview excerpted in “Assessing the Landscape of Future Scholarly Communication,” Center for Studies in Higher Education, UC Berkeley, 2010)

Digital data challenge

- scale
- preservation and curation
- long-term access
- replicate and validate

Expenditure Trends in ARL Libraries, 1986-2009



Source: ARL Statistics 2008-09, Association of Research Libraries, Washington, D.C.

issue #1: commercialization

- economics core journal study, from 100% non-profit control in 1960 to 33% in 2000 (Bergstrom, 2001)
- concentration among commercial publishing for subscription journals (Munroe, 2007)
- decline in market price control – 10-35% profit margins for each of past 10 years

Reed Elsevier	Taylor & Francis Informa	Wolters Kluwer	EQT / Singapore Investment Corp	Wiley Blackwell	Verlagsgruppe George von Holtzbrinck
~1800 journals	~1000 journals	~275 journals	~1600 journals	~1250 journals	~70 journals
Academic Press	AA Balkema	Lippincott Williams and Wilkins	BioMed Central	A.R. Liss	Nature Publishing/Macmillan
Cell Press	BIOS Scientific	Adis International	Kluwer Academic	GIT Verlag	Scientific American
Congressional Information Service	CRC Press		Springer	Scripta Technica	W.H. Freeman
Elsevier	Curzon Press			VCH	Bedford, Freeman Worth
Engineering Information	Gordon & Breach			Wiley	
Excerpta Medica	Harwood Academic			Interscience	
Harcourt	Marcel Dekker			Blackwell Publishing	
Morgan Kaufmann	Routledge			Blackwell Publishing Asia	
Mosby	Swets Zeitlinger			Blackwell Synergy	
Pergamon Press	Taylor & Francis			Munksgaard	
Urban & Fischer					
WB Saunders					

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Academic Press	AA Balkema	Lippincott Williams and Wilkins	BioMed Central	A.R. Liss	Nature Publishing/Macmillan
Cell Press	BIOS Scientific	Adis International	Kluwer Academic	GIT Verlag	Scientific American
Congressional Information Service	CRC Press		Springer	Scripta Technica	W.H. Freeman
Elsevier	Curzon Press			VCH	Bedford, Freeman Worth
Engineering Information	Gordon & Breach			Wiley	
Excerpta Medica	Harwood Academic			Interscience	
Harcourt	Marcel Dekker			Blackwell Publishing	
Morgan Kaufmann	Routledge			Blackwell Publishing Asia	
Mosby	Swets Zeitlinger			Blackwell Synergy	
Pergamon Press	Taylor & Francis			Munksgaard	
Urban & Fischer					
WB Saunders					

