Pay It Forward: Investigating a Sustainable Model of Open Access Article Processing Charges for Large North American Research Institutions

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California Digital Library

Berlin12
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“Breaking things down to the institutional level”

Need for market mechanisms to contain costs

Economic analysis, understanding of behavior and motivation, need for incentive structures...
Pay It Forward: A grant from the Andrew W. Mellon Foundation

Key Question:
Can a large-scale conversion to open access scholarly journal publishing funded via APCs be viable and financially sustainable for large North American research-intensive institutions?

18-month project, January 2015 – June 2016
Led by the University of California, Davis and the California Digital Library
Why this project, why now?

Increasing disconnect between European and North American approaches to open access

North America

• Tri-Agency Open Access Policy
• NIH Open Access Policy
• OSTP Directive
• Faculty OA Policies
• FASTR

Europe

• Finch Report
• Horizon 20/20
• APC Offset Agreements
Local drivers:

UC Faculty Open Access Policy

Campus Open Access Fund Pilots

Faculty began asking: “Does this mean I have to pay to publish?” and “Will the library pay?”

Our Libraries wanted to understand how gold OA would impact our budgets if we were to subsidize publication
“The cumulative effect of sustained above-global-average growth in R&D spending in emerging economies has been a profound shift in the global make-up of research.”

(STM Report, 2015)
Project Design

Qualitative Analysis

<table>
<thead>
<tr>
<th>Academic Author Surveys</th>
<th>Publisher Survey</th>
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</thead>
<tbody>
<tr>
<td>Library Subscription Expenditures</td>
<td>University Publishing Output &amp; Potential APCs</td>
</tr>
</tbody>
</table>

University Partners:
- University of California
- Harvard University
- Ohio State University
- University of British Columbia

Industry Partners:
- Assoc of Learned & Professional Society Publishers (ALPSP)
- Thomson Reuters (Web of Science)
- Elsevier (Scopus)

Quantitative Analysis: Five-Year Period, 2009-2013
Core Project Team

- **MacKenzie Smith**, UC Davis *(Co-PI)*
- **Ivy Anderson**, CDL *(Co-PI and Quantitative Lead)*
- **Greg Tananbaum**, ScholarNext *(Project Manager)*
- **Mathew Willmott**, CDL *(Data Analyst)*

Project Consultants

- **Greg Tananbaum**, ScholarNext *(Publisher surveys and costs)*
- **Carol Tenopir**, University of Tennessee *(User studies)*
- **David Solomon**, Michigan State University &
- **Bo-Christer Bjork**, Hanken School of Economics *(APC research, Scenario modeling)*
- **Mark McCabe**, Boston University & SKEMA Business School *(Scenario modeling, economic analysis)*
• A publicly accessible financial model that depicts what the emerging APC model would cost large research institutions under a variety of rigorously-modeled scenarios

• A replicable methodology that others can apply in a local context
  – What level of APC is realistic and sustainable in a given discipline?
  – How might costs be distributed among institutions, research funders, and other players?
Project Timeline

**Phase 1: January-March**
- Finalize data specifications, begin data gathering
- Conduct focus groups
- Develop publisher survey

**Phase 2: April-June**
- Collect and refine data
- Conduct user surveys
- Conduct publisher survey
- Perform publishing cost analysis

**Phase 3: July-December**
- Complete survey analysis
- Complete financial and bibliometric data analysis
- Build and refine models

**Phase 4: January-June**
- Review and refine model
- Prepare documentation
- Write up findings
Preliminary Findings

Author Studies

(Carol Tenopir)
# Author Study Impressions

## Range of perspectives
- True believers, skeptics, most people somewhere in the middle
- Many senior faculty already post green versions in a repository or personal website
- Support for OA as readers and as a moral good, but most have access to what they need now
- Arts, Humanities, & Social Sciences faculty are less supportive of OA

## Concerns
- Where funding will come from
- Richer nations may dominate publication
- Potential for APC price increases
- Predatory / vanity publishing
- Lack of transparency – ‘publishing is broken’
- APCs are too high – publishers charge what the market will bear

## Library role
- Negotiating Institutional publishing licenses
- Coordinating/administrative
• If they have a repository (green) why do they need gold?
• There is a confusing lack of transparency in APCs.
• Quality may still be costly.
• Figuring out a model will take time.
• We have to evaluate the impact on readers and authors and different fields separately.
• We have privilege of access so perhaps we aren’t the best judges of this issue.
Importance of Factors When Selecting Where to Publish

1. Quality and reputation of journal
2. Fit with scope of journal
3. Audience
4. Impact Factor
5. Likelihood of acceptance
6. Time from submission to publication
7. Editor or editorial board
8. Open Access

*Listed highest to lowest
Quality of a journal matters, but quality is often defined by traditional attitudes from the past.

