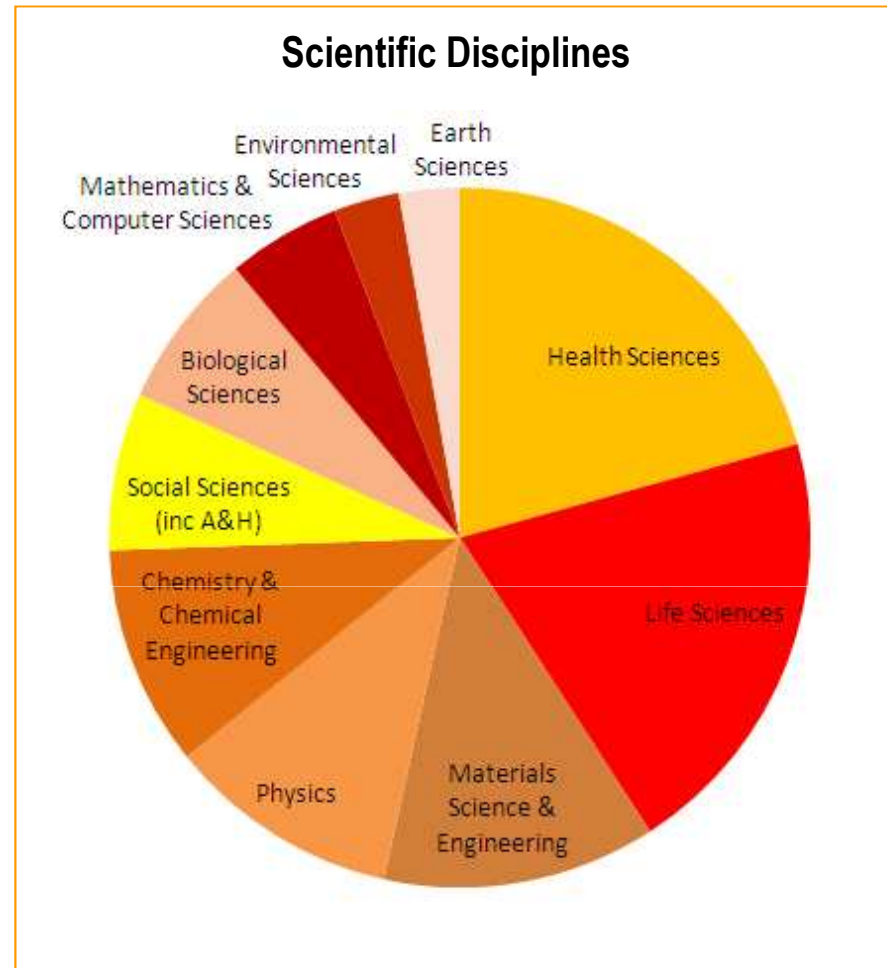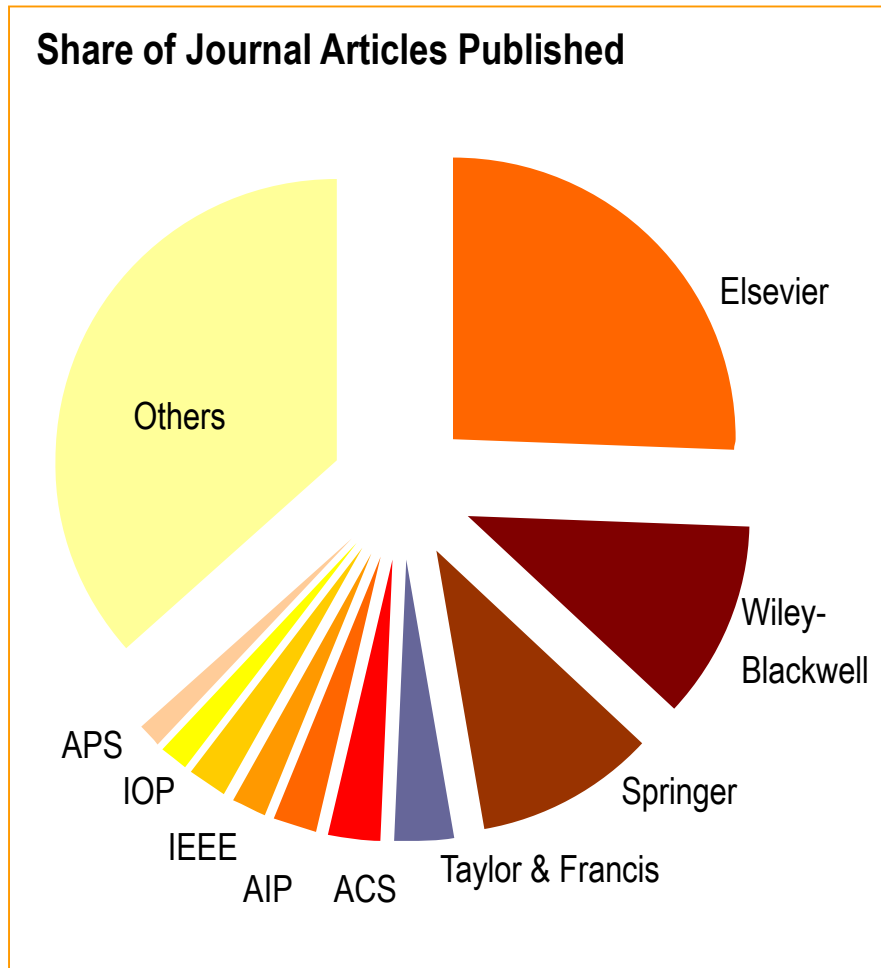# Scientific Technical and Medical (STM) journal publishing in 2010

April 2010

Scientific Technical and Medical (STM) journal publishing industry overview

Share of Journal Articles Published
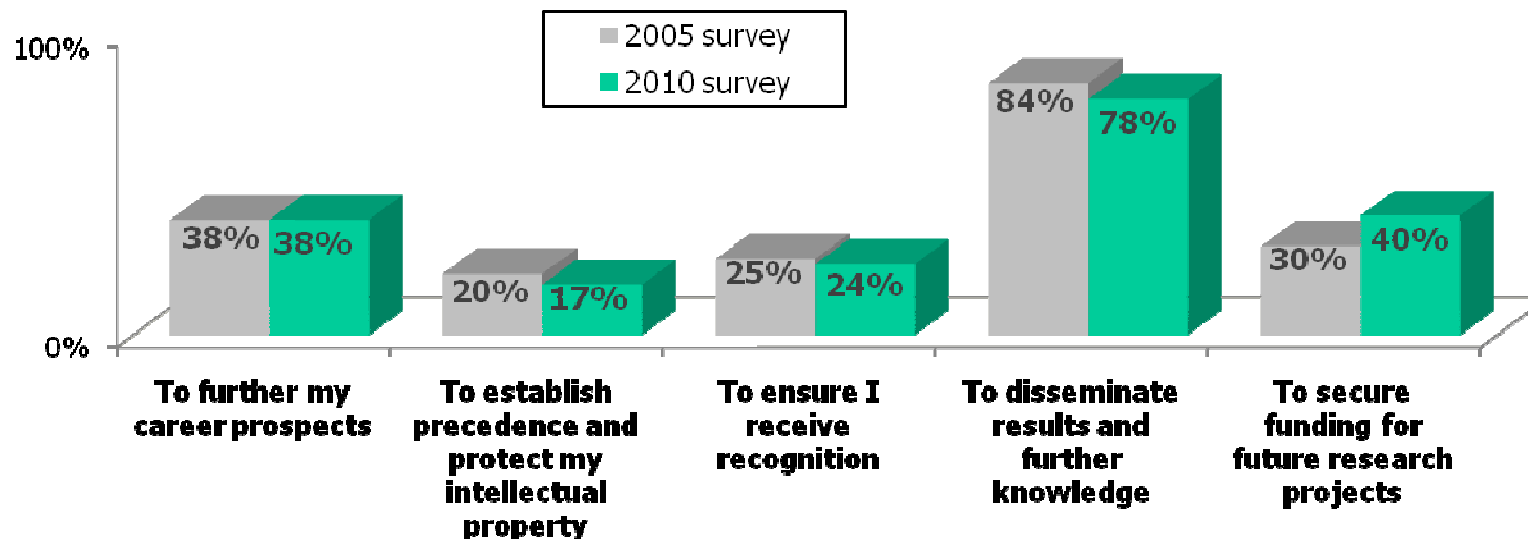

Scientific Disciplines

- 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)