journal cost studies

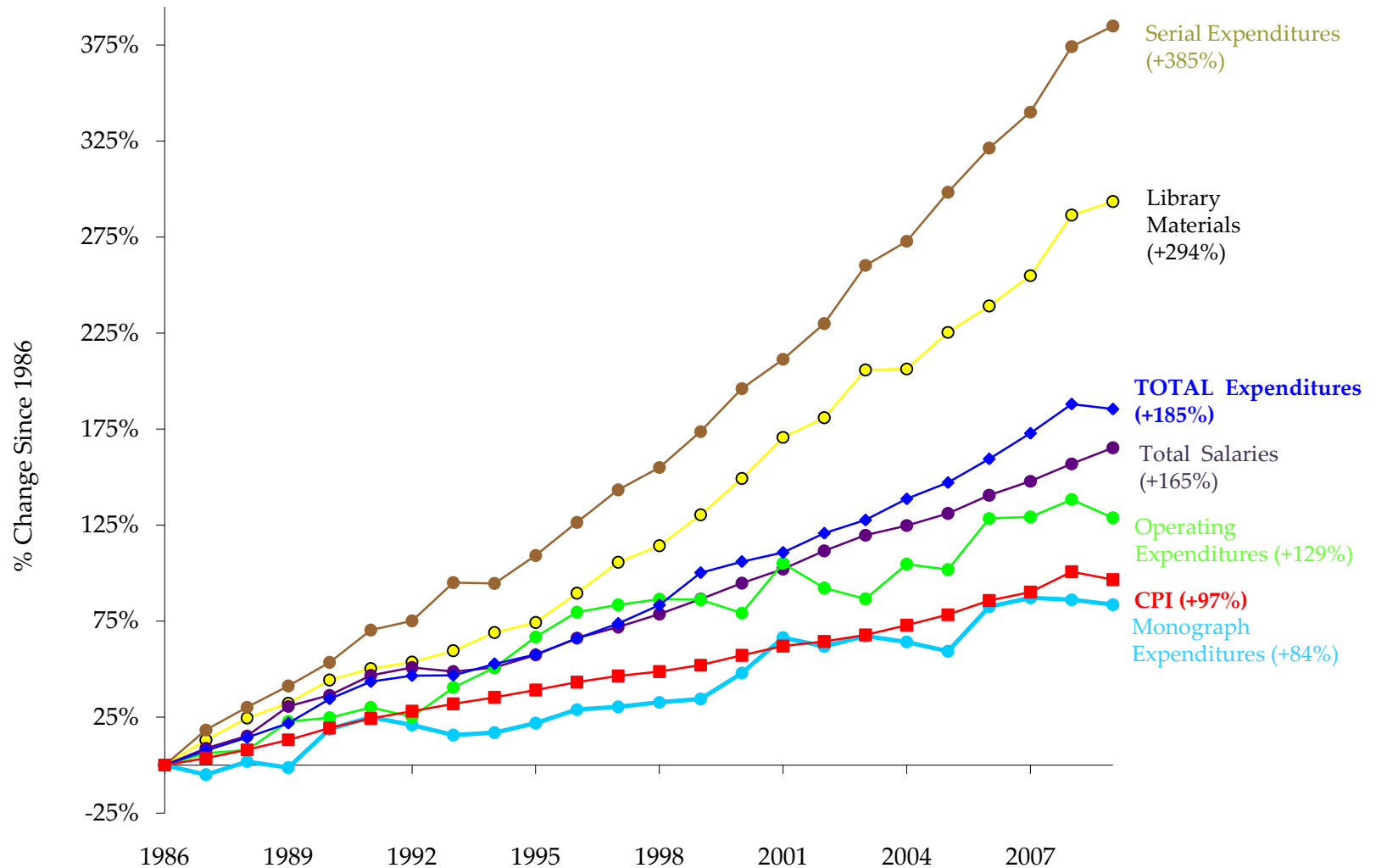
- non-profit journals are 50-75% lower in cost than commercial journals of equivalent quality (McCabe, 2001)
- cost per page of commercial titles in economics is 6 times higher than non-profit journals of equivalent quality (Bergstrom, 2001)
- cost per citation of commercial titles in economics 16 times higher (Bergstrom, 2001)

issue #2: toll-access

- from print subscription to digital license
- loss of transparent pricing
- new costs: authentication, IP mgmt, legal
- excluded classes: alumni, independent and affiliate researchers
- regional barriers (Gaulé, 2009)
- civil society

“Look at JSTOR (if you can). There you find the evidence-based, source-critical foundations of sociology, anthropology, geography, history, philosophy, classics, Oriental studies, theology, musicology, history of science and so on. They are all closed to the public. It is wonderful, of course, that high-energy physics and string theory are open to all. But is it not ironic that we have opened the gates only to that scholarship which few professors, let alone members of the public, have the cognitive capacity and appropriate training to grasp?” (Lisbet Rausing, The New Alexandria)

