Helping universities achieve their desired research outcomes: selected UK case studies

5th Annual UK Research Conference: *REF2014: Impact assessments and funding*

London, 29th September 2011

Dr Nick Fowler, Director of Strategy, Elsevier

Scopus: a unique vantage point on science

- 18,000+ titles across 5,000+ global publishers.
  - Health Sciences (100% Medline coverage): 6,800
  - Physical Sciences: 7,200
  - Life Sciences: 4,300
  - Social Sciences & Humanities: 5,300
- 30+ million citations added per year (80,000 per day)

Example users of Scopus data

ELSEVIER

REF2014

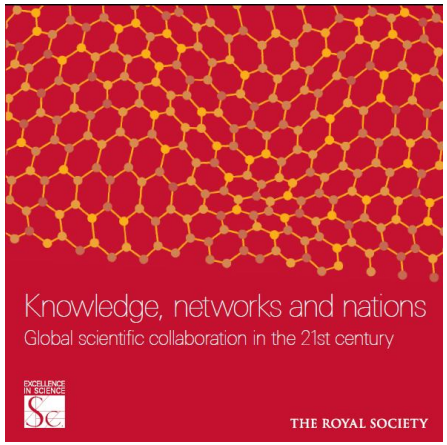
hefce Higher Education Funding Council for England · Scottish Funding Council · Cyngor Cyllido Addysg Uwch Cymru Higher Education Funding Council for Wales · hefcw · Department for Employment and Learning

REF 2014 latest news **September 12, 2011**

Citation data

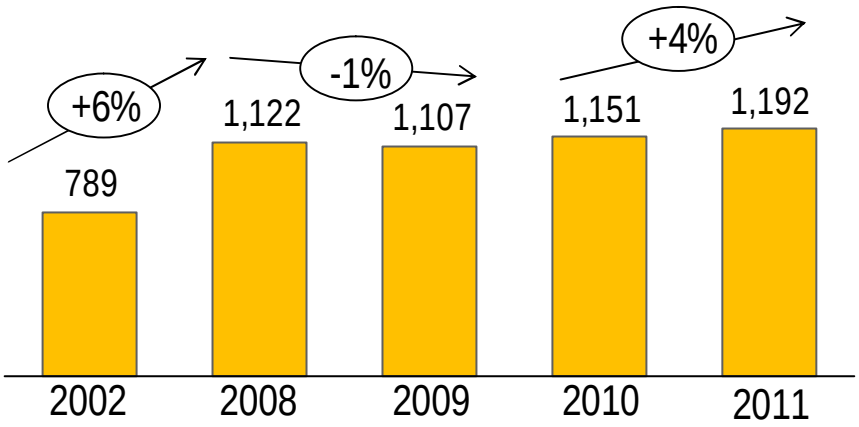
Elsevier has been awarded the contract for provision of citation data services in the 2014 REF.

BIS | Department for Business Innovation & Skills



Research is a global growth industry: inputs

Gross Expenditure on R&D - global, $ Billion



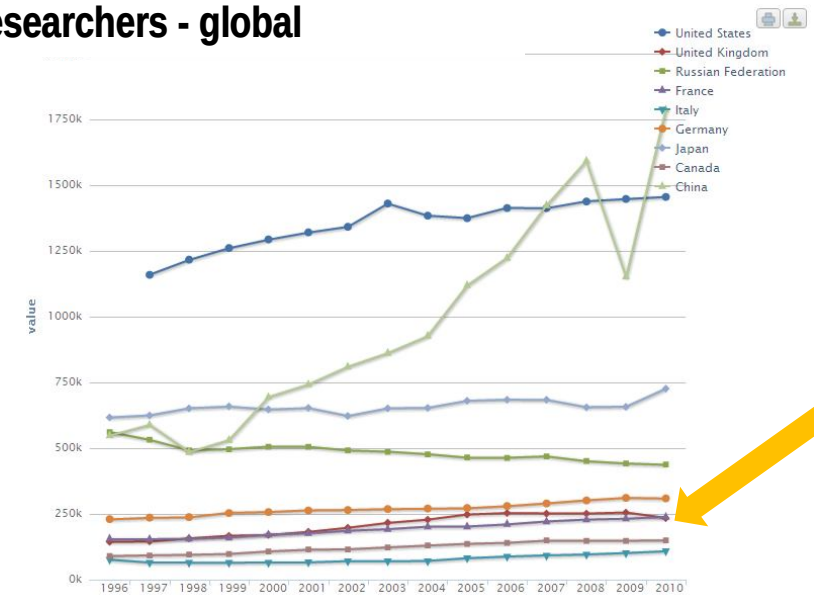
R&D spend as a proportion of GDP: 2%

Gross Expenditure on R&D - UK, $ Billion

- 2010: $32 billion, 3% of global total
- Growth 2006-2010: +0.8%
  - G8: +2.4%
  - OECD: +2.7%

