Scientific Technical and Medical (STM) journal publishing in 2010

April 2010
Scientific Technical and Medical (STM) journal publishing industry overview

- 2,000 publishers publish around 1.4 million peer reviewed articles per year in 23,000 journals
- STM industry employs (directly) 110,000 globally: 40,000+ in EU, 10,000 in UK
- UK universities spend around 0.5% of their annual income on STM journals (£116MM in 2008)

Sources: Scopus, SIMBA, THE, Mark Ware, SCONUL
Why do STM publishers exist?

- First peer reviewed journal founded in 1665 by Royal Society
- Journal publishing has evolved dramatically since, but its core functions remain:
  - Registration of new research findings
  - Quality assurance through peer-review
  - Dissemination globally
  - Archiving in perpetuity

Researchers: which publishing objectives are most important to you?

<table>
<thead>
<tr>
<th>Objective</th>
<th>2005 Survey</th>
<th>2010 Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>To further my career prospects</td>
<td>38%</td>
<td>38%</td>
</tr>
<tr>
<td>To establish precedence and protect my intellectual property</td>
<td>20%</td>
<td>17%</td>
</tr>
<tr>
<td>To ensure I receive recognition</td>
<td>25%</td>
<td>24%</td>
</tr>
<tr>
<td>To disseminate results and further knowledge</td>
<td>84%</td>
<td>78%</td>
</tr>
<tr>
<td>To secure funding for future research projects</td>
<td>30%</td>
<td>40%</td>
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STM publishers exist to provide highly valued services to scientific and medical researchers

Sources: NOP/Elsevier surveys 2005 and 2010
STM journal publishing is driven by R&D outputs

- 3-4% annual growth in R&D funding annually drives…
- 3-4% annual growth in number of R&D workers drives…
- 3-4% growth in number of articles and journals published
- From 2004-2008, number of articles published by 113 UK universities increased by 5% per year
  - 2004: 92,095
  - 2008: 112,762

What do STM publishers do?

- Solicit and manage submissions
- Archive and promote
- Manage peer review
- Edit and prepare
- Publish and disseminate

- Organise editorial boards
- Launch new specialist journals

- 5,000 new editors per year
- 500 new journals launched per year

- 3 Million+ article submissions per year
- 2.5 million+ referees
- 3.75 million+ referee reports per year
- 50%+ of submissions rejected

- 40 million articles available digitally, back to early 1800s
- 125,000 editors
- 350,000 editorial board members
- 30 million+ author/publisher communications per year

- 12 million researchers
- 4,500+ institutions
- 180+ countries
- 1 billion+ downloads/year
- 10 million+ printed pages/year

- 1.5 million new articles produced per year
- 180 years of back issues scanned, processed and data-tagged

Note: industry estimates based on known numbers for a subset of the industry that are then scaled to 100% based on the article share of the known subset.
Publishers have invested heavily to digitise since 2000

- Solicit and manage submissions
- Archive and promote
- Publish and disseminate
- Manage peer review
- Edit and prepare
- Production

**Organise editorial boards**
**Launch new specialist journals**

**Author Submission & Editorial Systems**
£20 million

**ScienceDirect**
**Scopus**
**Scirus**
**MD Consult**
**HealthConnect**
**eNewsletters and alerts**
>£400 million

**Electronic Warehouse**
£15 million

**Production Tracking System**
£15 million

**Elsevier** alone has invested over £600 million to digitise STM publishing processes since 2000
**STM industry has invested an estimated £2+ billion since 2000**

*Figures in current (2009) UK pounds using GDP deflators*
Publishers also evolved pricing models to expand electronic access

Print-only
(pre 1999)

- Core collections of institutional print journal subscriptions
- Annual price increases driven by
  - 3-4% annual growth in articles, higher in expanding subject fields
  - 3-4% annual inflation

P+E and E-only
(post 1999)

- “Core” collection plus fee for Electronic access to subscribed titles
- Annual price increases driven by
  - 3-4% annual growth in articles, higher in expanding subject fields
  - 3-4% annual inflation
  - 20%+ annual usage growth
- Major volume discounts to access previously unsubscribed-to titles
- Additional discounts for E-only
As a result, most customers now access journals electronically.