Expenditure Trends in ARL Libraries, 1986-2009

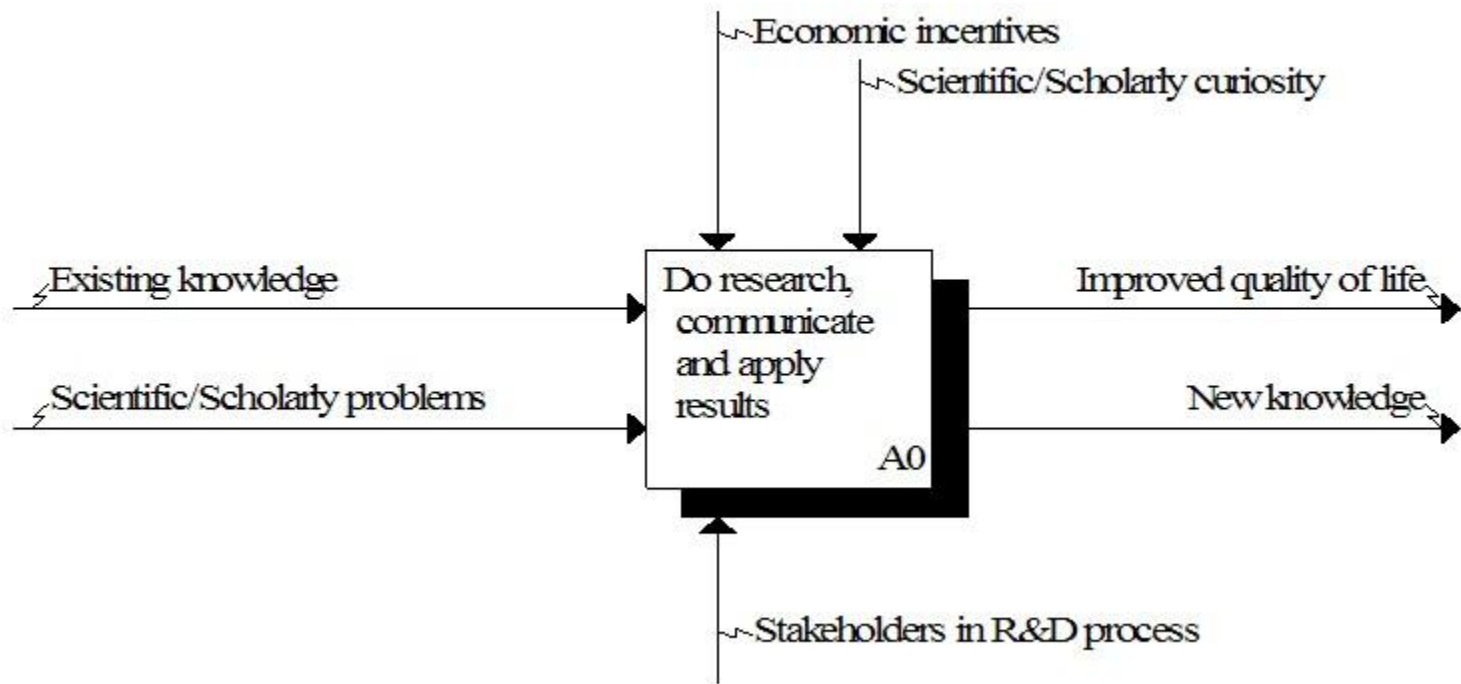


Source: ARL Statistics 2008-09, Association of Research Libraries, Washington, D.C.

