

Measuring and Managing Research Excellence

HEPI Conference: Assessing impact, rewarding excellence: REF 2014 and beyond London, 22nd November 2011

Dr Nick Fowler, Director of Strategy, Elsevier

Elsevier: commissioned to deliver 2011 BIS report on UK Research



Key data source: Scopus



BS Department for Business Innovation & Skills



Knowledge, networks and nations Global scientific collaboration in the 21st century

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BIS report inputs: quantitative

Data

• Scopus

- ScienceDirect usage
- OECD
- HESA
- WIPO
- AUTM
- HEFCE

- 112 database tables, 2.3 Gigabytes
- 20MM+ articles, 200MM+ citations, 3B downloads
- 45MM indicator values
- Largest indicator: 6MM+ values

Analyses



BIS report inputs: qualitative

UK strength case studies



Stakeholder workshops













18 workshop attendees, 7 organisations

BIS report outputs





Q4 2011: follow-up stakeholder workshops to discuss findings and implications

Summary of UK position in global research – share



UK inputs

3% of R&D spending4% of Researchers

UK outputs

2% of patent applications
6% of published articles
9% of article downloads
11% of article citations
14% of most highly cited articles

Summary of UK position in global research - efficiency





UK: brain circulation



UK: collaboration levels



Source data: Scopus

UK: collaboration networks



30+ interviews confirmed importance of mobility and collaboration





Global Research: tectonic shifts

Global share of R&D increased 2006-2010

12

Performance levers to manage research outcomes

Performance lever



13

Lever 1: increase funding – UK University example

UK University's quality rank > quantity rank

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

	MRC and BBSRC themes Natural protection Tissue disease and degeneration Mental health and wellbeing Repair and replacement Genetics and disease Life course perspective Lifestyles affecting health Environment and health	UK University's Total articles	UK University's Rank*			
		(cumulative, 2008-2010)	Quantity (Number of articles)	"Quality" proxy (Citations per article)		
\uparrow	Natural protection	832	8	6		
	Tissue disease and degeneration	623	9	6		
ical earch ncil	Mental health and wellbeing	636	8	7		
Rese Cour	Repair and replacement	879	8	9		
RC	Genetics and disease	1,039	8	9		
Z	Life course perspective	1,209	8	10		
	Lifestyles affecting health	1,213	8	10		
\downarrow	Environment and health	1,382	8	5		
() =						
BBSRC inscience for the futu	Food Security	607	10	1		
	Bio-energy and industrial biotechnology	414	10	2		
	Basic bio-science underpinning health	312	9	9		

*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

Example - Food Security

Funding	Register	Log in 🕀 🤇	Go to SciVerse s						
Home Search Browse F	Recommend	tations My Pro	file				H		
Food Security		Search 📀 Oppo	rtunities C Awarded Grants						
Search results						🔊 RSS 🗊 S	earch history		
Refine search results You searched for: foo AND Sponsor country(United Kingdom) Search within results Opportunities (241) Awarded grants (1) Inactive opportunities (152)									
Limit to or Exclude		t page or all 🗏	🗷 🗈 🛈		20 results per p	age 💌 1 to 2	0 🕨 of 241		
Limited submissions	_	Deadline	Title	Sponsor	Type 🔺	Amount ,	, Currency		
Sponsor country	1 1.	01-11-2012	Research Programme Grants	Leverhulme Trust	Research Grants	1,750,000	GBP		
L Europe	2.	05-19-2012	Energy Efficient Venues	Big Lottery Fund	Community Service Grants	1,000,000	GBP		
Subject area	3.	12-01-2011	Research Project Grants	Leverhulme Trust	Research Grants	500,000	GBP		
Sponsor type	· 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		
Deadline 于	1 5 .	11-03-2011	Development of prototype grant	Technology Strategy Board	Program Project/ Center	250,000	GBP		
Award type					Grants				
Amount 🗄	6.	02-01-2012	Future Research Leaders Grants	Economic and Social Research Council	Research Grants	215,000	GBP		
Restrictions		l la sa sifis d	Africa Des services	Nuffield Favedation	Descent Oracle	450.000	0.00		
Date posted] _ /.	Unspecified	Africa Programme	Numield Foundation	Research Grants	150,000	GBP		
Academic rank	8.	03-21-2012	International Networks	Leverhulme Trust	Research Grants	125,000	GBP		
Academic degree	9.	Unspecified	AXA Research Fund Doctoral Studentships 2011	University Of Manchester	Research Grants	120,000	GBP		
Limit to or Exclude	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

SciVal Strata Funding Spotlight	Strata	Valerie Thiel Log	gout Go to SciVers	se Suite
		Data la	st updated: Sunday, 3 A	pril 2011.
Publication & Citation		My Settings	Export analysis	Help
My Selection 🗉 🛛 🔳 🗶	Benchmark Influence			
Researcher A, University X	Citation Indices Document Output Citations Received Cited / Uncited Documents			
📥 🔺 Researcher B University X	Document Output i			
Cluster C, University X	Options Chart view			
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Researchers () () () () () () () () () () () () ()	Number of documents			
Anonymised!	0 0 1998 1999 2000 2001 2002 2003 2004 2005 2006	2007 2008 2009	2010 2011	

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 Example - collaboration between UK University and India



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	\vdash
Computer Science	184	202	201	195	205	291	363	480	587	550	1.389	1.142	1.609	Þ
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	1
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	1
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	1
Medicine	45	69	59	67	77	167	237	250	218	241	1 913	1.835	29	
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	1
Nursing	4	2			1	0	31	23	0	0		1.336	1.366	1
Pharmacology, Toxicology and Pharmaceutics	37	56	39	47	54	127	149	180	179	242	2 814	2.173	3 991	D
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	94	1.300	0.906	1.561	Þ
Veterinary	7	6	2	6	2	6	24	18	12	6	0.750	1.038	1.167	14

Lever 4: Improve research management information



Key conclusion

A national framework for data standards should be developed with stakeholders and used across the sector

Lever 4: Improve research management information



Lever 4: Improve research management information Example: Project Snowball



Lever 4: Improve research management information