R&D spend as a proportion of GDP: 1.8%

Researchers - global

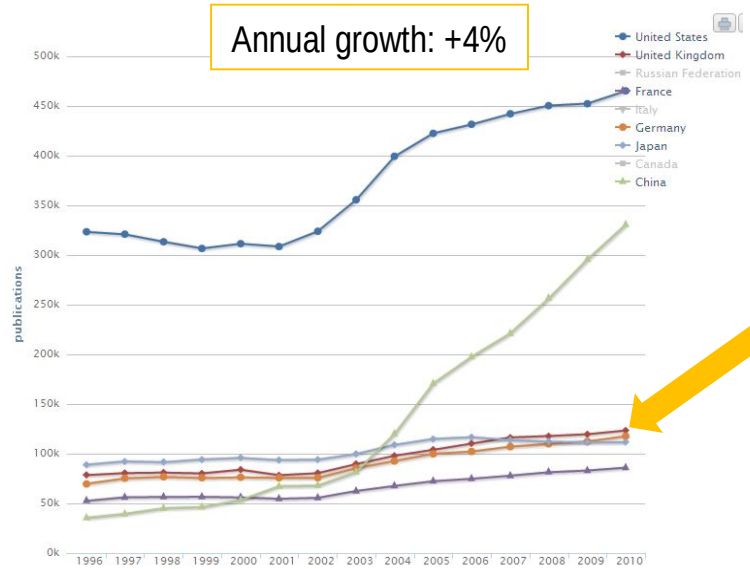


Researchers - UK

- 2010: 250,000, 4% of global total
- Growth 2005-2009: +0.75%
  - G8: +0.98%
  - OECD: +1.15%