Toll-Access and Open-Access

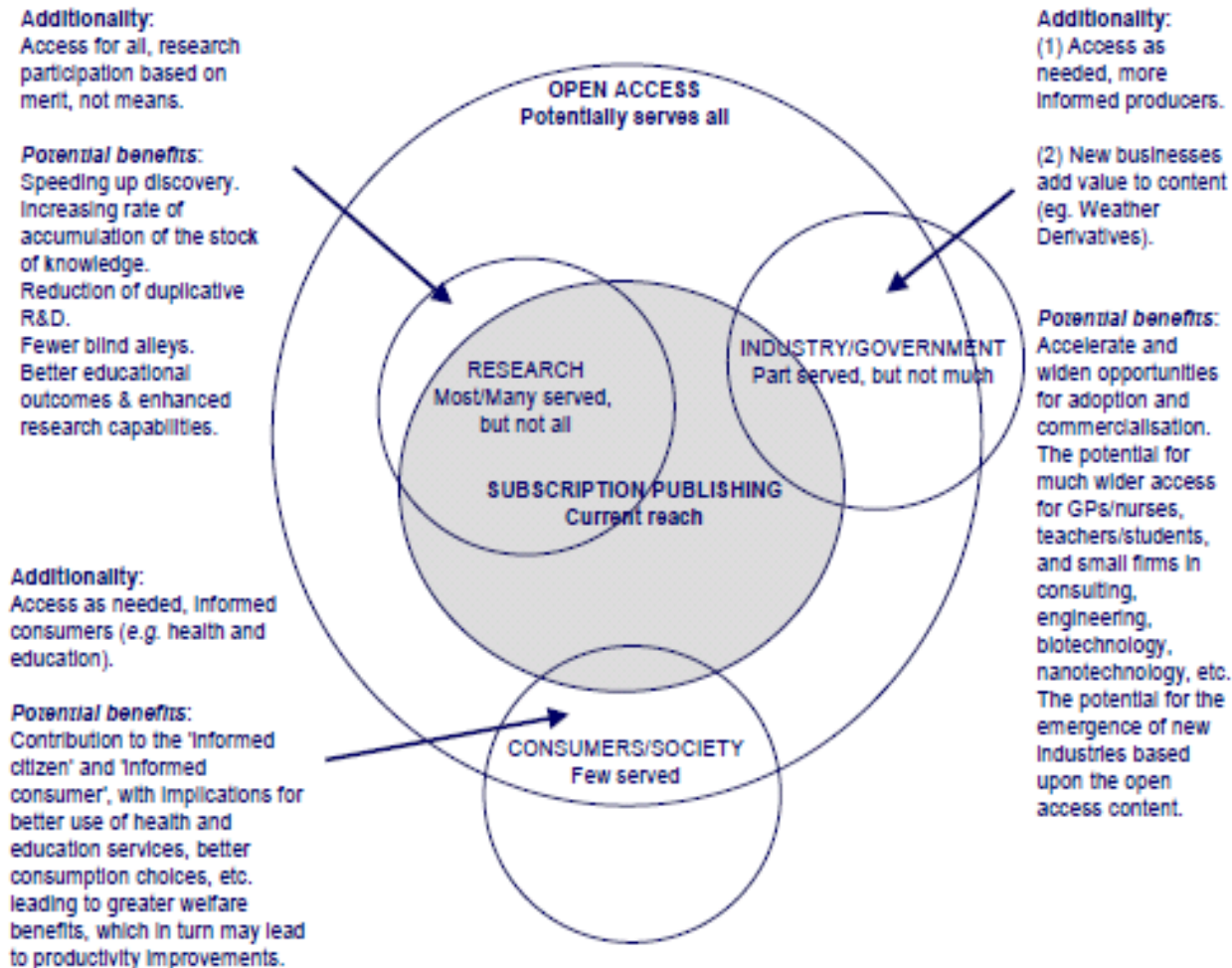
- Toll Access (subscription publishing)
 - subscription or licence-based
 - *registration, certification, dissemination/awareness*
- Open Access
 - OA Journals (“Gold OA”)
 - Various business models including author payment
 - *certification*
 - OA Repositories (“Green OA”)
 - Based on self-archiving
 - *registration and dissemination/awareness* (although could certify through development of peer-review overlay services)

Efficiency of the global scholarly communications system



Source: "Research Communication Costs in Australia: Emerging Opportunities and Benefits" (Houghton et al, 2006)

Impact framework – Toll Access v. OA



Source: “Research Communication Costs in Australia: Emerging Opportunities and Benefits” (Houghton et al, 2006)

Australian DEST report

- “Research Communication Costs in Australia: Emerging Opportunities and Benefits” (Houghton et al, 2006)
- Over 20 years, a full system of institutional repositories in Australia costing AUD 10 million a year and achieving a 100% self-archiving compliance would show:
 - A benefit/cost ratio of **51** for the modelled impacts of open access to public sector research (*i.e. the benefits are 51 times greater than the costs*);
 - A benefit/cost ratio of **30** for the modelled impacts of open access to higher education research; and
 - A benefit/cost ratio of **4.1** for the modelled impacts of open access to ARC competitive grants funded research

Scholarly communications lifecycle (Björk & Houghton)



1. Fund research and its communication

- set policy and direction
- evaluate research proposal
- make funding decisions
- evaluate impacts/outcomes

2. *Perform research & communicate results*

- perform research
- communicate the knowledge
 - *informal*
 - *formal*
 - *share data/models*