Why do STM publishers exist?
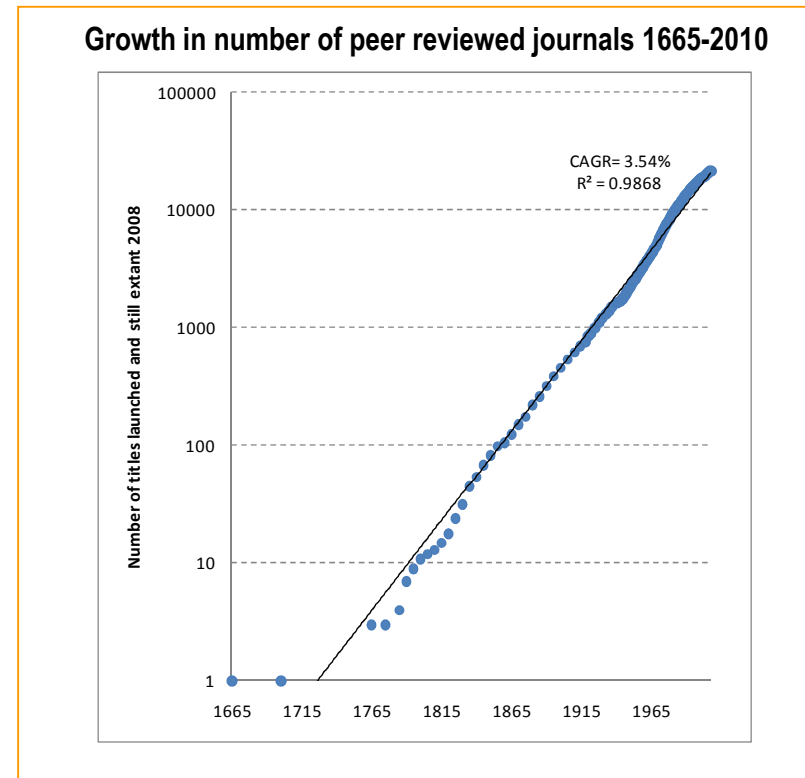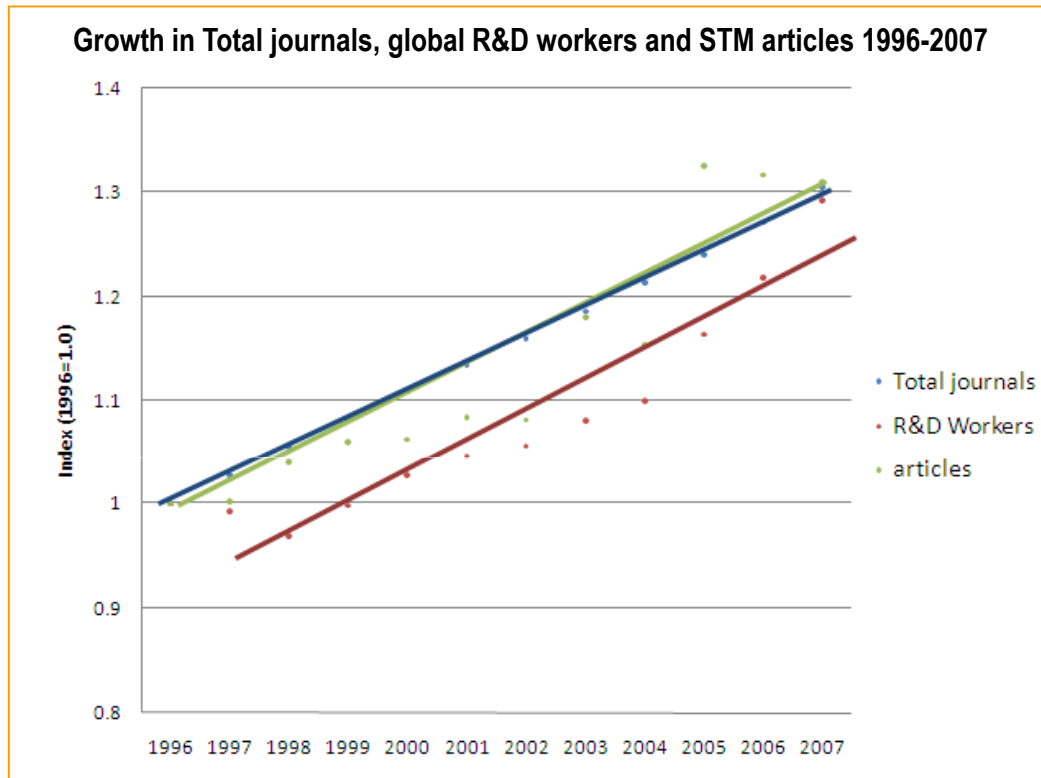
PHILOSOPHICAL TRANSACTIONS.
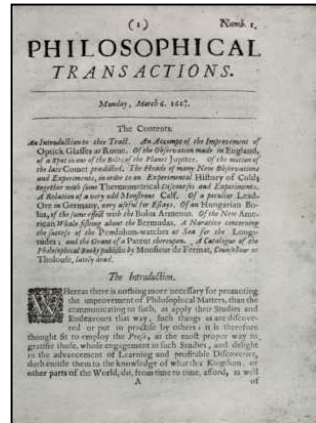
- First peer reviewed journal founded in 1665 by Royal Society
- Journal publishing has evolved dramatically since, but its core functions remain:
  - **Registration** of new research findings
  - **Quality assurance** through peer-review
  - **Dissemination** globally
  - **Archiving** in perpetuity

Researchers: which publishing objectives are most important to you?

Legend: 2005 survey, 2010 survey

	To further my career prospects	To establish precedence and protect my intellectual property	To ensure I receive recognition	To disseminate results and further knowledge	To secure funding for future research projects
2005 survey	38%	20%	25%	84%	30%
2010 survey	38%	17%	24%	78%	40%

STM publishers exist to provide highly valued services to scientific and medical researchers

STM journal publishing is driven by R&D outputs

Growth in Total journals, global R&D workers and STM articles 1996-2007

Growth in number of peer reviewed journals 1665-2010

- 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?

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

- Organise editorial boards
- Launch new specialist journals

Solicit and manage submissions

- 3 Million+ article submissions per year

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

Manage peer review

- 40 million articles available digitally, back to early 1800s

Archive and promote

Edit and prepare

- 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

Publish and disseminate

Production

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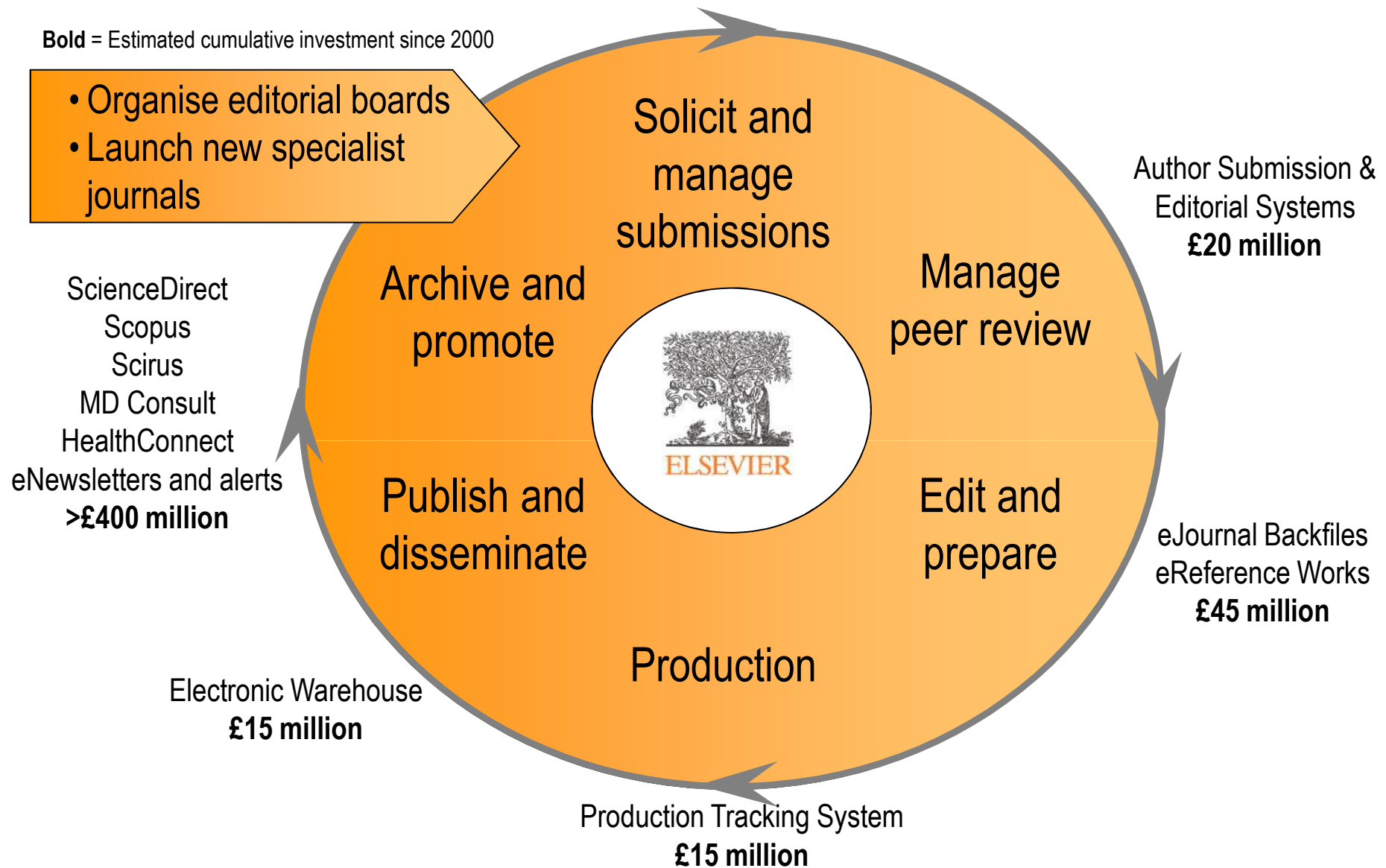- 180 years of back issues scanned, processed and data-tagged