Research is a global growth industry: outputs

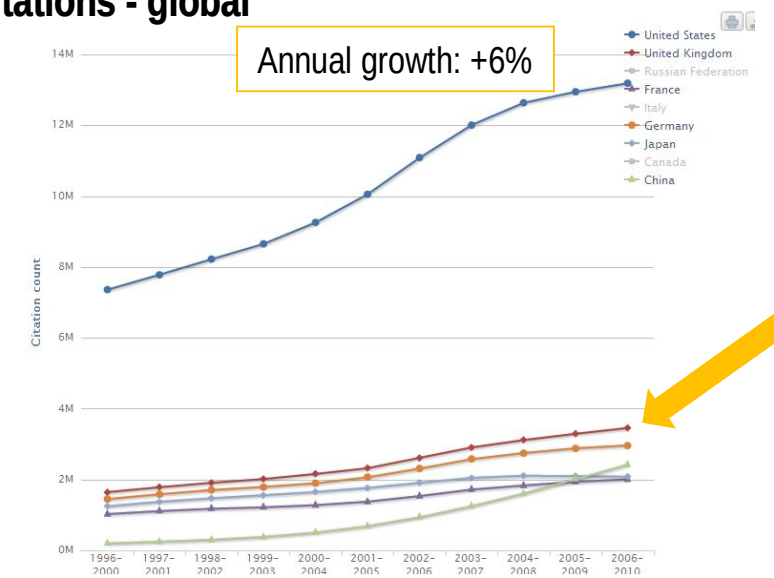
Articles Published - global



Articles Published - UK

- 2010: 124,000, 6% of global total
- Growth 2006-2010: +2.9%

Citations - global



Citations - UK

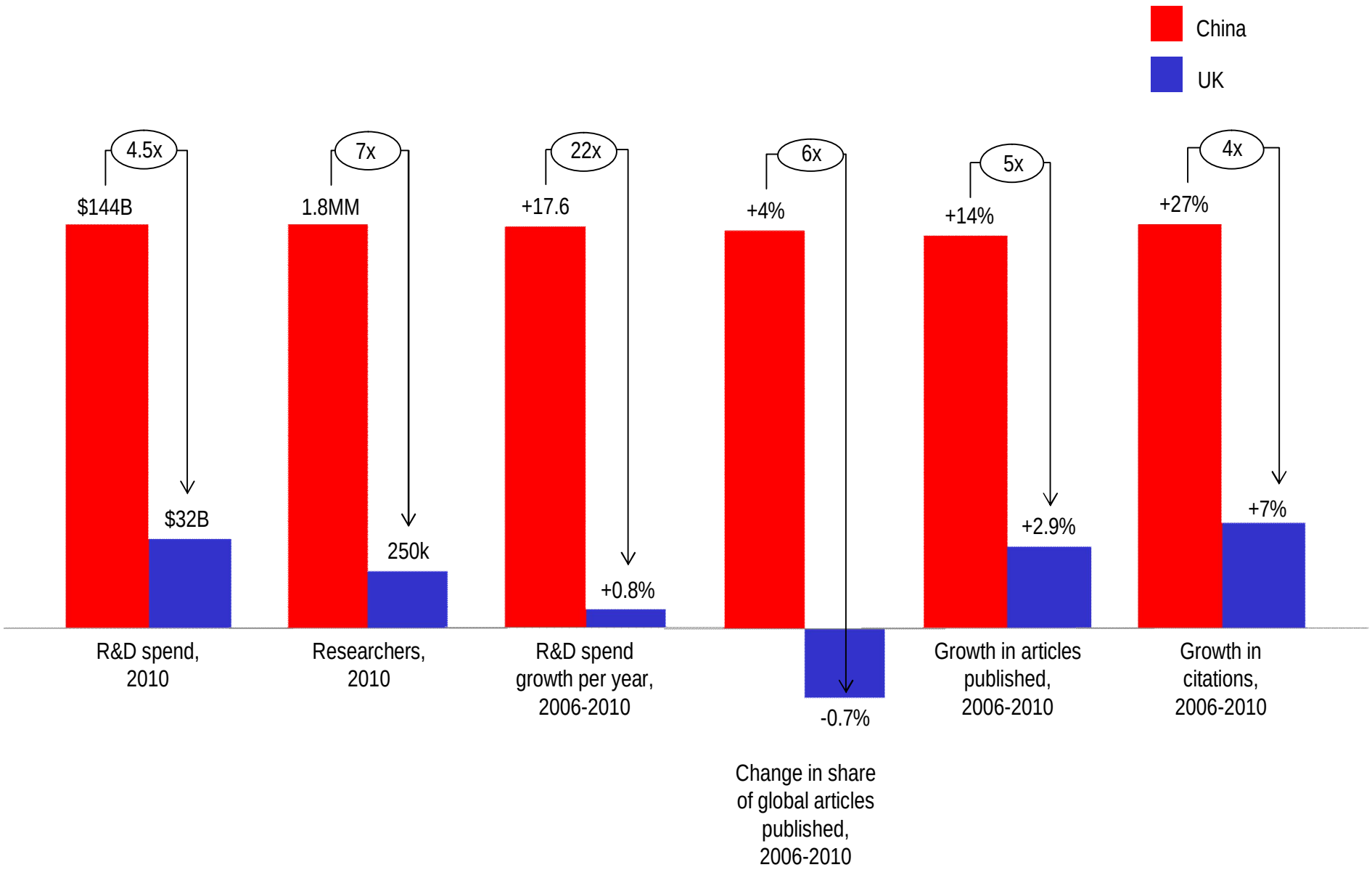
- 2010: 6 million, 10% of global total
- Growth 2006-2010: +7%
- Share of most highly cited (top 1%): 14%