3. Publish research outputs

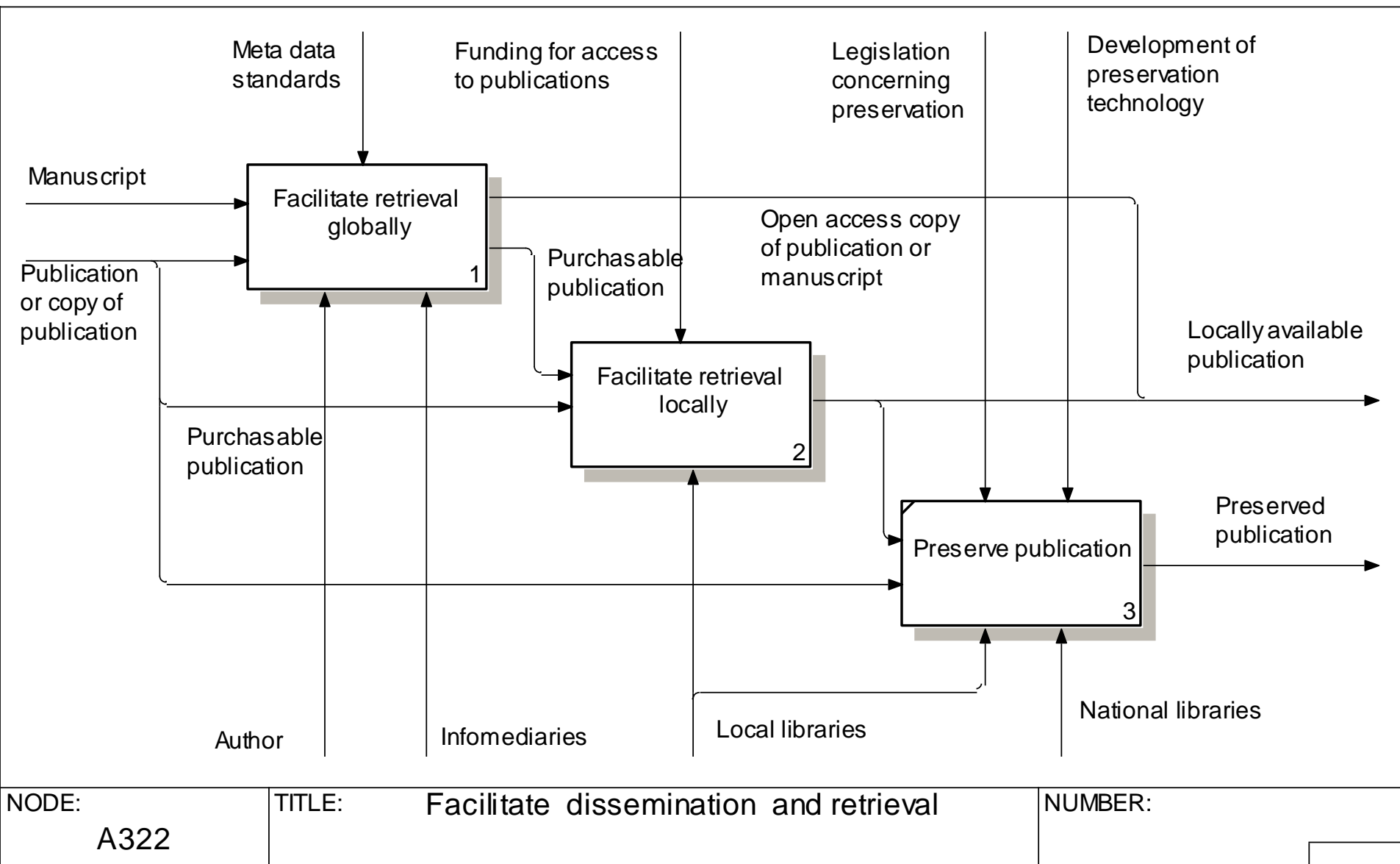
- as journal article
- as conference paper
- as monograph (or book chapter)

4. *Facilitate retrieval, dissemination & preservation*

- dissemination
- retrieval
 - *global*
 - *local*
- preservation

5. Study publications & apply knowledge

- educate professionals
- make policy and regulate
- do industrial development
- apply in practice



2008 UK RIN study

- Aim: “produce estimates, from a systems perspective, of the costs associated with the different parts of the scholarly communications process in the UK, and the sources and volumes of resources provided to meet those costs”
- Two key objectives:
 - to identify the cash and non-cash costs incurred by the key agents involved in the various stages of the scholarly communications process in the UK; and
 - to identify the sources, nature and scale of the funding and other resources made available to meet those costs.
- Focus:
 - journal articles
 - production, dissemination, providing access to and reading

