

IREG- 6 Conference



Developments in Research Assessment: towards a multi-dimensional approach



Said Taha, global director of solution services SciVal
Elsevier
20 March, 2012

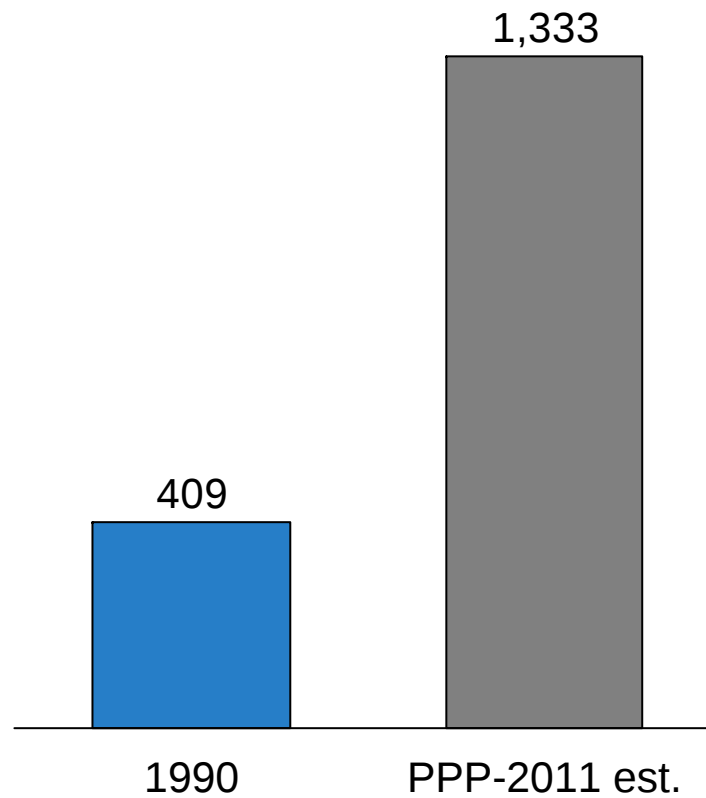
\$1,333B (USD PPP-2011 est.)

\$409B (USD -1990)

Global R&D expenditures



\$ billion



Source: Global R&D Magazine, Batelle (2010 estimates); UNESCO Institute for Statistics (1990 actuals)

\$38.0B

(USD PPP-2011 est.)

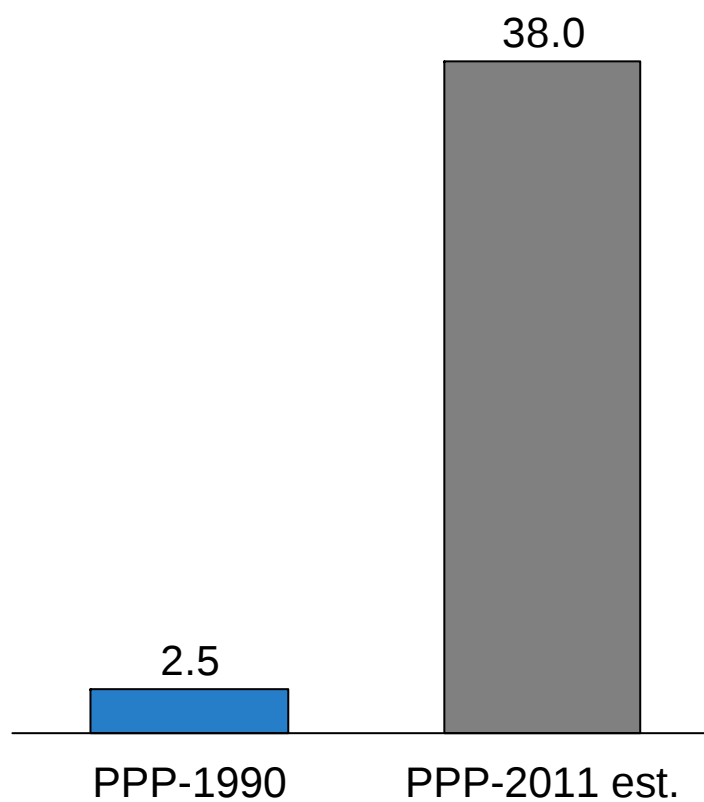
\$2.5B

(USD PPP-1990)