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

Bold = Estimated cumulative investment since 2000

- Organise editorial boards
- Launch new specialist journals

Solicit and manage submissions

Author Submission & Editorial Systems
£20 million

Archive and promote

Manage peer review

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

ELSEVIER

Publish and disseminate

Edit and prepare

eJournal Backfiles
eReference Works
£45 million

Production

Electronic Warehouse
£15 million

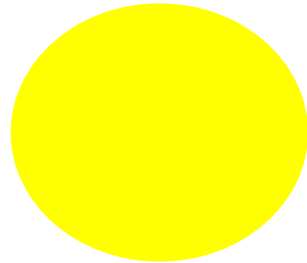Production Tracking System
£15 million

- **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
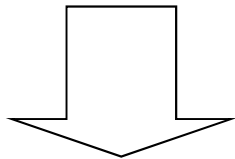
Publishers also evolved pricing models to expand electronic access
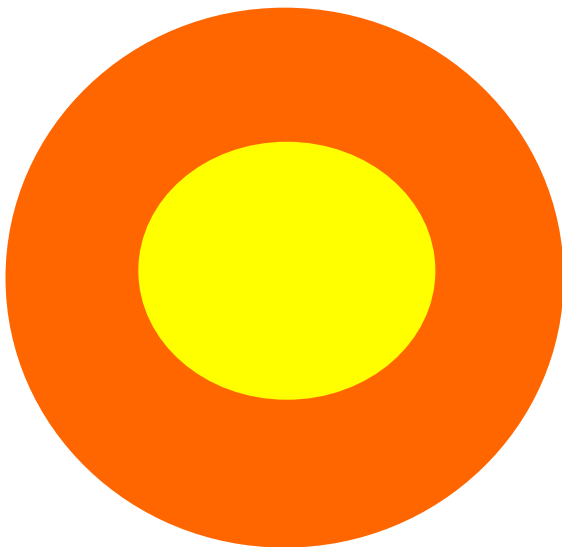
Print-only
(pre 1999)

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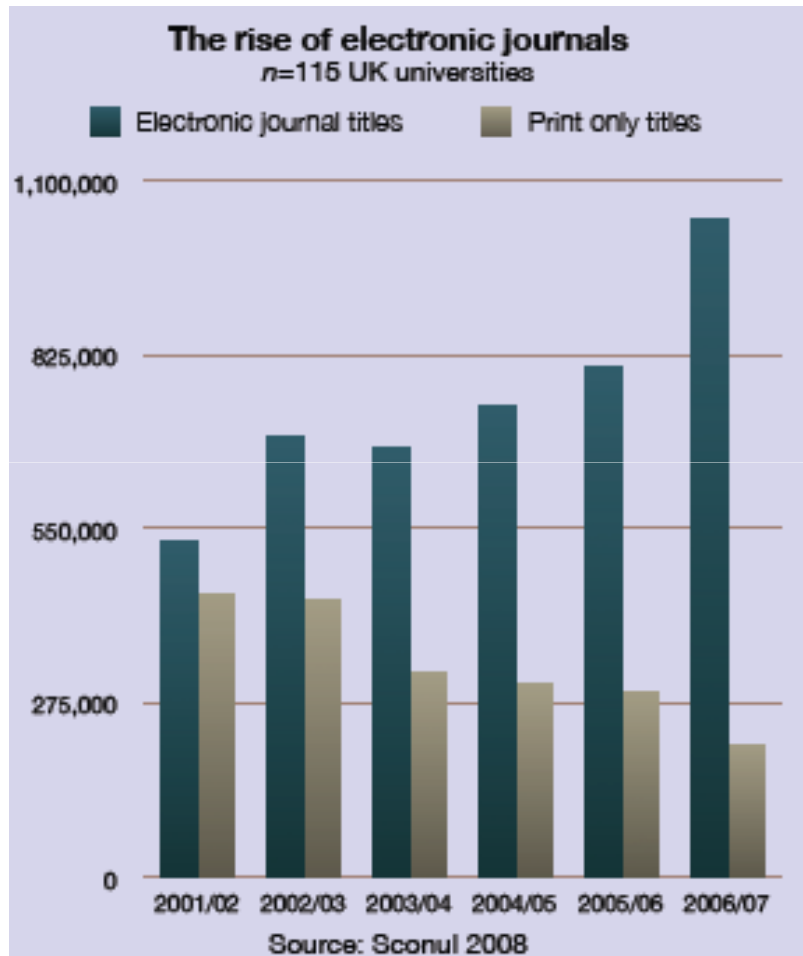   - 3-4% annual inflation

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

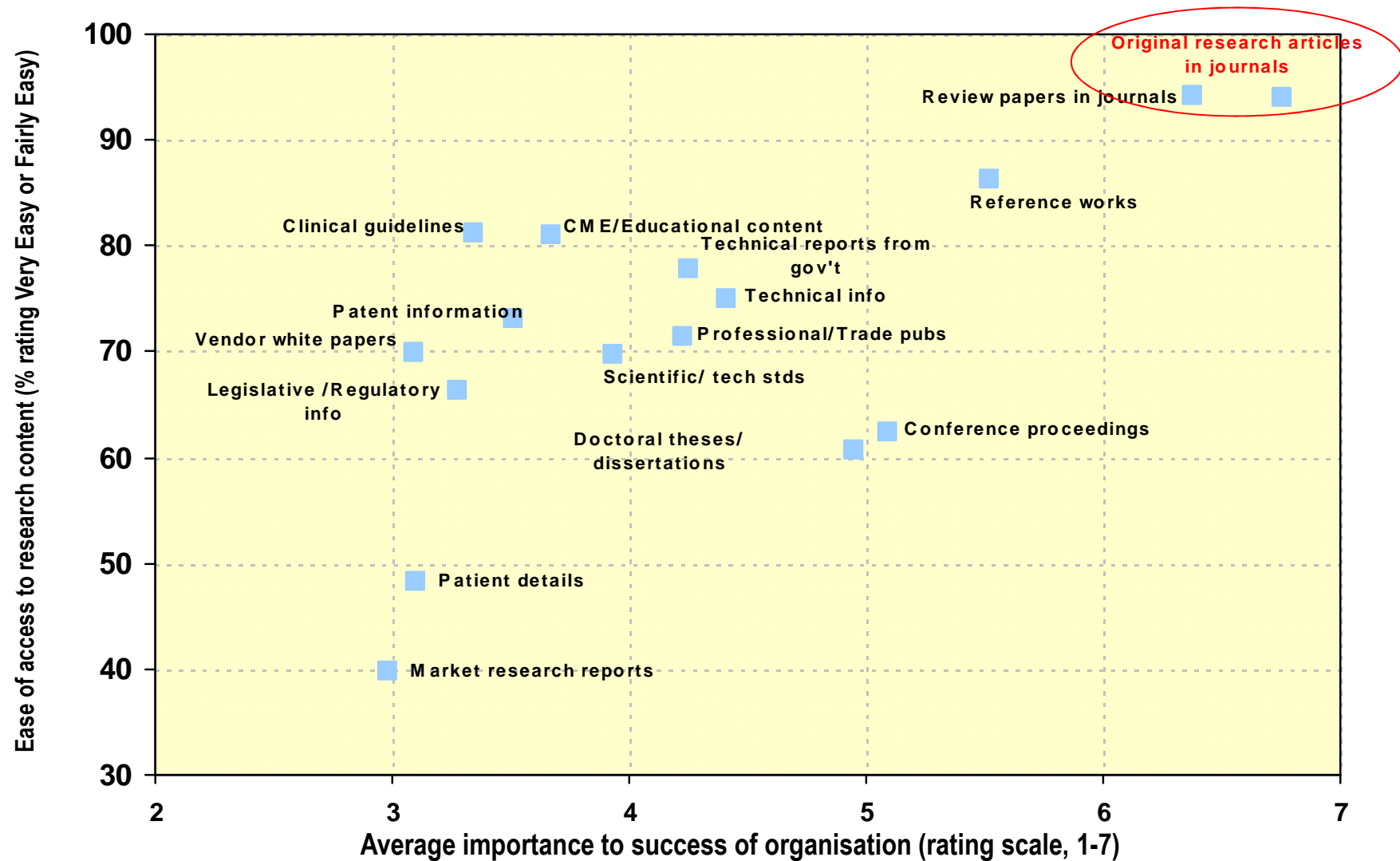# As a result, most customers now access journals electronically