Results: total global costs per year

- Undertaking and communicating the results of research reported in journal articles is £175bn,
 - £116bn for the costs of the research itself;
 - £25bn for publication, distribution and access to the articles; and
 - £34bn for reading them.
- Publishing and distributing articles is £6.4bn:
 - £3.7bn in fixed first copy costs, including £1.9bn in non-cash costs for peer review;
 - £2.7bn in variable and indirect costs, and the generation of surpluses by publishers.
- Global publishing and distribution costs covered:
 - 53% by library subscriptions
 - 23% by unpaid costs of peer review
 - 11% by non-academic subscriptions

The average total publishing and distribution costs per article amount to about £4,000

Findings: e-publishing conversion

- if 90% of journals converted to e-only, the global costs of publishing, distribution and access would fall by £1.08bn (12%), offset by a rise of £93m in user costs for printing
- the largest part of that reduction in costs would be accounted for by a fall of £758m (36%) in libraries' costs in providing access to journal articles
- global publication and distribution costs would fall by £318m (7% of total costs excluding peer review).
- reductions in advertising revenues, membership fees and personal subscriptions would mean that less than two-fifths of the publication and distribution savings would be passed on to libraries through a reduction in subscriptions.

Findings: OA conversion

Assuming savings from a move to e-only:

- If 90% of all articles were made open access upon payment of a publication fee...we estimate that the total saving in the global costs of publishing, distribution and access would be £561m, split almost equally between savings to publishers and to libraries.
- The subscriptions paid by academic libraries globally would fall by £2.91bn. But these savings would be offset by an increase of £2.92bn in the charges that the research or funding institutions would have to meet in author-side publication fees.
- The costs and benefits would be unevenly distributed across institutions: research-intensive institutions would tend to pay more in publication fees than they currently do for library subscriptions, while institutions where research constitutes a lower proportion of activity and expenditure would tend to see reductions in overall expenditure.

2009 JISC report (Houghton)

- “Economic Implications of Alternative Publishing Models”
- focus on Journal Articles under 3 different models
 - Toll Access
 - Open Access - publishing (‘gold OA’)
 - Open Access - self-archiving w/subs (‘green OA’)

Box 4.3: Estimation assumptions: Perform research and communicate results

<i>Parameter</i>	<i>Basis</i>	<i>Value</i>
Time to write a journal article	Tenopir and King (2000), King (2004)	90 to 100 hours, average 95
Time to peer review an article	Tenopir and King (2000), King (2004)	3 to 6 hours, average 4.5
Number of peer reviewers per article	Tenopir and King (2000)	2 to 3 reviewers, average 2.5
Rejection and resubmission (article)	Authors' estimate	50% rejected of which 60% are sent for external review and 40% rejected without review, and of which 75% are resubmitted once
Number of peer reviewers per monograph	Industry consultation	2 to 3 reviewers, average 2
Rejection and resubmission (monograph)	Authors' estimate	20% rejected of which 50% are resubmitted once
Time spent on editorial activities	Industry consultation	10 to 30 days per annum, average 20
Time spent on editorial board activities	Industry consultation	½ to 1 day per year, average ¾
Percentage of authors who are editors and/or on editorial boards	Rowlands and Nicholas (2005)	8% and 24%, respectively
Number of readings per researcher per year	Tenopir and King (2000), tracking studies and Tenopir <i>et al.</i> (2008)	Industry/higher education: <ul style="list-style-type: none"> Articles 130/270 rising to 280 Books 53/48 Reports 65/46 Trade literature 51/74 Other items 22/14
Time spent reading an article	Tenopir and King (2007) and Tenopir <i>et al.</i> (2008)	34 minutes falling to 31, but slightly higher for research, estimate 31
Time spent searching for and accessing an article	Tenopir and King (2007), CEPA (2008) and Tenopir <i>et al.</i> (2008)	8 to 17 minutes, average 12.5 but falling, estimate 12.5
Article requests per reading	Tenopir and King (2000), CEPA (2008)	1.3 to 1.4
Time spent by author obtaining permissions per article	Halliday and Oppenheim (1999)	1 to 4 hours, average 2
Percentage of articles photocopied or printed	CEPA (2008) and Tenopir <i>et al.</i> (2008)	20% print, 80% electronic
Cost of printing and copying per page	SCONUL	5 pence per page
Time spent printing or copying an article	Authors' estimate	1 to 5 minutes, average 3

