



Exploring the Economic Impacts of Open Access: A Research Perspective

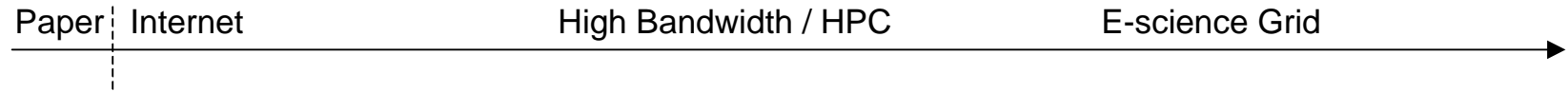
John Houghton

Centre for Strategic Economic Studies
Victoria University, Melbourne

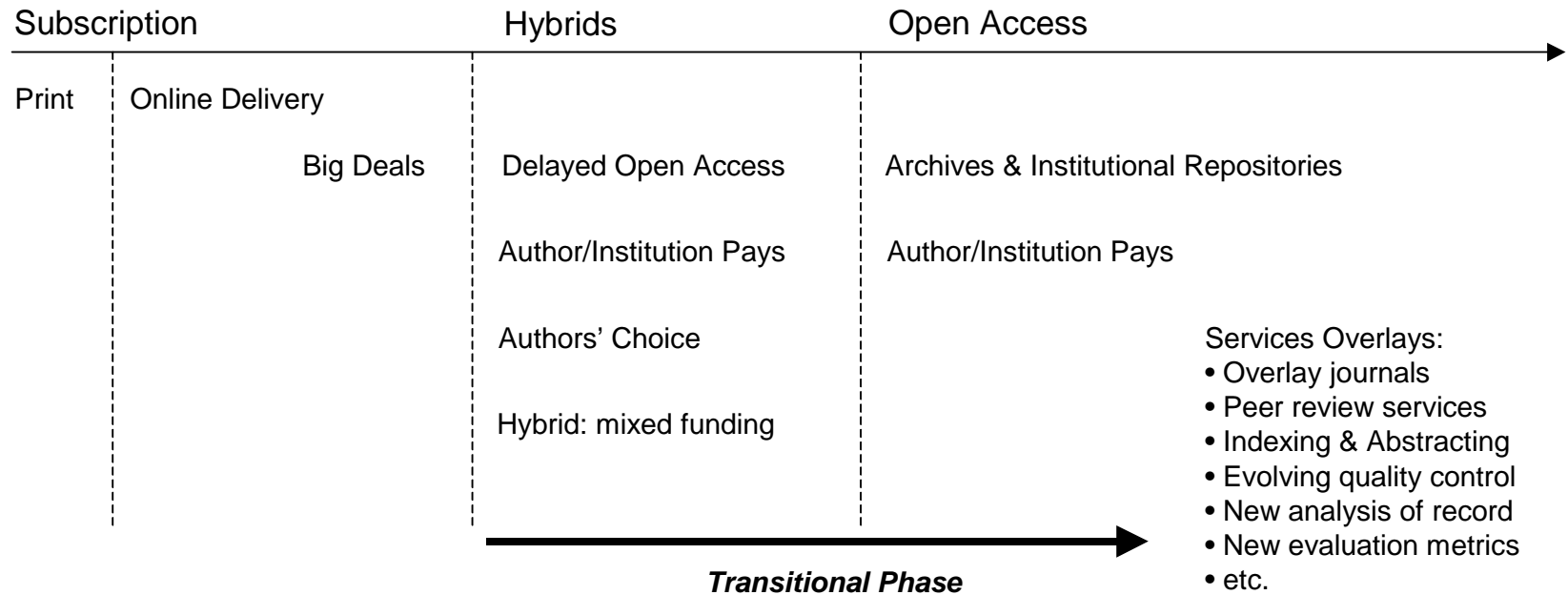
John.Houghton@vu.edu.au

Evolution of scholarly communication

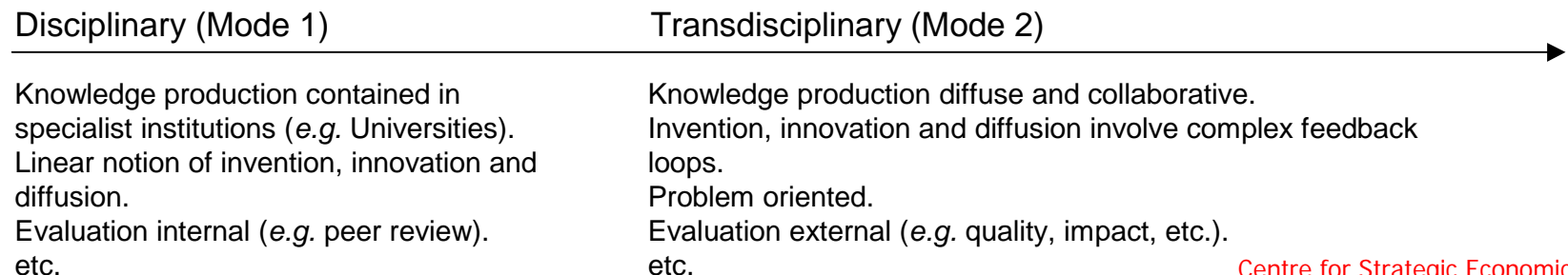
Infrastructure Platform



Publishing Business Model



Mode of Knowledge Production



Researching OA impacts

Policy issue:

- Are there new opportunities and new models for scholarly communication that could enhance the dissemination of research findings and, thereby, increase returns to public investment in R&D?

A policy-oriented research approach:

- What methodological approach or approaches might be used to explore the potential impacts of open access?
- What sort of evidence is required to examine the potential impacts?
- What sort of evidence might be compelling for stakeholders and influence policy?

Recent research activities

Research Communication Costs in Australia, Emerging Opportunities and Benefits

(John Houghton, Colin Steele & Peter Sheehan)

Seeks to identify and quantify all the costs associated with scholarly communication in Australia *and* explore the potential benefits of enhanced access to research findings.

(<http://www.cfses.com/documents/wp24.pdf>)

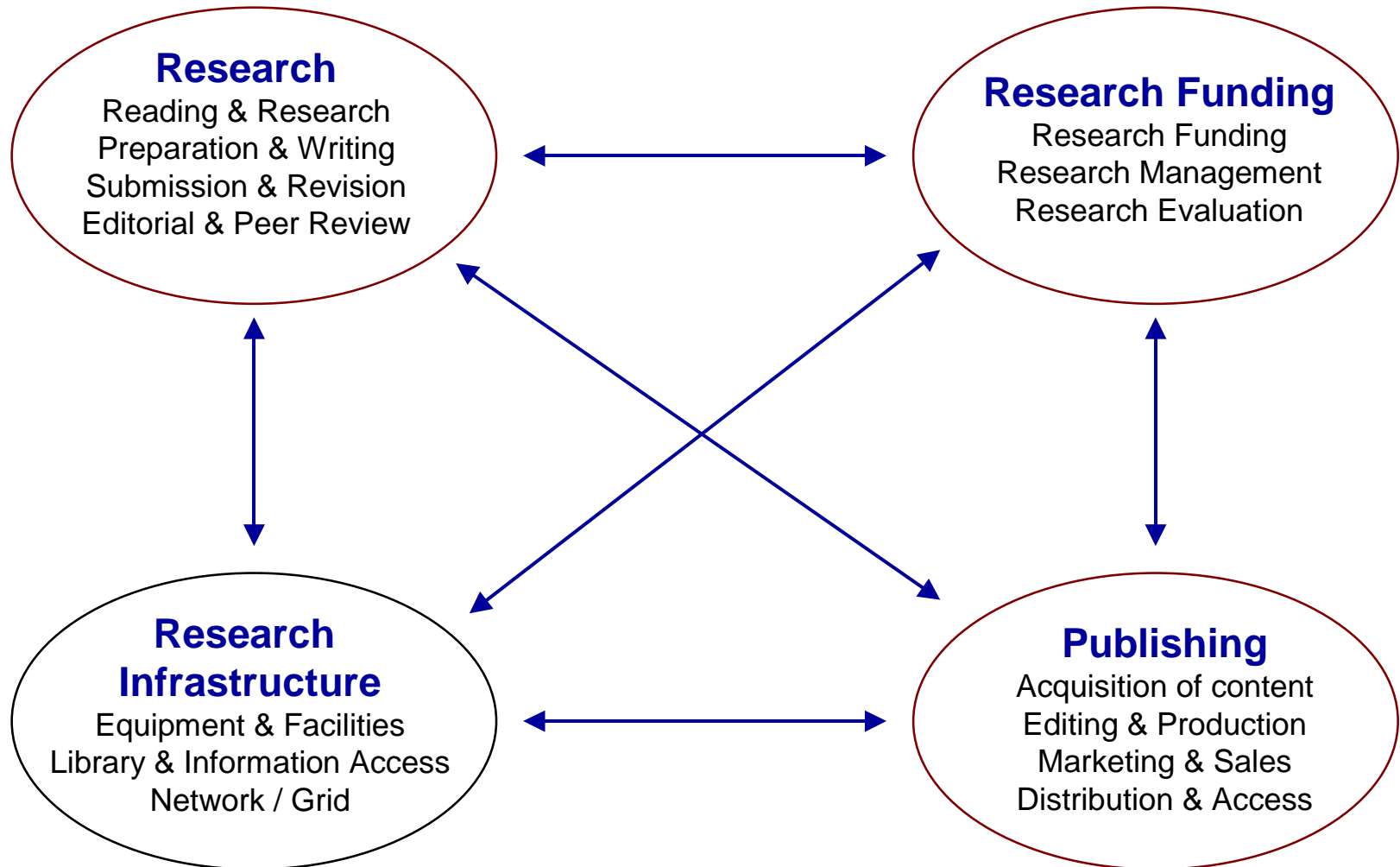
The Economic Impact of Enhanced Access to Research Findings