For OA to be widely accepted, there may need to be a cultural shift.
Preliminary Findings

APCs
(“Ground Up” Costs: Greg Tananbaum)
(APC Research: Dave Solomon)
Ground Up Cost Per Article: Data Sources

- Literature Review
- 990 Tax Forms
- ALPSP Survey
- Industry Input
<table>
<thead>
<tr>
<th>Source</th>
<th>Median Cost-Per-Article (CPA)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Literature Review</td>
<td>$2,508</td>
<td>Normalized to include no surplus.</td>
</tr>
<tr>
<td>990 Tax Forms</td>
<td>$2,266</td>
<td>No surplus.</td>
</tr>
<tr>
<td>ALPSP Survey</td>
<td>$1,712</td>
<td>Based on $2,140 median APC for 12 ALPSP survey respondents that indicated their APC pricing was based on a cost recovery model, including indirect costs and surplus. 20% removed as surplus, using Jisc and CEPA estimates.</td>
</tr>
<tr>
<td>Industry Sources</td>
<td>Range: $500 - $1275</td>
<td>APC-supported journals not tied to legacy infrastructure.</td>
</tr>
</tbody>
</table>
PIF partner author publications in WoS 2009-2013 merged with APC prices from:
Morrison et al. Publications 2015, 3(1), 1-16; doi:10.3390/publications3010001

Includes 59% of the partner authored publications tagged as OA.

<table>
<thead>
<tr>
<th>Discipline including Arts and Humanities</th>
<th>Mean</th>
<th>N</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arts and Humanities</td>
<td>1,273.26</td>
<td>19</td>
<td>354.76</td>
</tr>
<tr>
<td>Multidisciplinary</td>
<td>1,345.83</td>
<td>522</td>
<td>50.39</td>
</tr>
<tr>
<td>Mathematics</td>
<td>1,209.79</td>
<td>24</td>
<td>69.60</td>
</tr>
<tr>
<td>Clinical Medicine</td>
<td>1,753.60</td>
<td>3,456</td>
<td>466.20</td>
</tr>
<tr>
<td>Biomedical Research Disciplines</td>
<td>1,830.36</td>
<td>5,511</td>
<td>552.38</td>
</tr>
<tr>
<td>Life Sciences</td>
<td>1,789.30</td>
<td>2,286</td>
<td>552.35</td>
</tr>
<tr>
<td>Chemistry</td>
<td>1,712.00</td>
<td>189</td>
<td>308.93</td>
</tr>
<tr>
<td>Physics and Astronomy</td>
<td>1,327.90</td>
<td>139</td>
<td>84.72</td>
</tr>
<tr>
<td>Engineering</td>
<td>1,900.44</td>
<td>436</td>
<td>453.47</td>
</tr>
<tr>
<td>Earth Science</td>
<td>1,599.72</td>
<td>664</td>
<td>331.82</td>
</tr>
<tr>
<td>Business and economics</td>
<td>1,350.00</td>
<td>11</td>
<td>0.00</td>
</tr>
<tr>
<td>Psychiatry/Psychology</td>
<td>1,787.35</td>
<td>373</td>
<td>433.94</td>
</tr>
<tr>
<td>Social Science</td>
<td>1,940.57</td>
<td>726</td>
<td>460.28</td>
</tr>
<tr>
<td>Total</td>
<td>1,775.07</td>
<td>14,356</td>
<td>510.65</td>
</tr>
</tbody>
</table>
• Data sources
  • United Kingdom Universities
  • Wellcome Trust
  • German Universities and Foundations
  • Austrian Science Fund (FWF)