India



\$ billion



Source: Global R&D Magazine, Batelle (2010 estimates); UNESCO Institute for Statistics (1990 actuals)

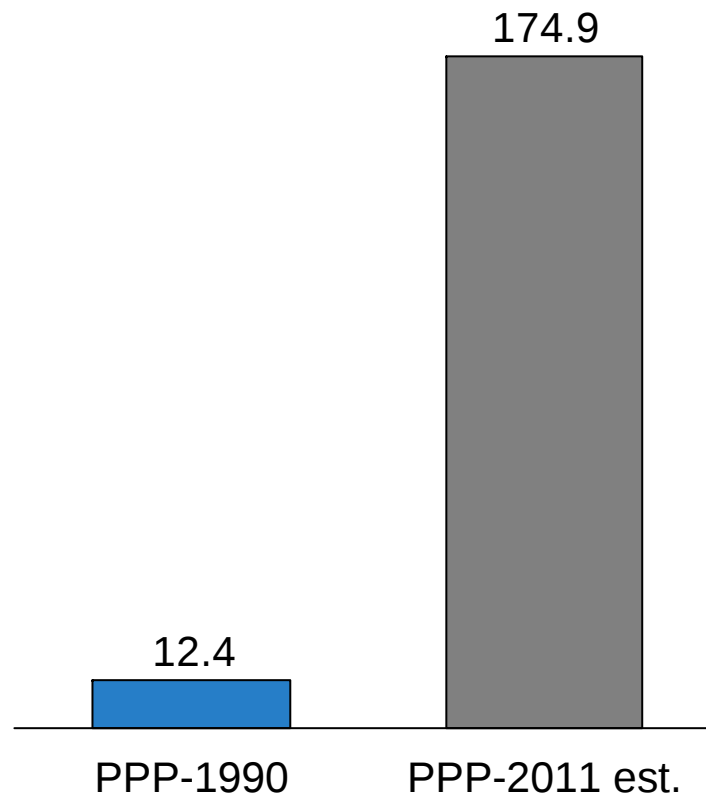
\$174.9B (USD PPP-2010 est.)

\$12.4B (USD PPP-1990)

China



\$ billion



Source: Global R&D Magazine, Batelle (2010 estimates); UNESCO Institute for Statistics (1990 actuals)

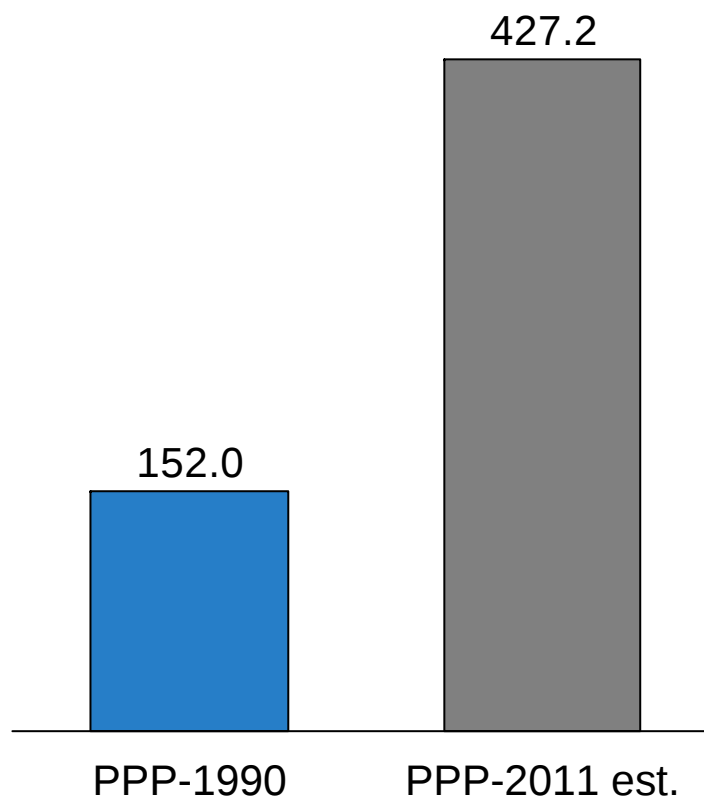
\$427.2B (USD PPP-2011)