The rise of electronic journals
n=115 UK universities

Electronic journal titles   Print only titles

Source: Sconul 2008

Benefits

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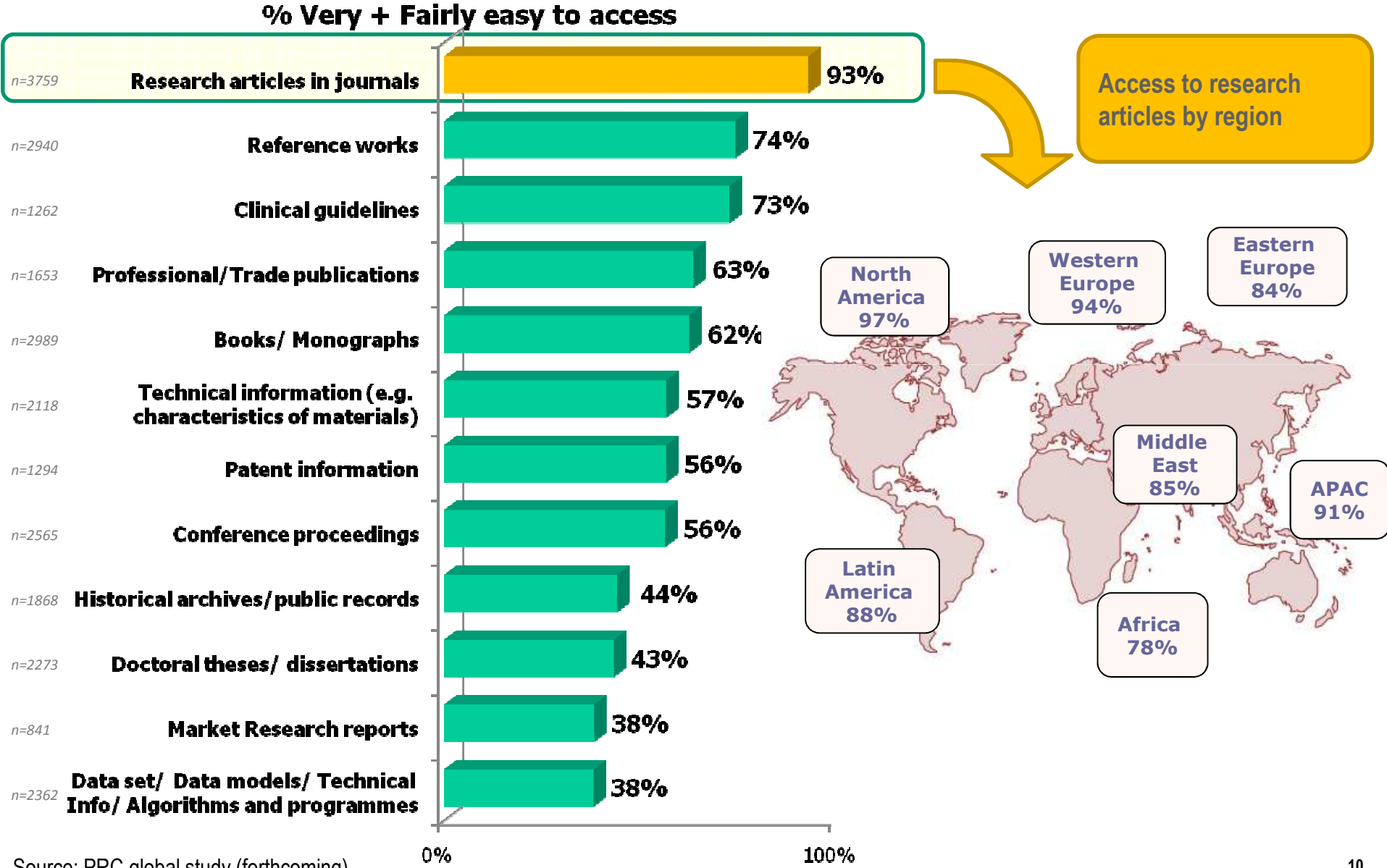- eFunctions, eg eMail alerts
- Links to datasets

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

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

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

Original research articles in journals

Review papers in journals

Reference works

Clinical guidelines

CME/Educational content

Technical reports from gov't

Patent information

Technical info

Vendor white papers

Professional/Trade pubs

Scientific/ tech stds

Legislative /Regulatory info

Doctoral theses/ dissertations

Conference proceedings

Patient details

Market research reports

Globally researchers are highly satisfied with access to journals

% Very + Fairly easy to access

Category	%
n=3759 **Research articles in journals**	93%
n=2940 **Reference works**	74%
n=1262 **Clinical guidelines**	73%
n=1653 **Professional/Trade publications**	63%
n=2989 **Books/ Monographs**	62%
n=2118 **Technical information (e.g. characteristics of materials)**	57%
n=1294 **Patent information**	56%
n=2565 **Conference proceedings**	56%
n=1868 **Historical archives/public records**	44%
n=2273 **Doctoral theses/ dissertations**	43%
n=841 **Market Research reports**	38%
n=2362 **Data set/ Data models/ Technical Info/ Algorithms and programmes**	38%

0%   100%

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)

10

UK universities access more titles and pay less per title accessed than in 2004

What UK universities get
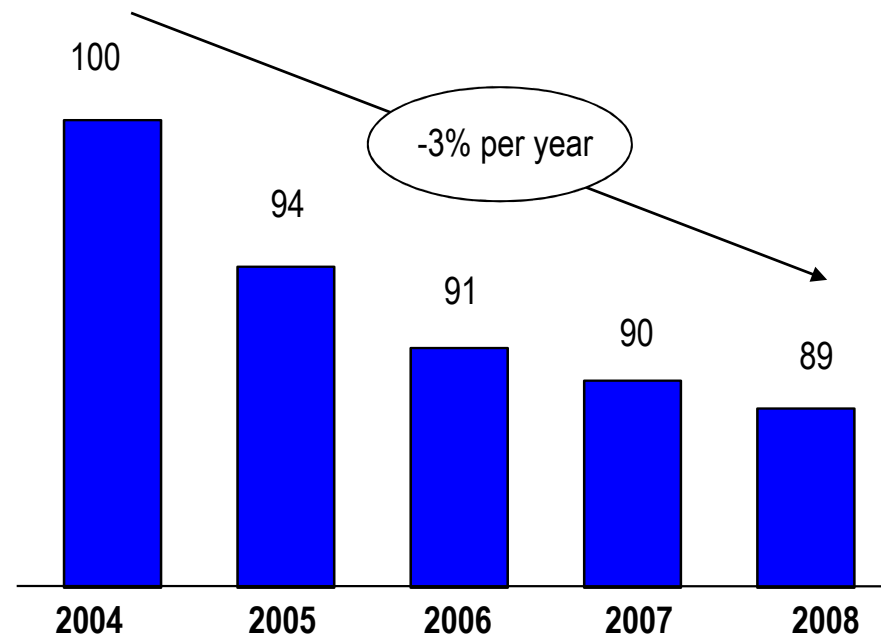
Number of journals accessed
Average journals per institute

+7% per year

8,391	9,022	9,601	10,615	11,058
2004	**2005**	**2006**	**2007**	**2008**
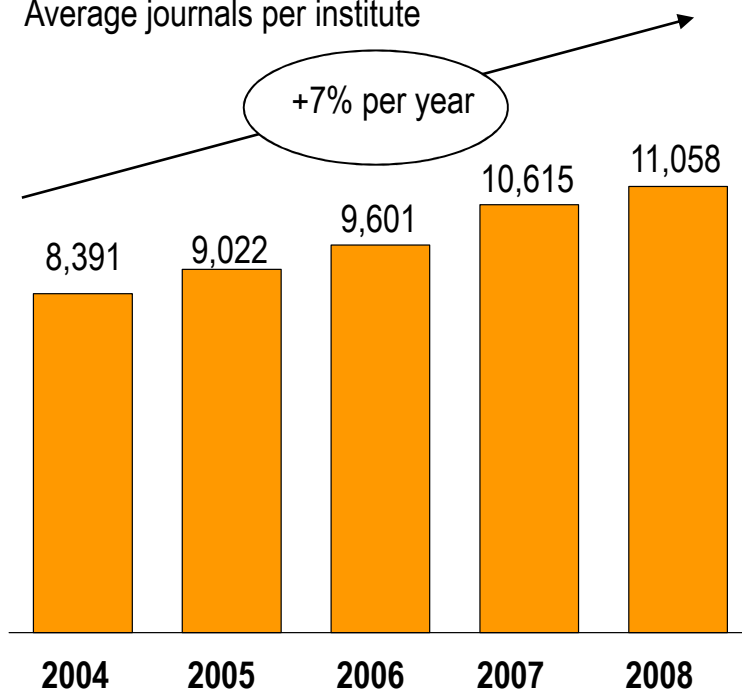
What UK universities pay

Amount paid per journal accessed
In constant 07/08 currencies (Index - 2004=100)