Est.UK higher ed costs by model

		Journals (per article)			Books (per title)		
		<i>Toll Access</i>	<i>OA Publishing</i>	<i>OA Self-archiving</i>	<i>Toll Access</i>	<i>OA Publishing</i>	<i>OA Self-archiving</i>
Fund							
Perform	<i>Write</i>	£5328	£5328	£5328	£63935	£63935	£63935
	<i>Review</i>	£631	£631	£631	£1514	£1514	£1514
Publish	<i>Publish e-only</i>	£2337	£1524	£1127	£11320	£7380	£6703
	<i>Distribute</i>				£3396		
Disseminate	<i>Handle e-only</i>	£0.23	£0.17	£0.17	£28	£20	£20
	<i>IR operation</i>			£19			£19
	<i>Deposit</i>			£9.35			£9.35
Use							
TOTAL		£8296.23	£7483.17	£7114.52	£80193	£72849	£72200.35
<i>UK mil (HE)</i>		£816	£736	£700	£1025	£932	£923
<i>UK mil (national)</i>		£949	£856	£814	£1050	£954	£945

Overall finding

“at the estimated costs, the benefits of enhanced accessibility and efficiency and potential system cost savings outweigh the costs of diverting research funds to author-side open access publishing fees”

Knowledge Exchange studies 2009

- “OA What are the Economic Benefits: A comparison of the UK, Denmark and Netherlands”
- Gold OA scenario
 - UK could save 480m Euro
 - Netherlands could save 133m Euro
 - Denmark could save 70m Euro
- Green OA scenario (with subscriptions)
 - UK 125m Euro
 - Netherlands 50m Euro
 - Denmark 30m Euro

US study (2010)

- “An Approach to Open Access Author Payment.” (Donald King)
- average cost-per-article of \$1,500 and \$2,500
U.S. scenarios are employed
- the additional cost for 100% funding of articles would be \$427 million (at \$1,500 per article) or \$712 million (at \$2,500 per article)
- academic and special libraries could, together, save an estimate \$4.1 billion per year.

Critiques

- cost assumptions (Hall 2010)
- concern for job loss for librarians and publishers (ALPSP, PA, ASTM)

Institutional perspective

- Cornell Study (2004)
- Swan Study (2010)
- UC Berkeley OA Fund (2008-)
- SFU OA Fund (2010-)

Cornell 2004

- article output at 3500 per annum
- cost of \$1250 per article
- OA would require increased expenditure of \$1.5m over Toll-Access subscription/license model

Alma Swan study (2010)

- “Modeling Scholarly Communications Options: Costs and Benefits for Universities” (JISC)
- 4 UK universities
- if universities continue to pay for subscription-based journals while simultaneously making their outputs freely available through their repositories, their savings range from 0.1 million GBP to 1.32 million GBP per annum. (savings accrue from increased efficiencies in the research and library handling processes)

UCB OA fund status (3-year)

- 60 articles funded
 - 30 OA articles; average US \$1500
 - 30 hybrid articles; average US \$1280
- only 25% UCB OA publishing requires use of the fund
- budget US \$50k per annum
 - under 1% of library's journals budget

publishers

- APS
- ASBMB
- BMC*
- CSH
- EDP Sciences
- EGU
- Frontiers
- Hindawi
- IOP
- IUC
- Magnolia
- NAS
- OSA
- Oxford
- PLoS**
- RSP