Summary of UK position in global research

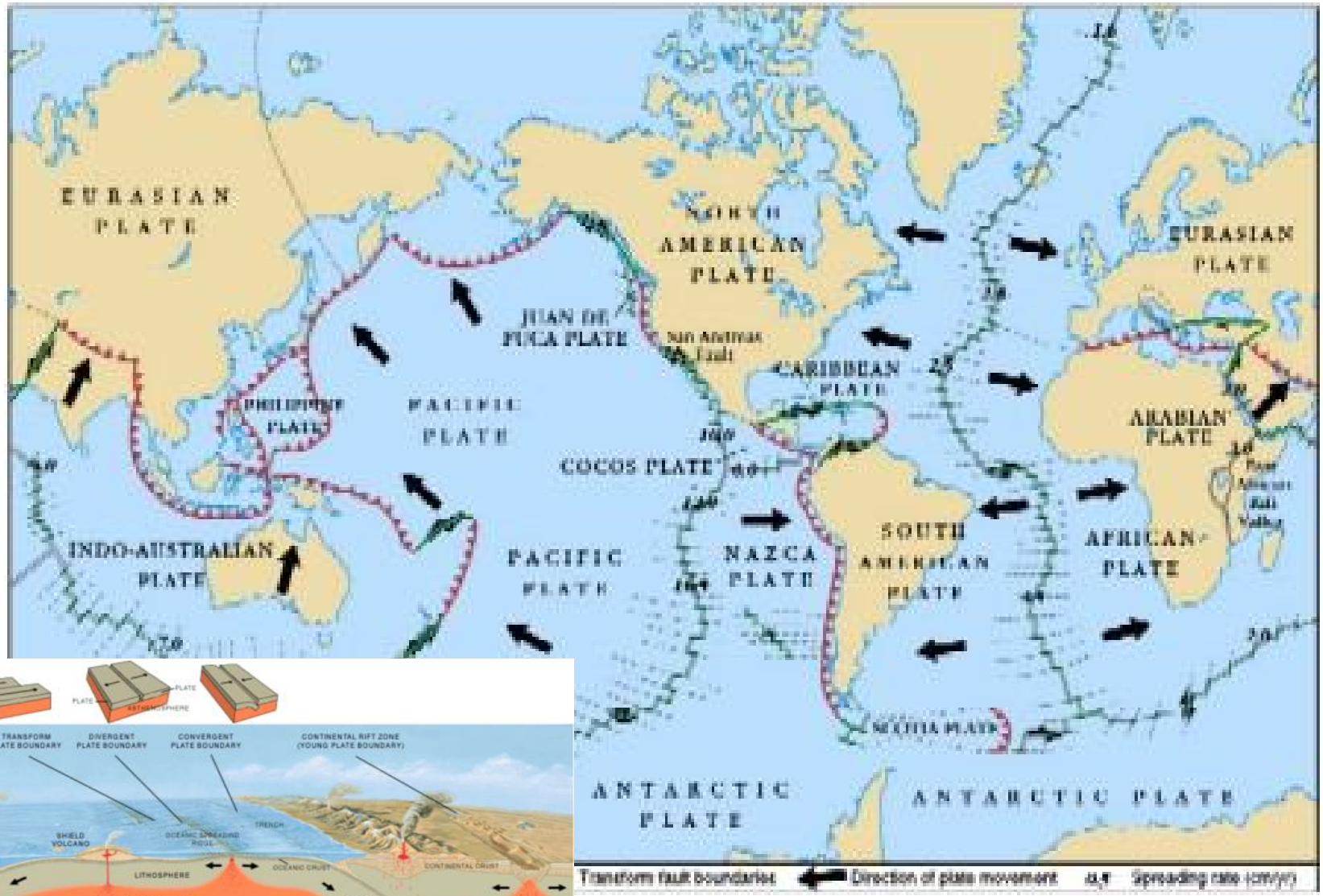
- UK punches above its weight
  - 3% of R&D, 4% of researchers but…
  - 6% of articles, 10% of citations, 14% of most cited articles
  - UK is a world leader in citations per unit spend on R&D

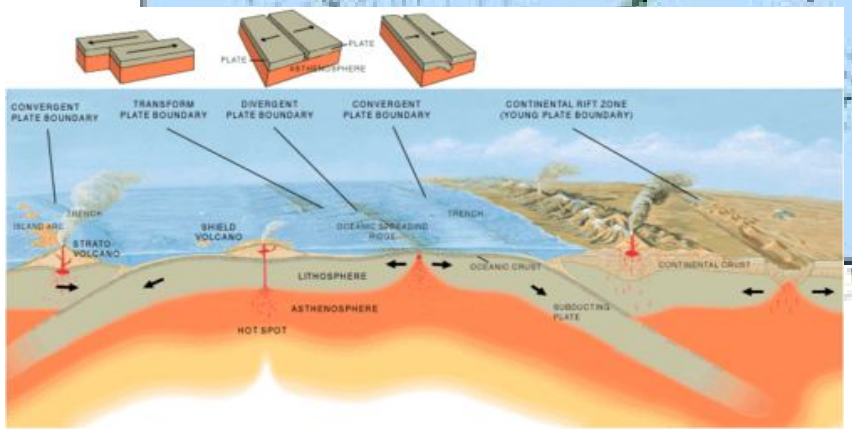
- However, can the UK sustain its position with growth of R&D spend and researchers below G8 and global averages?

Research indicators: China vs. UK



Global Research: tectonic shifts





Performance levers to manage research outcomes

Performance lever

Inputs

1 **Funding**

- National
  - Block grants (REF)
  - Project grants: Research Council, corporate and charity
- International , e.g. EU

2 **Human Capital**

- Researchers
  - UK vs. non UK
- PhDs
  - UK vs. non UK

Throughputs

- Capital, equipment, facilities
  - Space utilisation
  - Staff recruitment
- 3 Collaboration
  - UK vs. non-UK
- Skills development
  - PhD employment
- Spending efficiency
  - Start/end date slippage