-3% per year

100	94	91	90	89
2004	**2005**	**2006**	**2007**	**2008**

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

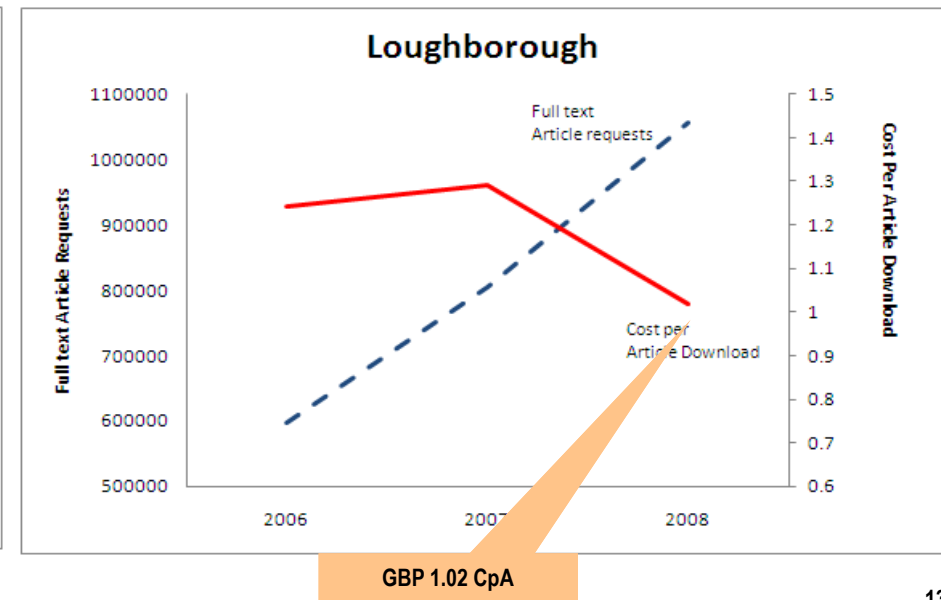**Full text article downloads**
Average per institute

+27% CAGR

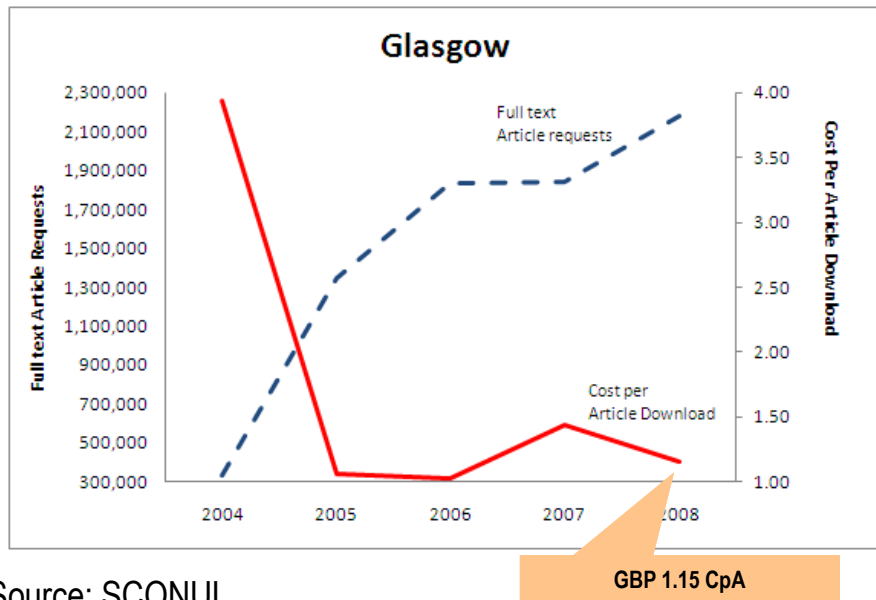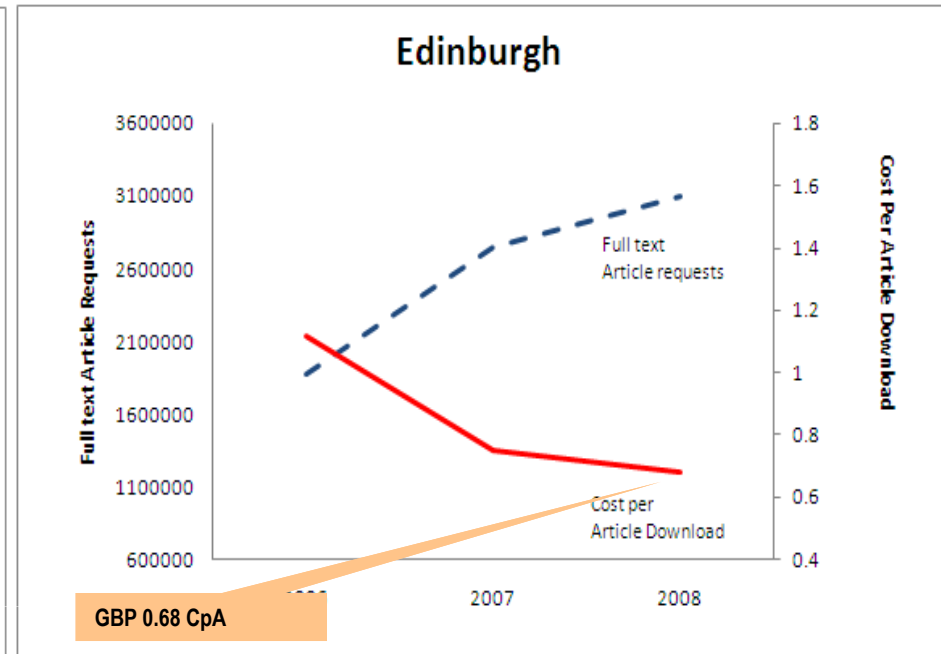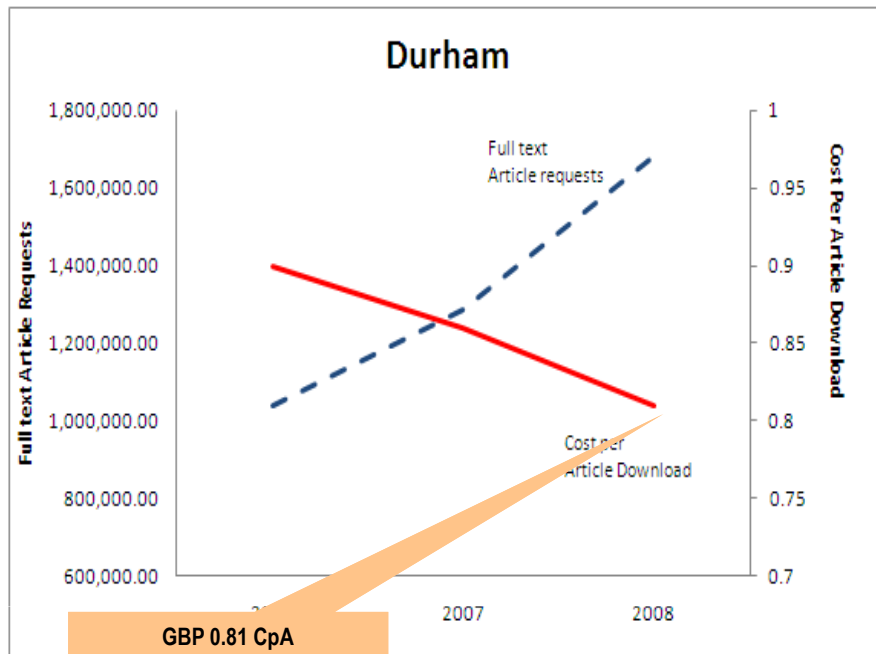|	2004	2005	2006	2007	2008
	432,693	632,758	772,600	930,415	1,134,165
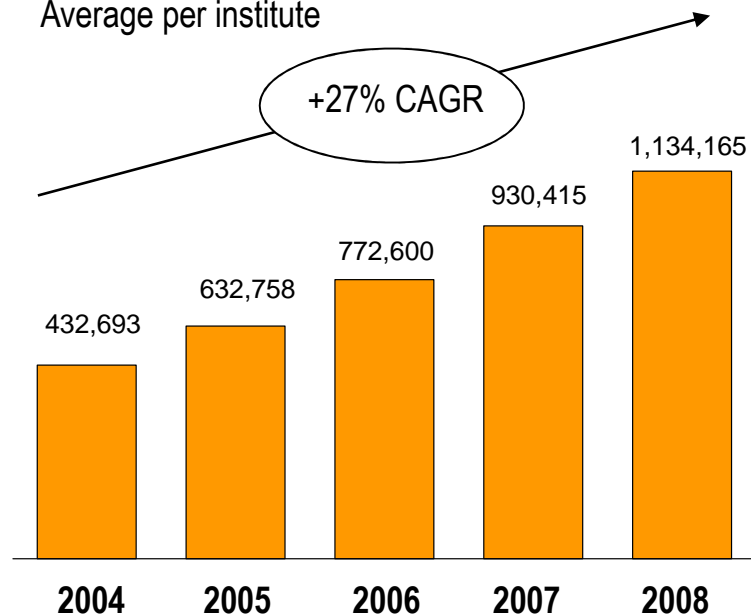
What UK universities pay