(John Houghton & Peter Sheehan)

Explores the potential impacts of enhanced access to research outputs using a modified growth model. Indicative impact ranges are calculated for all OECD countries.

(<http://www.cfses.com/documents/wp23.pdf>)

Scholarly communication costs



An Australian cost model



- A literature review informed the development of a model of the costs associated with scholarly communication activities, with activity costs and times cited used as the basis for calculating of local equivalents.
- These were supplemented and refined through local data collection and a series of interviews with stakeholders.
- Inevitably, a number of simplifying assumptions must be made in the construction of such a model, and these costings should be taken as no more than indicative.

Mean activity cost estimates for Higher Education, circa 2004 (AUD)

- Reading: academic staff ≈\$4.6 billion, published staff ≈\$2.7 billion pa.
- Writing (HERDC publications only) ≈ \$480 million pa.
- Peer review (scaled to HERDC) ≈ \$100 million pa.
- Editorial activities (scaled to published staff) ≈ \$33 million pa.
- Editorial board activities (scaled to published staff) ≈ \$3.5 million pa.
- Preparing grant applications (ARC & NHMRC) ≈ \$115 million pa.
- Reviewing grant applications (ARC & NHMRC) ≈ \$22 million pa.
- Publisher costs (scaled to HERDC) ≈ \$150 million pa.
- Library acquisition costs (CAUL) ≈ \$180 million pa.
- Library non-acquisition costs (CAUL) ≈ \$316 million pa.
- Cost per download (sample of CAUL subscriptions) \$3.60 – \$4.50
- Research management costs (estimated) ≈ \$37 million pa.
- ICT infrastructure (estimated total expenditure) ≈ \$1 billion pa.

An Impacts Framework

Additionality:

Access for all, research participation based on merit, not means.

Potential benefits:

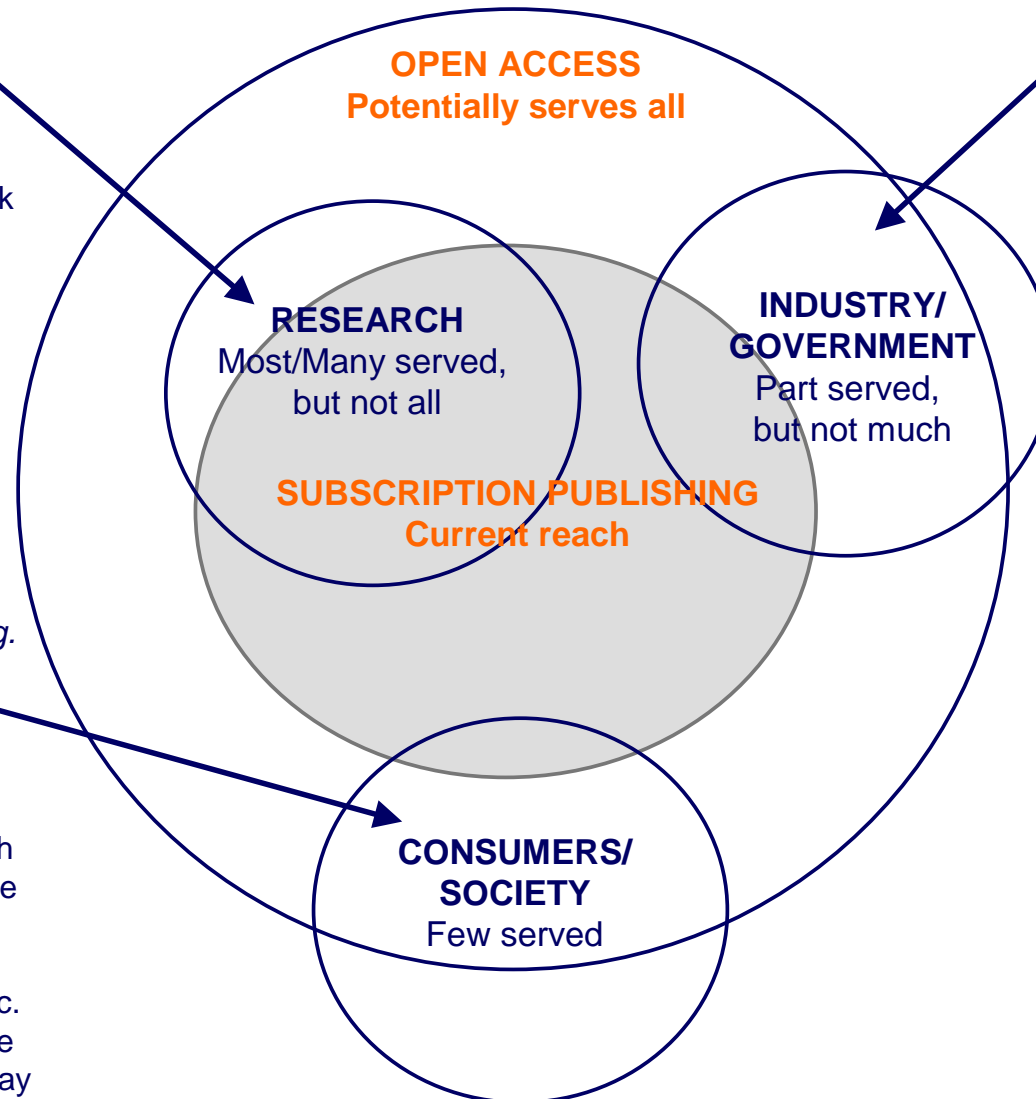
Speeding up discovery.
Increasing rate of accumulation of the stock of knowledge.
Reduction of duplicative R&D.
Fewer blind alleys.
Better educational outcomes & enhanced research capabilities.

Additionality:

Access as needed, informed consumers (e.g. health and education).

Potential benefits:

Contribution to the 'informed citizen' and 'informed consumer', with implications for better use of health and education services, better consumption choices, etc. leading to greater welfare benefits, which in turn may lead to productivity improvements.



Additionality:

(1) Access as needed, more informed producers.

(2) New businesses add value to content (e.g. Weather Derivatives).

Potential benefits:

Accelerate and widen opportunities for adoption and commercialisation.
The potential for much wider access for GPs/nurses, teachers/students, and small firms in consulting, engineering, biotechnology, nanotechnology, etc.
The potential for the emergence of new industries based upon the open access content.

A modified growth model



- There is a vast literature on returns to R&D.
- Rates of return to R&D are high – in the region of 30% to 60% a year, and much higher in some cases.
- The standard approach assumes that all R&D generates useful knowledge, and all knowledge is equally accessible.
- We introduce “access” and “efficiency” into a standard growth model as negative, friction variables, and look at the impact of reducing the friction by increasing access and efficiency.

Impact estimation ranges

Example of estimation tables (Australian GovERD)

GovERD	Rate of return to R&D				
	25%	40%	50%	60%	75%
5,438					
Per cent change in accessibility and efficiency	Recurring annual gain from move to open access (AUD million)				
1%	27	44	55	66	82
2%	55	88	110	132	165
5%	139	223	279	334	418
10%	285	457	571	685	856

Calculating potential impacts



Beware – Work in Progress!