\$152.0B (USD PPP-1990)

US



\$ billion

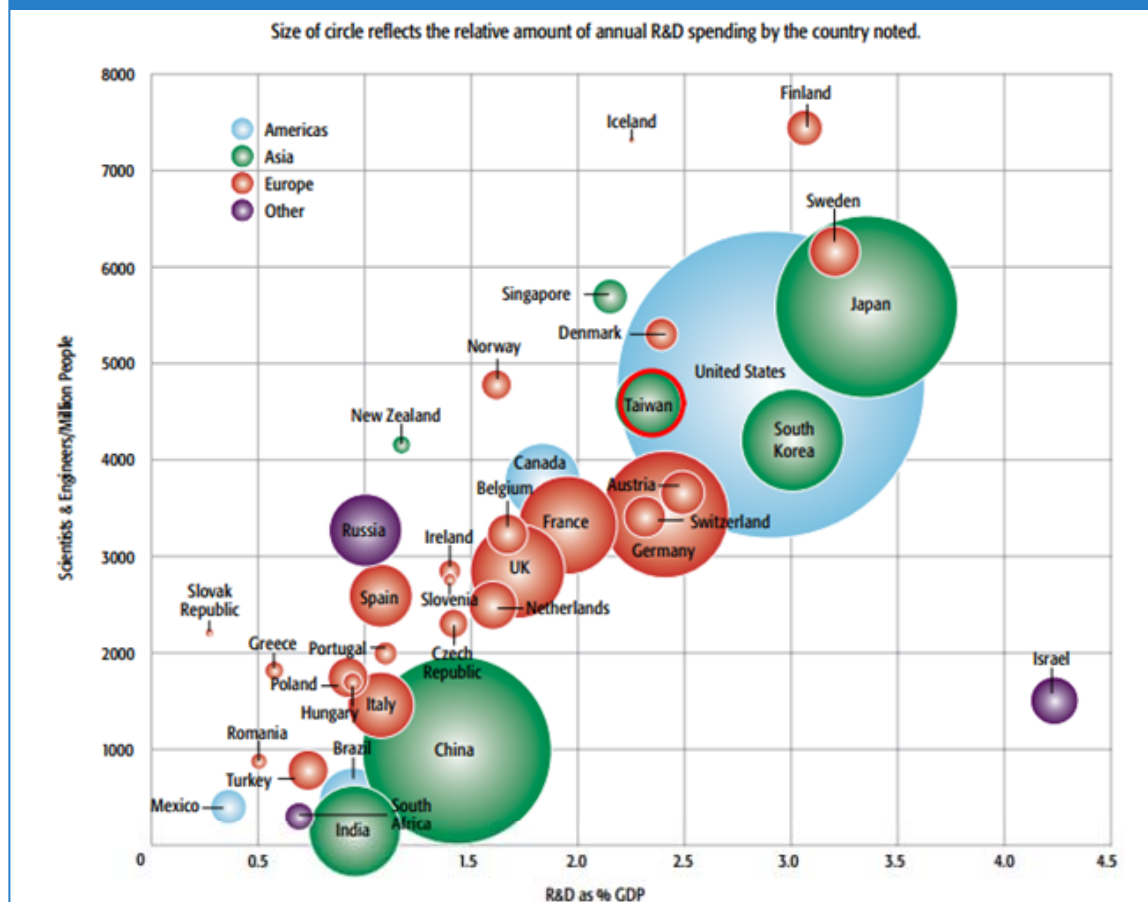


Source: Global R&D Magazine, Batelle (2010 estimates); UNESCO Institute for Statistics (1990 actuals)

Taiwan – A Spot Not to be Missed



World of R&D 2010



Notes

- The world as a whole will spend over \$1.4T on R&D in 2012
- In 2011 China spent more on R&D than Japan, at \$175B vs. \$152B (PPP USD)
- In 2011, India's investments in R&D were roughly equivalent to the UK's, at around \$38B annually.
- U.S. R&D spending was up 2.9% over prior year to \$427B
- Taiwan's GERD is ranked 11th among major OECD countries, and is expected to reach 3% by 2012*