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

-12 % CAGR

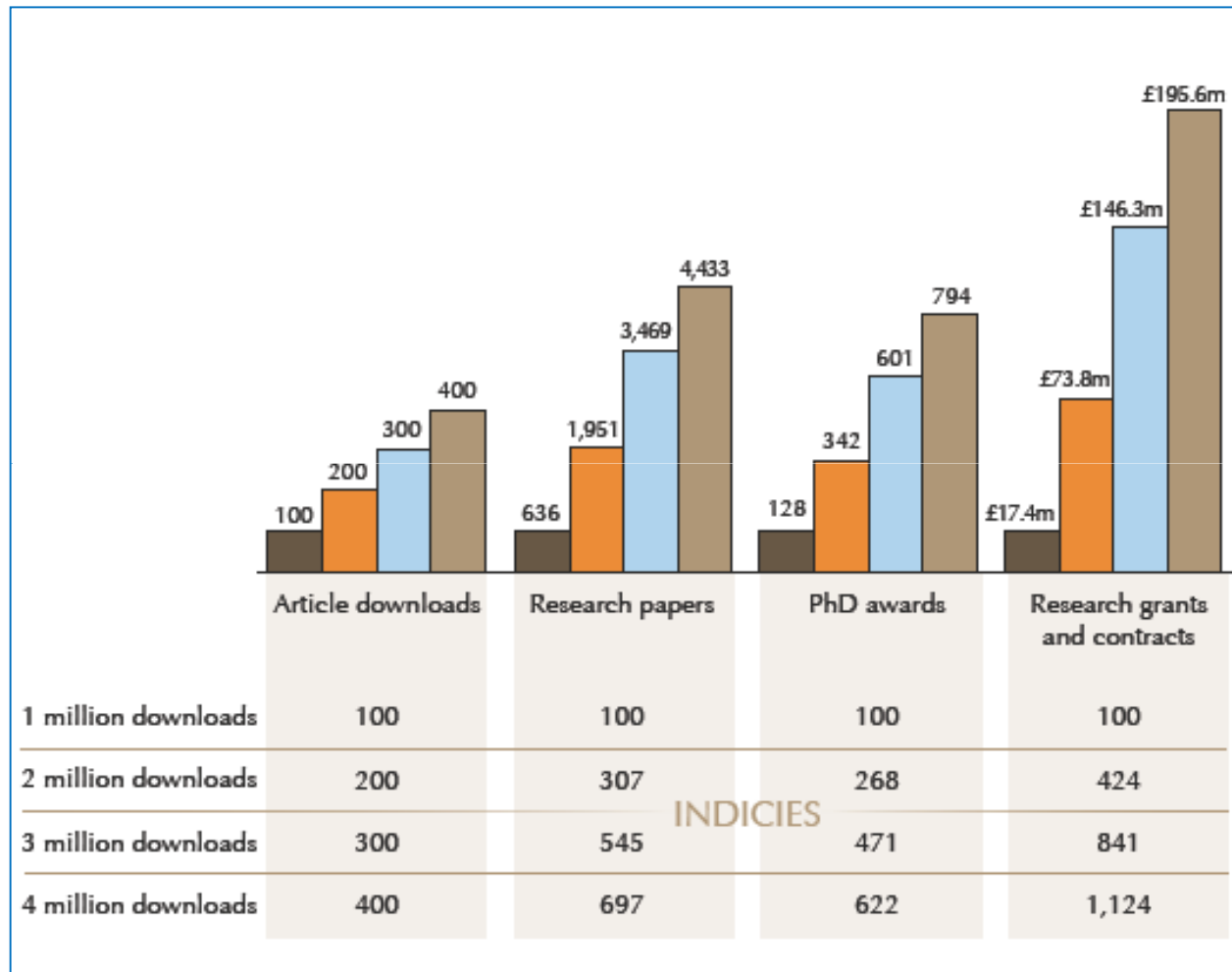|	2004	2005	2006	2007	2008
	1.19	0.91	0.83	0.77	0.70
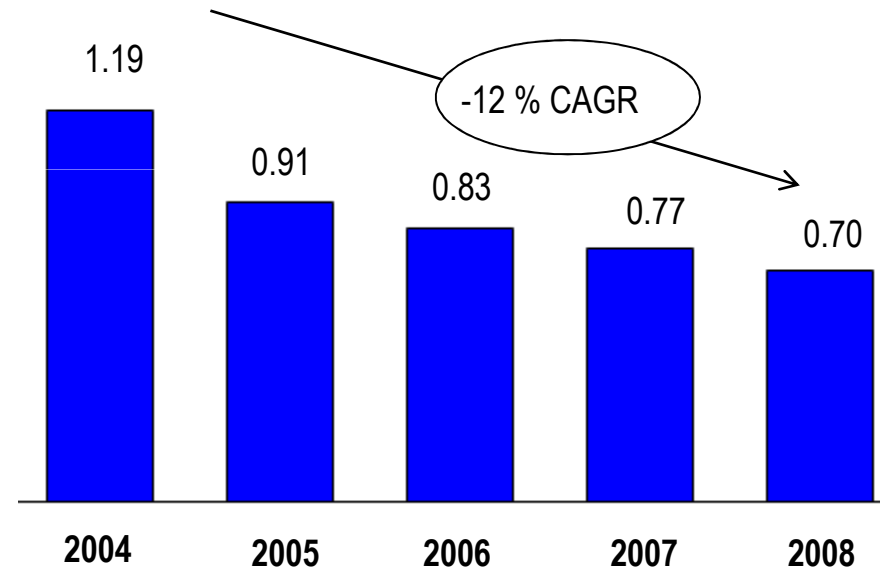
- **UK universities downloaded over 120 million articles in 2008, 160% more than in 2004**
- **The effective mean price paid per article downloaded in 2008 was 70 pence**

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

	Article downloads	Research papers	PhD awards	Research grants and contracts
1 million downloads	100	100	100	100
2 million downloads	200	307	268	424
3 million downloads	300	545	471	841
4 million downloads	400	697	622	1,124

INDICIES

- "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%
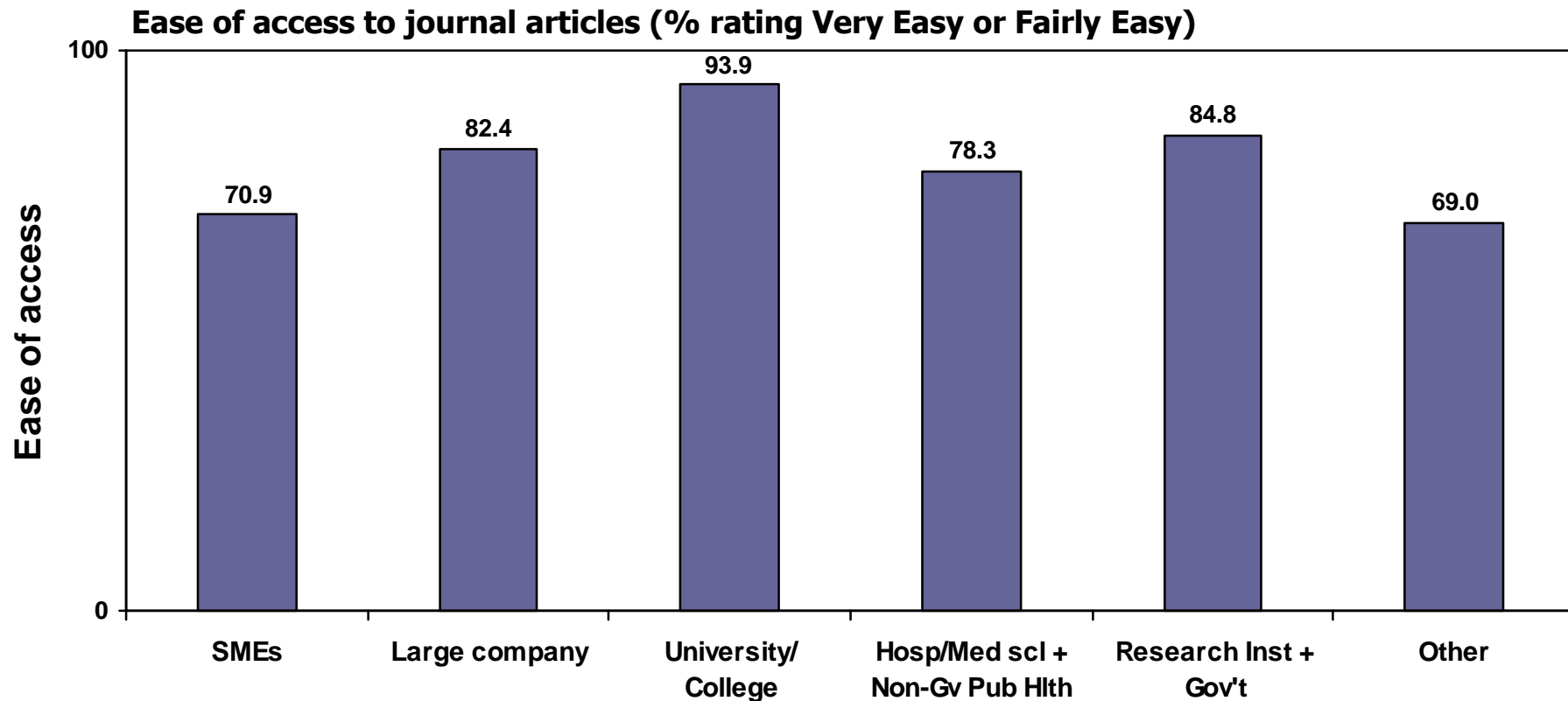
- Even stronger as downloads increase further

As a result, UK university researchers 'punch well above their weight'