- With gross expenditure on R&D at \$12 billion a year and a 50% return to R&D, a 5% increase in access and efficiency would be worth \$628 million pa.
- With higher education R&D expenditure at \$3.4 billion and a 25% return to R&D, a 5% increase in access and efficiency would be worth \$88 million pa.
- With RC administered competitive grants funding at \$830 million and a 25% return to R&D, a 5% increase in access and efficiency would be worth \$21 million pa.

Calculating cost-benefits



- We compare the estimated incremental cost of institutional repositories in higher education, with the potential incremental benefits from enhanced access to higher education research (*ceteris paribus*).
- Over 20 years, a national system of institutional repositories costing \$10 million a year would cost around \$130 million (NPV).
- Enhanced access to higher education research, with impacts at \$88 million a year, would realise benefits of around \$4 billion (a benefit/cost ratio of 30).
- Enhanced access to RC competitive grants funded research, with impacts at \$21 million a year, would realise benefits of around \$925 million (a benefit/cost ratio of 7.2).

Potential impacts in the OECD



- Preliminary estimates – with many limitations, caveats and assumptions.
- At 2003 levels of gross expenditure on R&D (GERD) and assuming a 50% return, a 5% increase in access and efficiency for OECD research would have increased annual returns by around USD 35 billion.
- At the lower 25% rate of return, a 5% increase in access and efficiency for OECD public sector research (Government & Higher Education) would have increased annual returns by around USD 5.2 billion.

The Easi-OA Research Program

(Economic and Social Impacts of Open Access)

- Meeting of researchers, held in March at OSI New York.
- To discuss how best to research the impacts of open access and, if possible, develop a research program identifying *and* estimating those impacts.
- The aim is to examine the costs and benefits of various scholarly communication models *and* the distribution of those costs and benefits throughout the scholarly communication system.
- Everyone is invited to participate, with the program providing a focal point for activities.

TOP DOWN: ESTABLISHING A FRAMEWORK

(Framing the question – identifying issues and dimensions, and providing preliminary estimates)

- Preliminary estimates of the impacts of OA on returns to R&D (vertical studies will refine).
- Identification of the dimensions of costs and benefits, where possible quantifying impacts (to refine estimates).
- Analysis of key stakeholder issues and barriers, including stakeholder-evidence matching (to give focus).

VERTICAL ISSUES AND CASE STUDIES

(Individual studies – exploring the mechanisms for realising cost-benefits)

Mechanisms and Indicators (Measurable OA impacts):

- How OA accelerates R&D and impacts research.
- How OA impacts dissemination beyond researchers to industry, government and public users.
- The speed of citation of OA articles in patent applications.
- OA downloads by country, type of user and case by case.
- Papers and/or proposals rejected as duplicative and/or ill-informed about previous work.
- Proportion of researchers/users finding what they want (*i.e.* satisfy vs satisfice) and impact on quality.
- Collect/collate/monitor work on measurable OA Advantages using OAA framework (*e.g.* eprints.org).

Business Models and Case Studies (Supply and Demand Side Perspectives):

- System costs related to each business model, taking both demand (user) and supply (publisher) perspective.
- Industry impacts – case studies of access costs and OA benefits for industry users in a range of sectors.
- Wider sectoral impacts – case studies of impacts in health, education, agriculture, etc.
- Country impacts – case studies of impacts on various countries (*e.g.* developed and developing).
- Disciplines & Fields – case studies of impacts in specific fields (*e.g.* Physics/arXiv, Biomed/OAJs).
- Specific examples – case studies from experience (*e.g.* arXiv, Medline, PubMed, etc.).

BOTTOM UP: SCOPING THE SYSTEM

(System mapping – scoping the system and identifying the actors and activities involved)

- Identification of the actors and the costs and benefits to them, drawing on existing work, updating and extending.
- Exploration of the flow of funds around the system, looking at the effects of open versus toll access on the system

Conclusions



- There are new opportunities to increase returns to R&D by increasing access to it (*e.g.* Open Access).
- Preliminary work shows that the impacts of enhanced access to research findings are likely to be substantial, so it is worthy of serious attention.
- It is a complex and challenging area, with no easy answers to the questions about approaches and evidence.
- From a research perspective, it makes sense to create a framework and focal point for activities that helps put the pieces in place and build a clearer picture.



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