Outputs

Academic
- Articles, citations

Esteem
- Awards, prizes, recognition

Commercial
- Patents, licences, spin-outs

Impact
- Social, economic, political, cultural

4 **Information**
- Metrics, case studies, vignettes

Lever 1: increase funding – 1994 Group University example

1

1994 Group University's quality rank > quantity rank

1994 Group University's quality rank > quantity rank, and quality is ranked in top 3

MRC and BBSRC themes	1994 Group University's Total articles (cumulative, 2008-2010)	1994 Group University's Rank*			
		Quantity (Number of articles)	"Quality" proxy (Citations per article)	National collaboration	International collaboration
Natural protection	832	8	**6**	7	9
Tissue disease and degeneration	623	9	**6**	6	4
Mental health and wellbeing	636	8	**7**	7	8
Repair and replacement	879	8	9	7	8
Genetics and disease	1,039	8	9	6	8
Life course perspective	1,209	8	10	5	9
Lifestyles affecting health	1,213	8	10	6	10
Environment and health	1,382	8	**5**	6	8
Food Security	607	10	**1**	4	6
Bio-energy and industrial biotechnology	414	10	**2**	2	5
Basic bio-science underpinning health	312	9	9	3	4

*Comparator set for 9 UK universities that collectively account for around 45% of MRC grants awarded.

Note: Each one of 336 journal categories in Scopus (ASJC) were manually assigned to MRC and BBSRC themes. Articles/citations in journals that are relevant to more than one theme have been "double-counted" (vs. fractionalised) to show the full count that is relevant to each theme

Lever 1: increase funding – project grants

1

Example - Food Security

SciVal Funding

Experts | Funding | Spotlight | Strata

Register | Log in | Go to SciVerse s

Home | Search | Browse | Recommendations | My Profile

Food Security | Search | Opportunities | Awarded Grants

Search results

RSS | Search history

Refine search results

Search within results

Limit to or Exclude

Limited submissions

Sponsor country

Europe

United Kingdom (241)

Subject area

Sponsor type

Sponsor

Deadline

Award type

Amount

Restrictions

Date posted

Academic rank

Academic degree

Limit to or Exclude

You searched for: foo AND Sponsor country(United Kingdom)

Opportunities (241) | Awarded grants (1) | Inactive opportunities (152)

Advanced search

Select page or all | 20 results per page | 1 to 20 of 241

	Deadline	Title	Sponsor	Type	Amount	Currency
1.	01-11-2012	Research Programme Grants	Leverhulme Trust	Research Grants	1,750,000	GBP
2.	05-19-2012	Energy Efficient Venues	Big Lottery Fund	Community Service Grants	1,000,000	GBP
3.	12-01-2011	Research Project Grants	Leverhulme Trust	Research Grants	500,000	GBP
4.	Unspecified	JISC Grant Funding 07/11: JISC Managing Research Data Programme (02) 2011-13: Strand A(2)	Joint Information Systems Committee	Program Project/ Center Grants	250,000	GBP
5.	11-03-2011	Development of prototype grant	Technology Strategy Board	Program Project/ Center Grants	250,000	GBP
6.	02-01-2012	Future Research Leaders Grants	Economic and Social Research Council	Research Grants	215,000	GBP
7.	Unspecified	Africa Programme	Nuffield Foundation	Research Grants	150,000	GBP
8.	03-21-2012	International Networks	Leverhulme Trust	Research Grants	125,000	GBP
9.	Unspecified	AXA Research Fund Doctoral Studentships 2011	University Of Manchester	Research Grants	120,000	GBP
10.	10-01-2011	The Lord Dowding Fund for Humane Research	Lord Dowding Fund	Research Grants	75,000	GBP

SciVal Funding

- Launched in UK Summer, 2011
- Daily updated funding opportunities from 4,100+ public and private funding sources
- 1.8 million+ awarded grant records
- 5 million+ Scopus researcher profiles enables alerts