Figure 1.2 **The UK's share of global science**

1% of population

3% of global funding for research

7.9% of papers

11.8% of world citations

14.4% of world's most highly cited
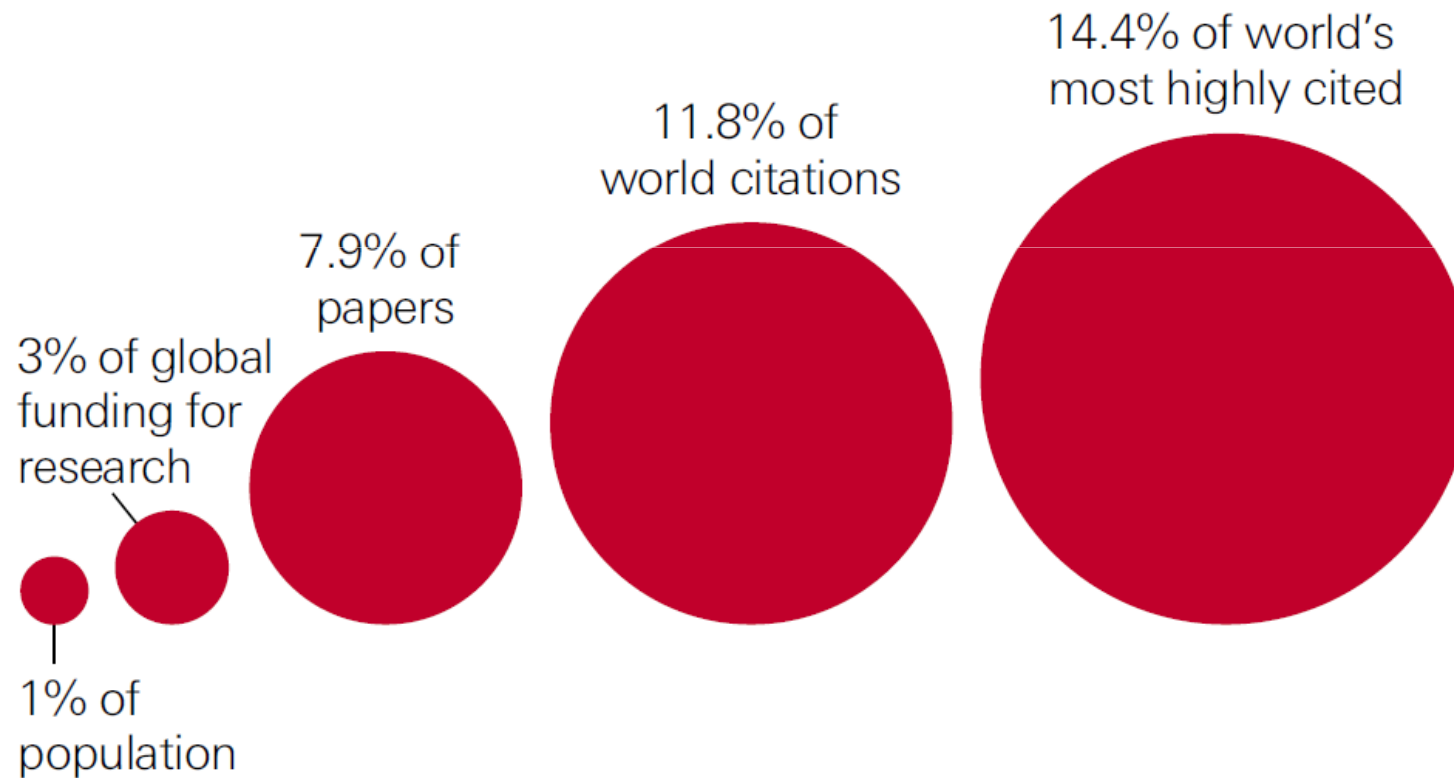
Non-university researchers are satisfied with access to journals

Ease of access to journal articles (% rating Very Easy or Fairly Easy)

Bar chart — y-axis labeled "Ease of access" (scale 0 to 100):

Category	Value
SMEs	70.9
Large company	82.4
University/College	93.9
Hosp/Med scl + Non-Gv Pub Hlth	78.3
Research Inst + Gov't	84.8
Other	69.0

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

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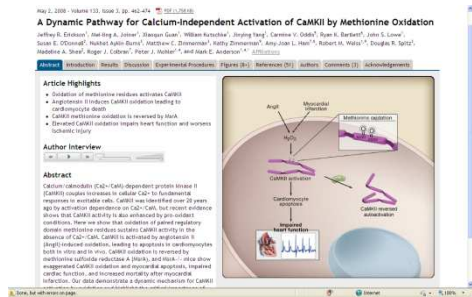
- Graphical abstracts with main message of the paper.
- Hierarchical presentation of text and figures.
- Alternate views to hide or show experiment details.
- Real-time reference analyses for citation exploration.
- Interactive to assist in navigating the article

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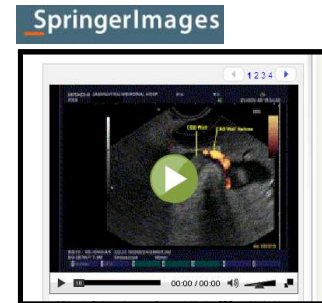
- Peer reviewed video journals
- Searchable Image databases using semantic linking
- In-line video to enhance article content (techniques and demonstrations)
- Multiple platform support

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
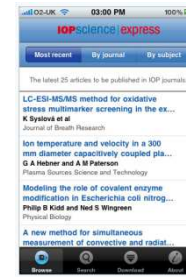
- Journal, book and database content on mobile devices
- Search and browse articles
- Create alerts and citation analysis
- Save favourite articles information and add notes
- Share result information via Email or Twitter
- News feeds and RSS technology

STM publishers are continuing to invest:
2. Tools to derive insights across all articles
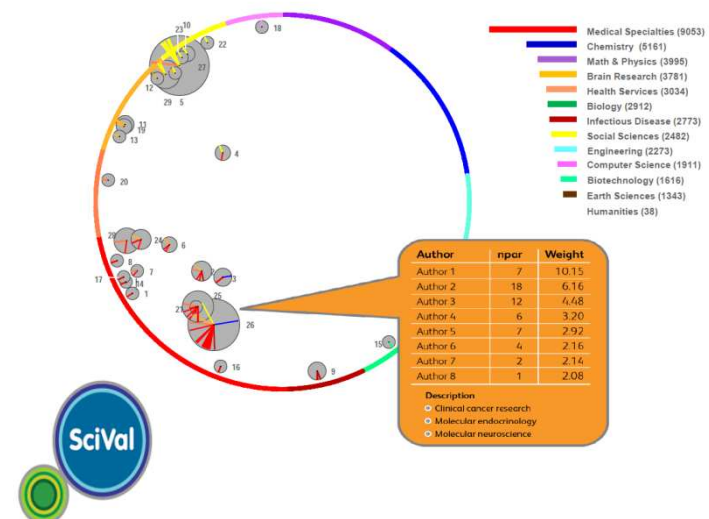
Text Mining Tools

- 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

PANGAEA®
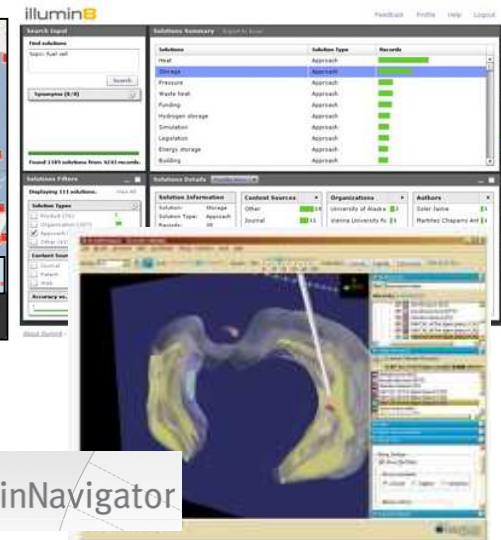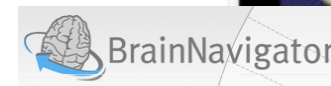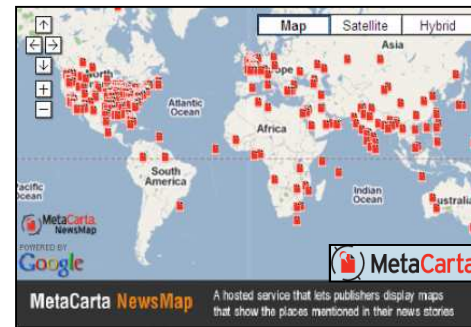
Research Performance Measurement Tools

- Products that helps 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

A UNIVERSITY'S "DISTINCTIVE COMPETENCIES"

		Medical Specialties (9053)
		Chemistry (5161)
		Math & Physics (3995)
		Brain Research (3781)
		Health Services (3034)
		Biology (2912)
		Infectious Disease (2773)
		Social Sciences (2482)
		Engineering (2273)
		Computer Science (1911)
		Biotechnology (1616)
		Earth Sciences (1343)
		Humanities (38)

Author	npar	Weight
Author 1	7	10.15
Author 2	18	6.16
Author 3	12	4.48
Author 4	6	3.20
Author 5	7	2.92
Author 6	4	2.16
Author 7	2	2.14
Author 8	1	2.08