Benefits

For researchers
- Remote, desktop access
- Fast search
- Interlinked articles
- eFunctions, eg eMail alerts
- Links to datasets

For librarians
- Easier collection management
- Usage data per journal
- Reduced storage space
- Staff efficiencies

Source: “E-journals, their use, value and impact”, 2009 RIN/Ciber
UK university researchers are highly satisfied with access to journals

- Original research articles in journals
- Review papers in journals

Ease of access to research content (% rating Very Easy or Fairly Easy)

Average importance to success of organisation (rating scale, 1-7)

*PRC study: Survey of access to professional and academic information in the UK, August 2009 – companion report
Globally researchers are highly satisfied with access to journals.

- **Research articles in journals**: 93%
- **Reference works**: 74%
- **Clinical guidelines**: 73%
- **Professional/Trade publications**: 63%
- **Books/Monographs**: 62%
- **Technical information (e.g., characteristics of materials)**: 57%
- **Patent information**: 56%
- **Conference proceedings**: 56%
- **Historical archives/public records**: 44%
- **Doctoral theses/dissertations**: 43%
- **Market Research reports**: 38%
- **Data set/Data models/Technical Info/Algorithms and programs**: 38%

**Access to research articles by region**

- **North America**: 97%
- **Western Europe**: 94%
- **Eastern Europe**: 84%
- **Middle East**: 85%
- **APAC**: 91%
- **Latin America**: 88%
- **Africa**: 78%

Source: PRC global study (forthcoming)
UK universities access more titles and pay less per title accessed than in 2004

UK universities now access 32% more journals than in 2004, and pay 11% less per journal accessed

Source: Based on SCONUL data (Ciber analysis of 113 UK Universities)
As usage has exploded, effective price paid per article downloaded has fallen

What UK universities get

Full text article downloads
Average per institute
+27% CAGR

2004 2005 2006 2007 2008
432,693 632,758 772,600 930,415 1,134,165

What UK universities pay

Effective price paid per article downloaded
GBP (in constant 07/08 currencies – gdp deflator)
-12% CAGR

2004 2005 2006 2007 2008
1.19 0.91 0.83 0.77 0.70

• UK universities downloaded over 120 million articles in 2008, 160% more than in 2004
• The effective mean price paid per article downloaded in 2008 was 70 pence

Source: Based on SCONUL data (Ciber analysis of 113 UK Universities)
Benefits are realised at the individual institutional level.

Source: SCONUL
UCL study shows e-journal usage drives researcher productivity

- “Doubling in downloads, from 1 to 2 million, is statistically associated with dramatic - but not necessarily causal - increases in research productivity”
- Papers up 207%
- PhD awards up 168%
- Research grants and contract income up 324%
- Even stronger as downloads increase further

Source: “E-journals, their use, value and impact”, 2009 RIN/Ciber
As a result, UK university researchers ‘punch well above their weight’

Figure 1.2 The UK’s share of global science

- 14.4% of world’s most highly cited
- 11.8% of world citations
- 7.9% of world papers
- 3% of global funding for research
- 1% of population

Source: Royal Society, “the Scientific Century” 2010
Non-university researchers are satisfied with access to journals

STM publishers and other stakeholders are working to understand and close remaining gaps

PRC study: Survey of access to professional and academic information in the UK, August 2009 – companion report
STM publishers are evolving licensing models to extend access to non-university constituents further.

**Corporations, SMEs**
- Customised access and pricing mechanisms
  - Corporate editions
  - Article choice
  - Pay per view
  - Sponsored articles

**Hospitals and medical schools**
- Customised access and pricing mechanisms
  - Medical collections
  - Article choice
  - Pay per view
  - Sponsored articles

**Research institutes**
- Customised access and pricing mechanisms
  - Article choice
  - Sponsored articles

**Individuals**
- Customised access and pricing mechanisms
  - Basic functionality pay per view, e.g. Patient Research, Deep Dyve
  - Article sponsorship
Information philanthropy is further broadening access globally

- **PatientINFORM** provides patients with access to summaries of journal articles and links to full-text: 19 different publishers and STM and PSP organisations with annual cost of $110k.

- **PatientResearch** provides patients and carers access to articles in 100+ medical journals for a minimal processing fee.

- **Research4Life** provides developing countries with free / low cost access to peer-reviewed content to over 8,100 scientific journals, books, and databases.

  Across three programmes, over 350 publishers provide free / low cost access to over 3,000 institutions across 108 countries.