* Source: investtaiwan.nat.gov.tw
Source: 2011 Global R&D Funding Forecast, Battelle, www.battelle.org

Top Investing Countries on R&D



Forecast gross domestic expenditures on R&D (GERD), \$ Billions

Global Rank	Country	2009 GERD PPP \$ Billions	2009 R&D as % of GDP	2010 GERD PPP \$ Billions	2010 R&D as % of GDP	2010-11 GDP Growth	2011 GDP PPP \$ Billions	2011 GERD PPP \$ Billions	2011 R&D as %
1	United States	383.6	2.7%	395.8	2.8%	2.3%	14,963	405.3	2.7%
2	China	123.7	1.4%	141.4	1.4%	9.0%	10,747	153.7	1.4%
3	Japan	139.6	3.4%	142.0	3.3%	1.5%	4,339	144.1	3.3%
4	Germany	68.0	2.4%	68.2	2.4%	2.0%	2,957	69.5	2.3%
5	South Korea	41.4	3.0%	42.9	3.0%	4.5%	1,512	44.8	3.0%
6	France	41.1	2.0%	41.5	1.9%	1.6%	2,176	42.2	1.9%
7	United Kingdom	37.2	1.7%	37.6	1.7%	2.0%	2,218	38.4	1.7%
8	India	28.1	0.8%	33.3	0.9%	8.4%	4,193	36.1	0.9%
9	Canada	23.2	1.8%	23.7	1.8%	2.7%	1,357	24.3	1.8%
10	Russia	21.8	1.0%	22.1	1.0%	4.3%	2,288	23.1	1.0%
11	Brazil	18.0	0.9%	18.6	0.9%	4.1%	2,253	19.4	0.9%
12	Italy	18.7	1.1%	18.7	1.1%	1.0%	1,775	19.0	1.1%
13	Taiwan	17.6	2.4%	18.2	2.3%	4.4%	839	19.0	2.3%
14	Spain	17.3	1.3%	17.2	1.3%	0.7%	1,366	17.2	1.3%
15	Australia	15.0	1.8%	15.3	1.8%	3.5%	907	15.9	1.7%
16	Sweden	11.5	3.4%	11.6	3.3%	2.6%	366	11.9	3.3%
17	Netherlands	10.5	1.6%	10.6	1.6%	1.7%	681	10.8	1.6%
18	Israel	8.8	4.3%	9.1	4.2%	3.8%	223	9.4	4.2%
19	Austria	8.2	2.5%	8.2	2.5%	1.6%	339	8.3	2.5%
20	Switzerland	7.3	2.3%	7.4	2.3%	1.7%	327	7.5	2.3%

Rankings – Benefits and limitations



Strengths – Good general measure of university prestige, especially for comprehensive and flagship research universities, focus on research outputs, meets a need in the markets for students

Limitations – Single measure of complex institution, methodologies often questionable (20% on Nobel prizes for Shanghai Jiaotong) or manipulable, vary highly from year to year outside of top 50

Poor way to assess individuals and institutions – Difficult to compensate for size (Cal Tech w 700 students, Michigan with 50,000, Univ. Auto. De Mexico >250K), misses focused research areas, favors geographies (SHJ favors US, THE favors UK/Commonwealth, some do not have global coverage), misses quality of teaching/educational component (uses proxies like ratios)