• Matched with WoS metadata based on DOI (85%)
• Limited to articles and proceedings
• Only full OA journals (no hybrid payments)
• VAT was included if applicable
• Currency conversion to USD
  • GBP 1.60
  • EUR 1.30
### Weighted Average APC Payment

<table>
<thead>
<tr>
<th>APCs in USD</th>
<th>Weighted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discipline</td>
<td>Average</td>
</tr>
<tr>
<td>Arts and Humanities</td>
<td></td>
</tr>
<tr>
<td>Multidisciplinary</td>
<td>1,812.98</td>
</tr>
<tr>
<td>Mathematics</td>
<td>905.60</td>
</tr>
<tr>
<td>Clinical Medicine</td>
<td>1,880.89</td>
</tr>
<tr>
<td>Biomedical Research Disciplines</td>
<td>2,036.35</td>
</tr>
<tr>
<td>Life Sciences</td>
<td>1,885.75</td>
</tr>
<tr>
<td>Chemistry</td>
<td>2,383.47</td>
</tr>
<tr>
<td>Physics and Astronomy</td>
<td>1,889.14</td>
</tr>
<tr>
<td>Engineering</td>
<td>1,684.52</td>
</tr>
<tr>
<td>Earth Science</td>
<td>1,580.45</td>
</tr>
<tr>
<td>Business and economics</td>
<td>1,415.65</td>
</tr>
<tr>
<td>Psychiatry/Psychology</td>
<td>1,646.72</td>
</tr>
<tr>
<td>Social Science</td>
<td>1,812.62</td>
</tr>
<tr>
<td>Total</td>
<td>1,907.43</td>
</tr>
</tbody>
</table>

Weighted Average across European payment databases
Preliminary Findings

Break-Even Scenarios for Partner Libraries
(Mark McCabe, Mat Willmott)
Bibliometric data – summary statistics

73,436 publications in WoS across our partner universities in 2013

Documents by discipline, 2013
Documents by partner institution

Bibliometric data – summary statistics

Corresponding authorship rates:

**Scopus**: 49% - 55%

**WoS**: 58% - 62%
Break-Even Point: the average APC which an institution would be able to support from its library subscription budget, given its publication output.

- A **high** break-even point means that the institution could support publication even if the average APC is quite high (represented in green in the following charts)

- A **low** break-even point means that the institution could only support publication if the average APC is very low (represented in red in the following charts)

Break-even points were calculated for each partner institution, assuming that the institution is responsible for payment of an APC if the corresponding author is from that institution.
Break-Even Points: Library funding pays for all articles

Institutions with a higher break-even point are generally smaller, less research-intensive universities with*:
- A lower ratio of grad students to undergraduates
- A higher ratio of teaching to research faculty
- More students per faculty member

$1907$: Average APC for publication in full OA journal, from European payment databases

$1775$: Average APC for partner institution publications in full OA journals

Institutions with a lower break-even point are generally more research-intensive universities with*:
- A higher ratio of grad students to undergraduates
- A higher ratio of research to teaching faculty
- Fewer students per faculty member

Break-Even Points: Excluding articles with grant funding

- **$1775**: Average APC for partner institution publications in full OA journals
- **$1907**: Average APC for publication in full OA journal, from European payment databases

If we assume that documents which acknowledge a grant can have their APC’s fully covered by the granting agency, then institutions can support publication at a much higher cost.

About 2/3 of all documents in our dataset which acknowledge a grant are acknowledging either NIH, NSF, DoD, DoE, or NASA, all of which do allow charging APC’s to the grant.
Author

**Author has grant $**

1. Grant must be applied up to $X

2. Library pays up to $X

3. Author is responsible for the balance of (APC-$X), to be paid at the author's discretion out of grant funds (if available) or other sources

**Author does not have grant $**

1. Author may have grant $

2. Library pays up to $X

3. Author is responsible for the balance of (APC-$X), to be paid at the author's discretion from wherever he/she can secure funds

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_Preliminary multi-stakeholder funding scenarios - including market dynamics_
Remaining Tasks

• Refine Data
  – Library Expenditure Data
  – APCs
  – Publication data (incl. WoS and Scopus differences)
  – Project growth over time

• Develop funding scenarios to encourage market dynamics
  – Role of authors and granting agencies

• Build and populate calculation tool

• Write final report
  – Will share all data that’s publicly shareable