Description
- Clinical cancer research
- Molecular endocrinology
- Molecular neuroscience

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
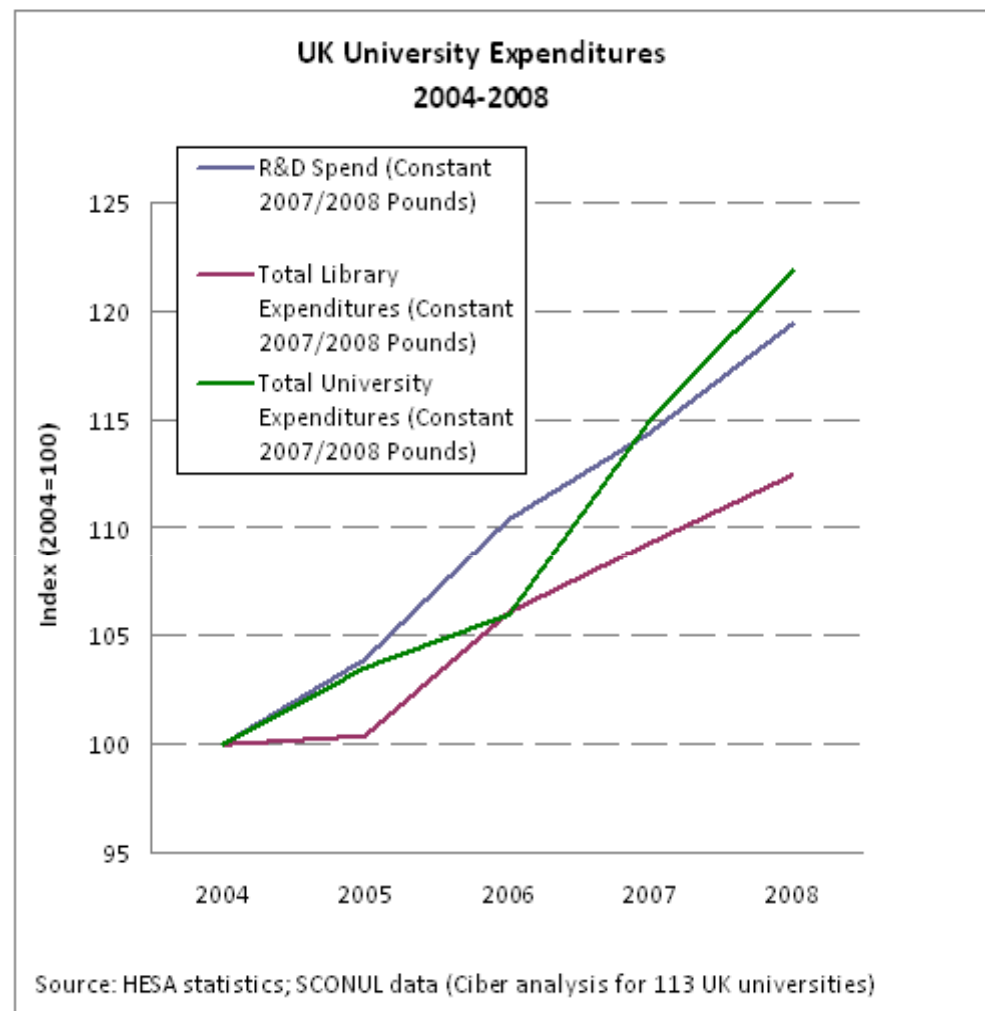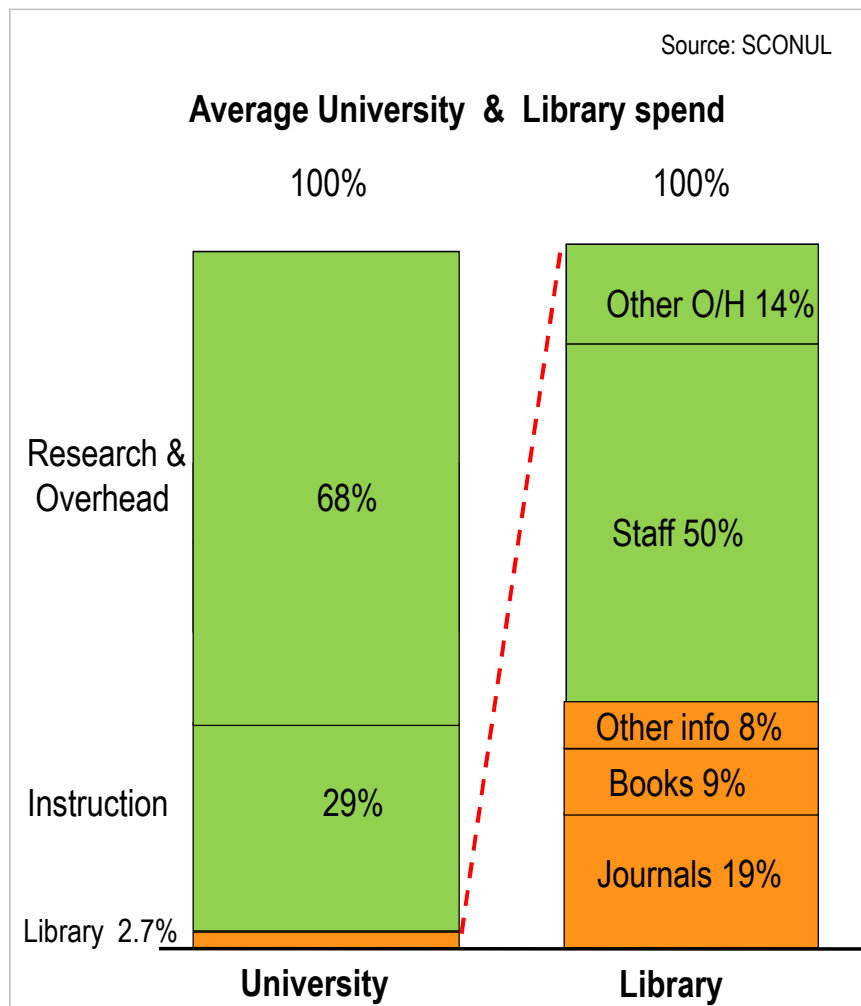
- Libraries in 2008 received only 2.7% (net 2.4%) of UK universities' budgets, down from 3% in 2004
- Library funding is outstripped by R&D funding and outputs, and by total university expenditures

Cash costs of alternative access models: significantly higher for UK

Cash expenditures on STM journals for UK universities
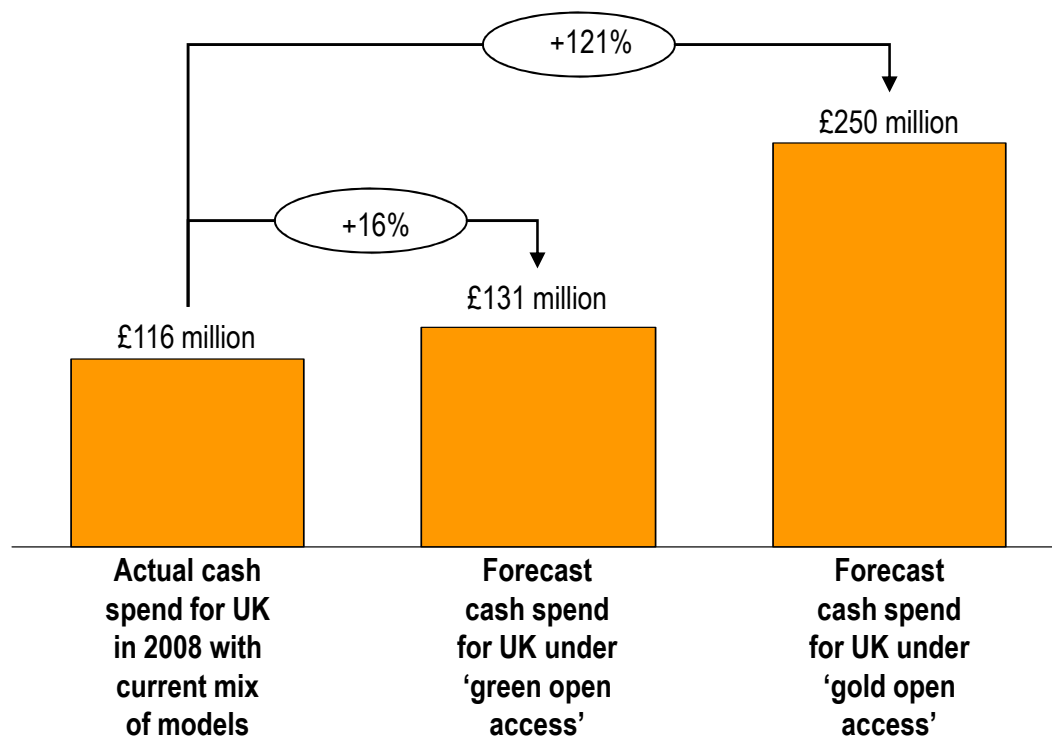
- STM publishers are receptive to and are enabling 'open access' (oa) models
  - 90%+ of articles appear in journals enabling 'green oa'. .
  - 30%+ of articles appear in journals enabling 'gold oa'

- 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.

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