Lever 2: Attract and retain top researchers

Example - UK University, Energy

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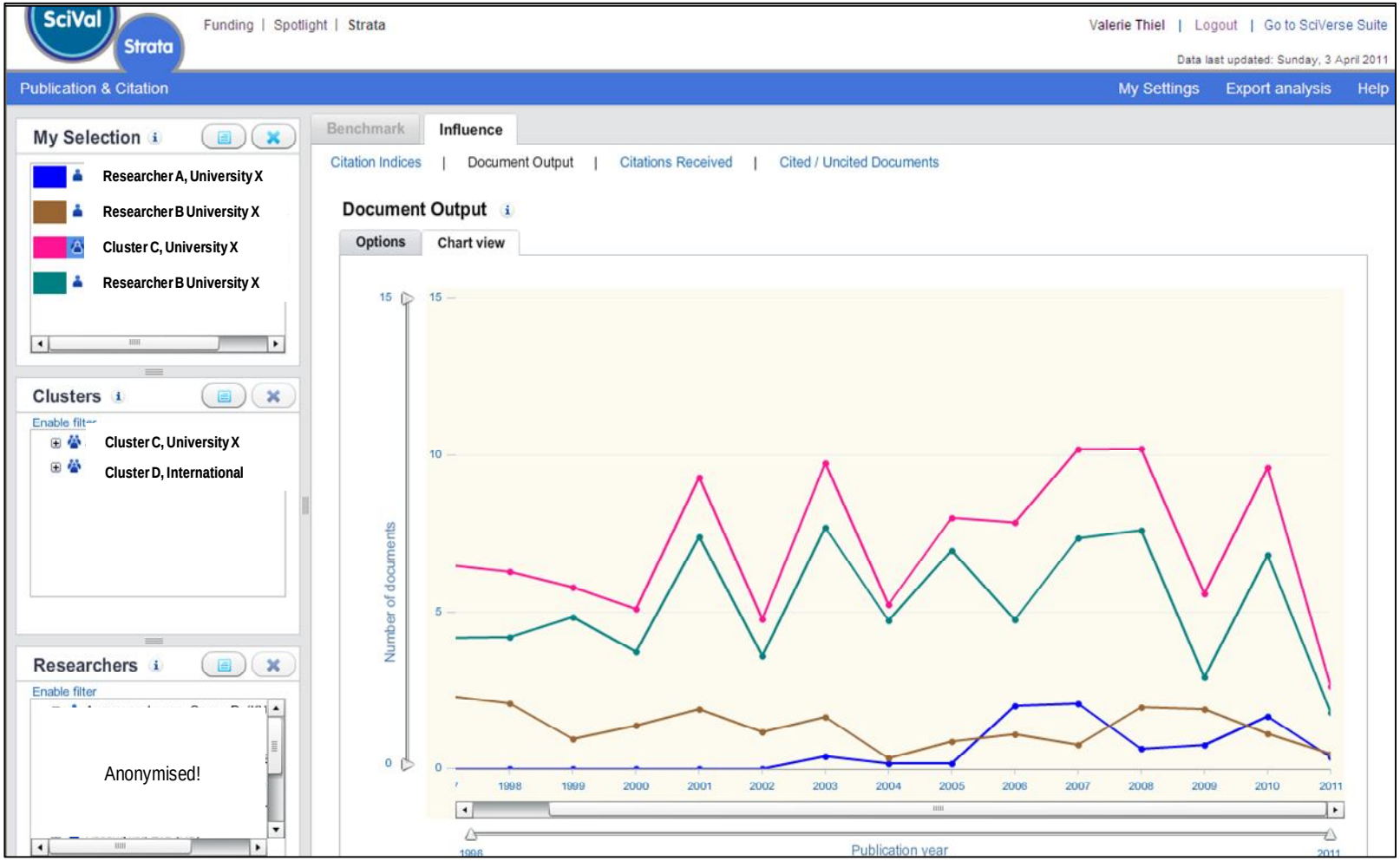