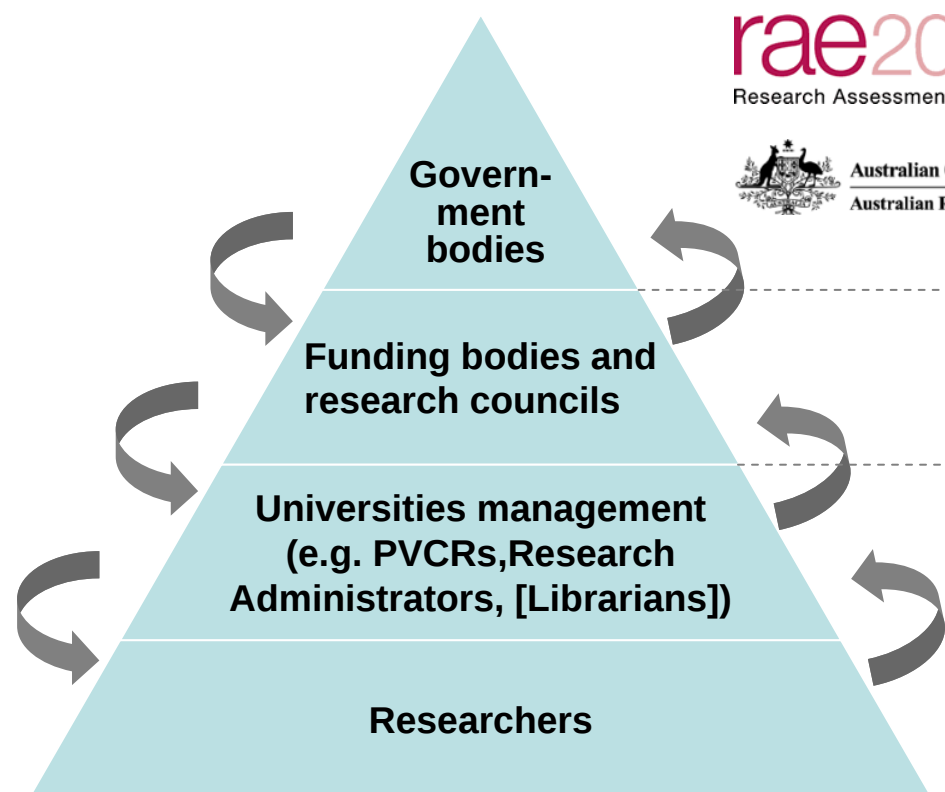
Heavy focus on rankings in East Asia, especially allocating research funds, may be detrimental. Rankings totally ignore or miss, for instance, individual and small group research excellence, which can occur even on campuses with low research intensity



Elsevier's involvement with research assessment



Elsevier's SciVal Products and Capabilities



rae2008
Research Assessment Exercise



Australian Government
Australian Research Council

Custom reports
and analytical
services



Funding body
solutions and
services



Products, data
and custom
reports

SciVal Spotlight*
SciVal Strata*
SciVal Funding
SciVal Experts
SCOPUS

Elsevier's SciVal suite provides research management solutions based on data, services, and software to governments, funding bodies, research institutions



Our views on Research Assessment Matrix: rely on a Multi-dimensional, flexible framework



The multi dimensional research assessment matrix:

	Unit of assessment	Purpose	Output dimensions	Bibliometric indicators	Other indicators
1	Individual	Allocate resources	Research productivity	Publications	Peer review
2	Research group	Improve performance	Quality, scholarly impact	Journal citation impact	Patents, licences, spin offs
	Department	Increase regional engagement	Innovation and social benefit	Actual citation impact	Invitations for conferences
3	Institution	Stimulate international collaboration	Sustainability & Scale	International co-authorship	External research income
	Research field	Promotion, hiring	Research infrastructure	Citation 'prestige'	PhD completion rates

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1 Evaluating A Researcher



① Evaluating A Researcher



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Verapamil

Benzodiazepines

Anti-Anxiety Agents

Diazepam

Administration, Oral

Trends

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Research Network

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- 2011

D R Abernethy; J P F Bai; K Burkhart; H-G Xie; P Zhichkin

Integration of diverse data sources for prediction of adverse drug events.

Clinical pharmacology and therapeutics 2011;90(5):645-6.
- 2011

D R Abernethy; J Woodcock; L J Lesko

Pharmacological mechanism-based drug safety assessment and prediction.

Clinical pharmacology and therapeutics 2011;89(6):793-7.
- 2011

Seongeun Cho; S W Johnny Lau; Veneeta Tandon; Kofi Kumi; Elimika Pfuma; Darrell R Abernethy

Geriatric drug evaluation: where are we now and where should we be in the future?

Archives of internal medicine 2011;171(10):937-40.