- Publishers engage with visually impaired and disabled users to make accessibility enhancements to products and websites.

- **AccessText Network**, supplies resources to support the use of textbooks and this is supported by publishers including Elsevier, Wiley-Blackwell, McGraw-Hill Education and Pearson Education.
STM publishers are continuing to invest:

1. Enriching and enhancing articles

### Article Enhancement (e.g. Article of the Future)

- Graphical abstracts with main message of the paper.
- Hierarchical presentation of text and figures.
- Alternate views to hide or show experiment details.
- Real-time reference analyses for citation exploration.
- Interactive to assist in navigating the article

### Visualisation

- Peer reviewed video journals
- Searchable Image databases using semantic linking
- In-line video to enhance article content (techniques and demonstrations)
- Multiple platform support

### Social Networking

- Online community sites facilitating discussion and sharing research findings, techniques and methods
- Linked in journal and book content into community
- Supports continuous learning, CME and virtual conferences

### Mobile Technology

- Journal, book and database content on mobile devices
- Search and browse articles
- Create alerts and citation analysis
- Save favourite articles information and add notes
- Share result information via Email or Twitter
- News feeds and RSS technology
STM publishers are continuing to invest:
2. Tools to derive insights across all articles

**Text Mining Tools**
- Publishers are developing data and text mining tools with partners to extract semantic connections within journal and book content
- Working with partner to link to datasets, e.g. EMBL, Pangaea
- Researchers want to save time searching and spend more time analyzing and experimenting
- Solutions help to discover ideas and new uses for technologies

**Research Performance Measurement Tools**
- Products that help decision makers in institutions and governments analyse research performance and emerging areas of science
- Identifies drivers of competitive research positions and strengths.
- Data derived from publication and citation analysis
- Matching of output by authors and institutions
- Intuitive application of article-level classification and bibliometrics, through partnership with industry researchers
STM publishers are continuing to invest:
3. Anti-Plagiarism and Ethics Enforcement

- Cross-publisher initiative with CrossRef to detect instances of plagiarism in scientific articles
- Annual investment from publishers of membership and article processing fees

- Provides online forum for publishers or journal editors to discuss issues regarding scientific and peer review integrity

- Publishers have introduced the Rightslink reprints and permission system to enable authors to have permissions for content use to be enabled online and receive instant permissions.
Key issue: university library funding outpaced by R&D outputs

- Libraries in 2008 received only 2.7% (net 2.4%) of UK universities' budgets, down from 3% in 2004
- Library funding is outstripped by R&D funding and outputs, and by total university expenditures
Cash costs of alternative access models: significantly higher for UK

- STM publishers are receptive to and are enabling ‘open access’ (oa) models
  - 90%+ of articles appear in journals enabling ‘green oa’.
  - 30%+ of articles appear in journals enabling ‘gold oa’

- Current global and UK uptake of these models is low:
  - ‘Green oa’: 7%
  - ‘Gold oa’: 1-2%

- Publishers are receptive to discussing ways to increase uptake further

- Significant cash spend increases are required for the UK to support these models
  - ‘green oa’: +16% increase in cash costs
  - ‘gold oa’: +121% increase in cash costs

- Future spending would also increase at inflation-plus-R&D output-growth (i.e. around 6% in total each year) under ‘green’ and ‘gold oa’, because both models expand with growth of R&D outputs.

Source: SCONUL data, JISC/Houghton report
Note: ‘green open access’ is the system of posting manuscripts in institutional repositories; ‘gold open access’ is funded by author and/or funding body fees per article
Conclusions

- STM publishing provides a valued service to science and medical researchers
- STM publishing is driven by R&D outputs, which grow 3% annually
- STM publishers have invested more than £2 bn in digital technologies since 1999 delivering massive benefits:
  - Access – for university and non-university researchers
  - Quality of content
  - Productivity of researchers
  - Unit prices paid
- STM publishers are continuing to invest to deliver the next generation of benefits for researchers
  - Intra-article functionality
  - Inter article insights, linking to datasets
  - Anti-plagiarism and ethics enforcement
- A key issue is that library funding is outpaced by the growth of R&D outputs
- STM publishers are receptive to facilitating alternative access models, although these would result in significantly higher cash expenditures for UK universities
- STM publishing is a key enabler of the UK’s global leadership position in R&D