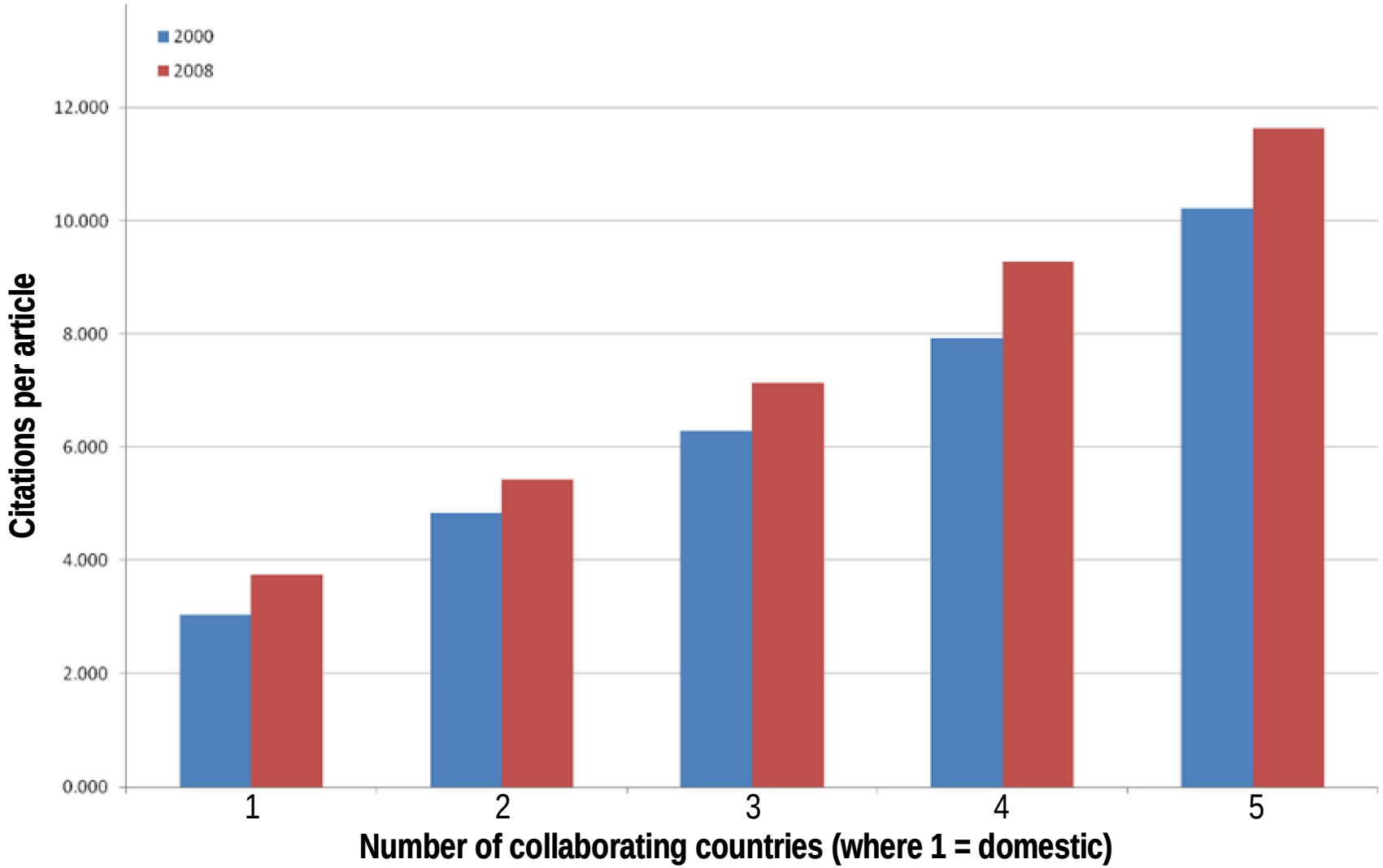
SciVal Strata

- Helps inform decisions about recruitment, retention and promotion
- Compares publication activity of individual researchers and research clusters
- Models collaborative networks and what-if scenarios for cross- and multi-disciplinary research

Source: SciVal Strata (based on Scopus data)

Lever 3: Facilitate international collaboration

3



- International scientific collaboration is widely acknowledged as a positive force driving national impact and prestige
- Domestic articles ('1') have no collaboration partners have around 3 times fewer citations per article than those with four collaborating countries ('5')

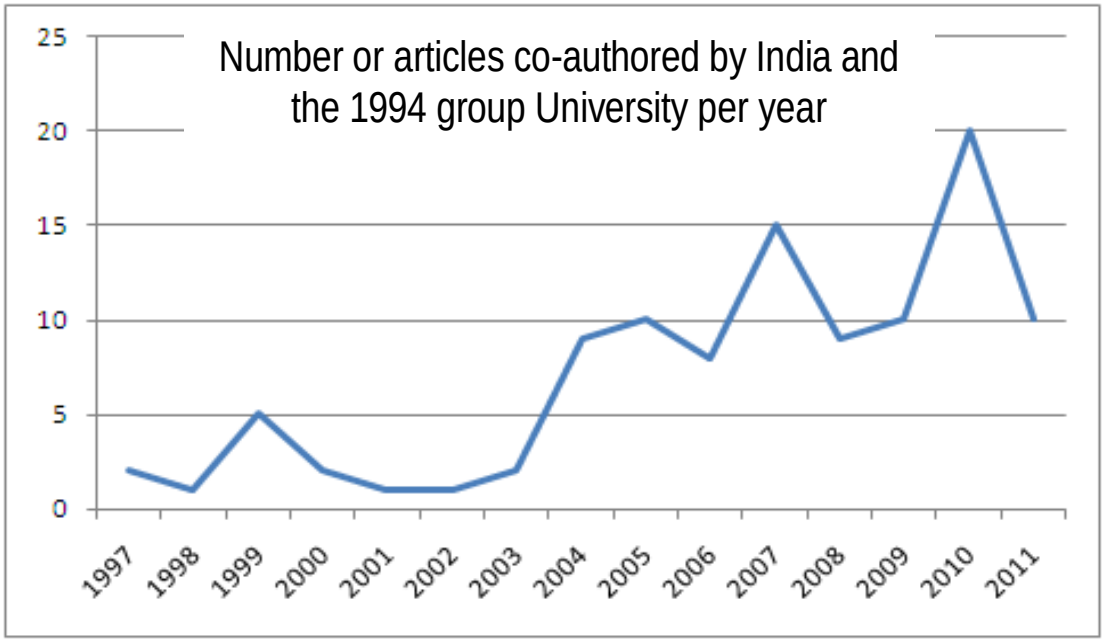
Source: Scopus

Source: SciVal Strata (based on Scopus data)

Lever 3: Facilitate international collaboration

Example - collaboration between 1994 Group University and India

3



In 2008-2010 the most important Indian collaborative partners were:

- Bhabha Atomic Research Centre (5)
- Tata Institute of Fundamental Research (3)
- Indian Institute of Information Technology & Management (2)

These collaborative papers in 2008-2010 were mostly published in:

- Physics and Astronomy 41%
- Computer Science 18%
- Chemistry 15%
- Materials Sciences 13%

Lever 3: Facilitate international collaboration

Example - collaboration between 1994 Group University and India

3

Indian Institute of Science
Bangalore, India

Univ X + IISB cpa > world cpa

IISB > Univ X cpa > world cpa

	Output per publication year					Citation Count per Subject Area per Citation Year (using IF window, so citations in 2007 for 2005 and 2006 articles)					2010 citations to 2008 and 2009 articles	WORLD 2010 cit to 2008 and 2009 art	Univ X 2010 cit to 2008 and 2009 art
	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010	2010 cpa	world cpa	Univ X CPA
Agricultural and Biological Sciences	62	59	65	69	83	80	215	216	177	208	1.552	1.661	4.332
Arts and Humanities	2	4	3	3	3	13	10	9	2	1	0.167	0.426	0.848
Biochemistry, Genetics and Molecular Biology	167	184	182	186	196	800	838	774	783	932	2.533	3.13	4.387
Business, Management and Accounting	9	7	9	11	11	10	14	10	11	22	1.100	0.933	1.234
Chemical Engineering	61	90	94	95	112	439	389	367	538	765	4.048	2.489	4.628
Chemistry	318	352	340	413	403	1457	1430	1391	1687	2398	3.185	2.484	4.025
Computer Science	184	202	201	195	205	291	363	480	587	550	1.389	1.142	1.609
Decision Sciences	13	12	14	13	13	5	23	25	38	22	0.815	1.612	1.525
Dentistry	6	8	7	13	11	19	25	21	22	30	1.500	1.967	3.393
Earth and Planetary Science	82	64	99	109	101	221	205	211	245	394	1.894	1.683	3.304
Economics, Econometrics and Finance		2	1	3	6	5	0	0	1	9	2.250	1.016	1.451
Energy	43	46	50	66	54	77	107	160	246	423	3.647	1.499	2.808
Engineering	371	393	411	420	407	661	765	928	1141	1354	1.629	1.117	1.958
Environmental Science	54	65	60	80	91	132	138	192	218	241	1.721	1.947	3.687
Health Professions	6	11	14	15	6	4	10	20	32	51	1.759	1.471	3.366
Immunology and Microbiology	33	34	51	29	32	103	124	164	195	210	2.625	3.139	4.381
Materials Science	352	369	374	435	444	1098	1159	1251	1475	1825	2.256	1.521	1.848
Mathematics	166	179	182	179	177	222	284	322	404	328	0.909	0.934	1.182
Medicine	45	69	59	67	77	167	237	250	218	241	1.913	1.835	2.9
Multidisciplinary	53	71	67	88	83	115	125	132	159	197	1.271	4.706	13.079
Neuroscience	6	12	13	13	11	20	45	49	86	72	2.769	2.908	3
Nursing	4	2			1	0	31	23	0	0		1.336	1.366
Pharmacology, Toxicology and Pharmaceutics	37	56	39	47	54	127	149	180	179	242	2.814	2.173	3.991
Physics and Astronomy	433	421	418	504	524	1221	1255	1511	1161	1344	1.458	1.362	1.429
Psychology	3	2	3	7	4	24	27	14	7	11	1.100	1.629	2.418
Social Sciences	25	19	19	51	42	80	126	124	73	91	1.300	0.906	1.561
Veterinary	7	6	2	6	2	6	24	18	12	6	0.750	1.038	1.167

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Lever 4: Improve research management information

Example: Project Snowball

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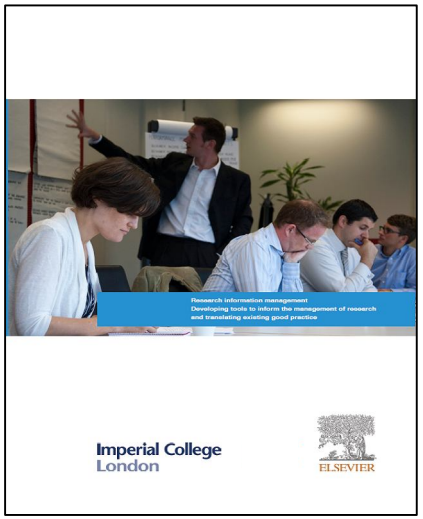

Imperial College London

University of Oxford

University of Bristol

University of Cambridge

University of St Andrews

Queen's University Belfast

University of Leeds

UCL

Summary

Quality information → **Quality research** → **Quality of life**