Similar Experts

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Publications

Roland Griffiths	262	
Solomon Snyder	1044	
Paul Gurbel	236	
Nancy Ator	59	
Victor Serebruany	229	

Journals

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Publications

Clinical pharmacolog...	39
The Journal of pharm...	18
Journal of clinical ...	12
Journal of chromatog...	12
Pharmacology	11



Note: SciVal Experts is customized for the institution. Sample screens from other organizations provided
Source: SciVal Experts (April 2012), Universiti Kebangsaan Malaysia

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② Evaluating A Group



Citation Benchmark ▼

Options Chart view Table view

Reference Field **Chemistry**

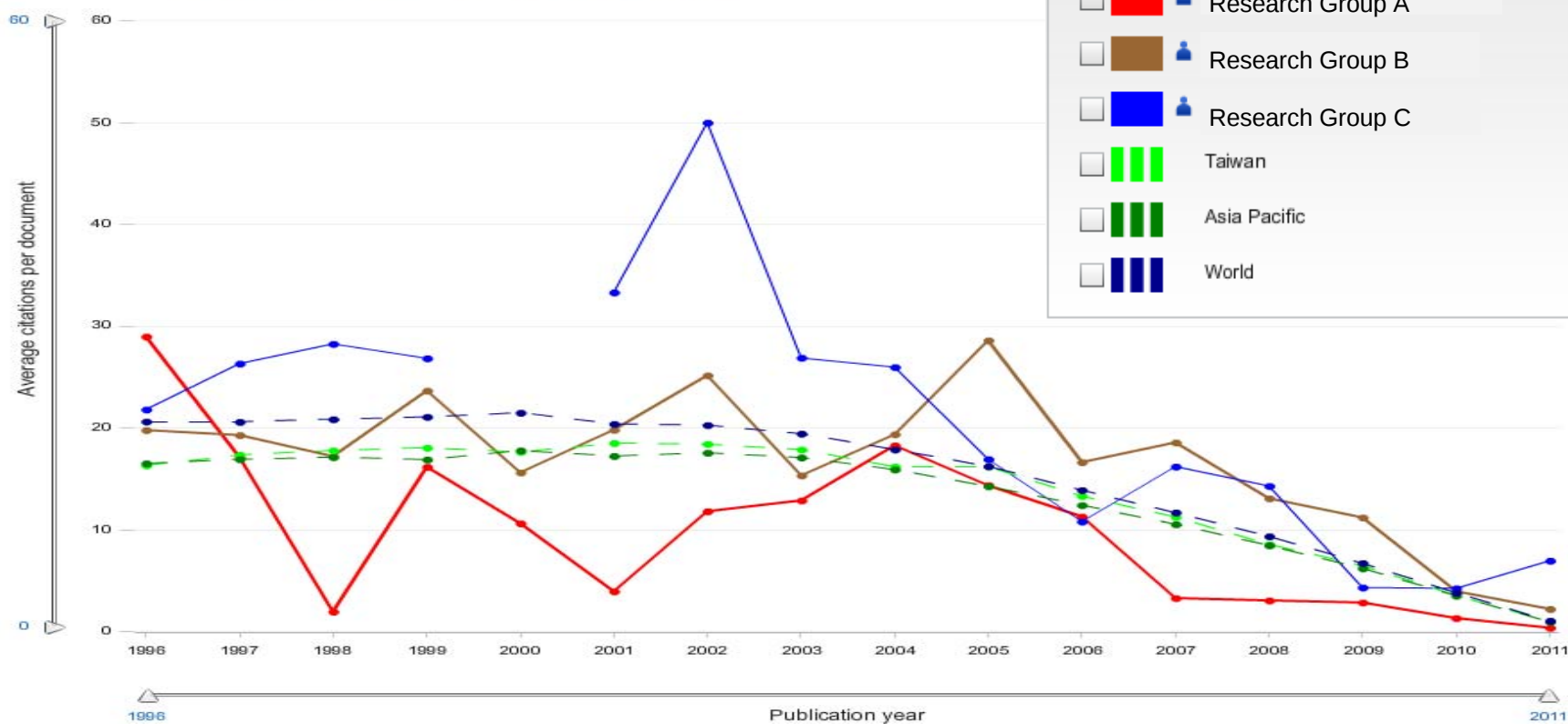
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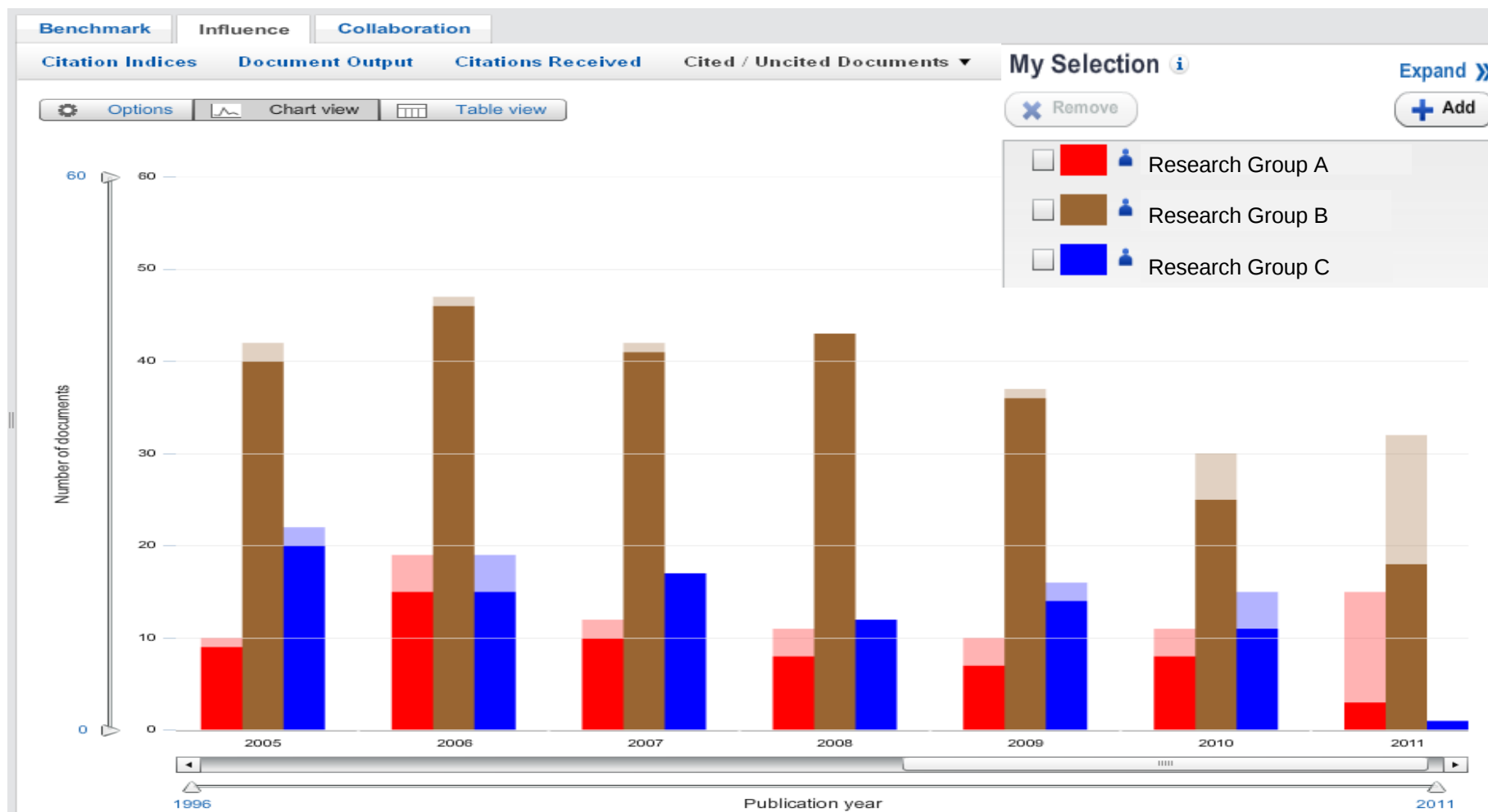
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② Evaluating a Group