**UCB is a BMC supporting member*

***UCB is a PLoS institutional member*

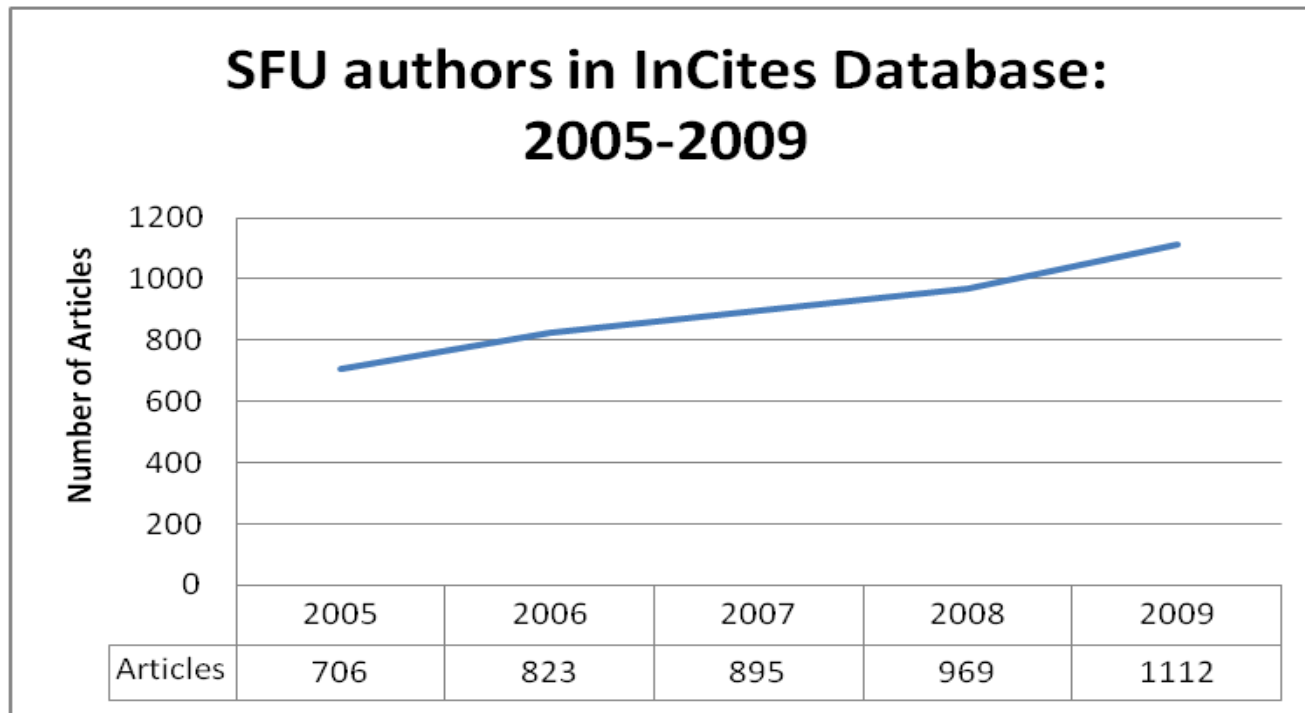
Hypothetical UCB move to OA

- 5200 UCB articles (2009, WOS and SCOPUS)
- currently 75% OA costs covered by research funders
- liability is for 1300 @ \$1500 -> \$1.95m
- contrast to current journal spend of \$6m

SFU OA fund status (1-year)

- 28 pure OA articles
- average cost \$1367
- expended \$38,724
- less than 1% of the library's journals budget
- publishers: BMC 20 of 28

SFU authors' article output



Hypothetical SFU move to OA

- 1112 SFU articles in Thomson InCites (2009)
- 1112 articles @ \$1367 -> \$1.52m
- contrast to current journal spend of \$4.3m

Key OA fund findings

- faculty will publish OA when insulated from publication charges by funds from whatever source
 - researchers will use extramural funds
 - an institutional OA fund safety net will be tapped
- less than 1% of a library's materials budget can make a big difference

The Challenge: adopting a producer rather than consumer orientation

- develop deeper institutional understanding of the our researcher's publishing
- encourage more transparency among publishers in pricing and licensing practices
- review assumptions regarding what parts of the scholarly communications process are appropriate for outsourcing
- experiment in institutional (individual and collective) support for OA books, chapters, conference proceedings, and digital archives

WILEY Open Access

Quality Op

Welcome to Wiley Open Access

Wiley is pleased to announce the launch of Wiley Open Access, a new publishing program of open access journals. Wiley Open Access journals are supported by a network of high-quality journals and societies as well as internationally-renowned editorial board members. The Wiley Open Access journals will be launching throughout 2011 and will be taking submissions soon.

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Launching in 2011

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Edited by Andrei V.
Alexandrov

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