Our views on Research Assessment Matrix: rely on a Multi-dimensional, flexible framework

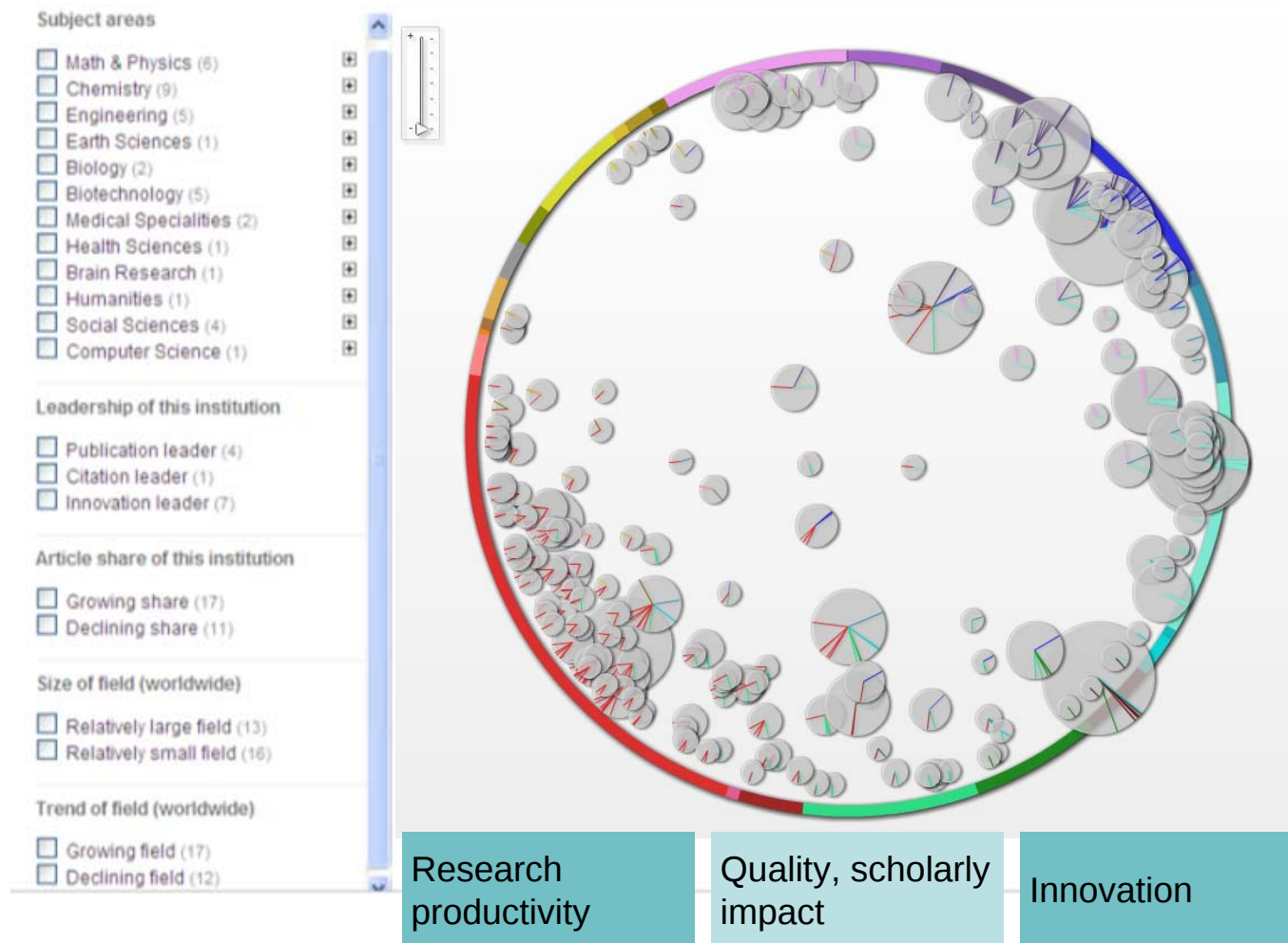


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3 Evaluating an Institution



- The larger the circle, the more articles are in that competency.
- The location of each circle is determined by the primary subject area of that competency. Circles closer to the center are more interdisciplinary.

[Learn more »](#)

Subject areas

- ☐ Math & Physics
- ☐ Chemistry
- ☐ Engineering
- ☐ Earth Sciences
- ☐ Biology
- ☐ Biotechnology
- ☐ Infectious Diseases
- ☐ Medical Specialities
- ☐ Health Sciences
- ☐ Brain Research
- ☐ Humanities
- ☐ Social Sciences
- ☐ Computer Science
- ☐ Other



Our views on Research Assessment Matrix: rely on a Multi-dimensional, flexible framework

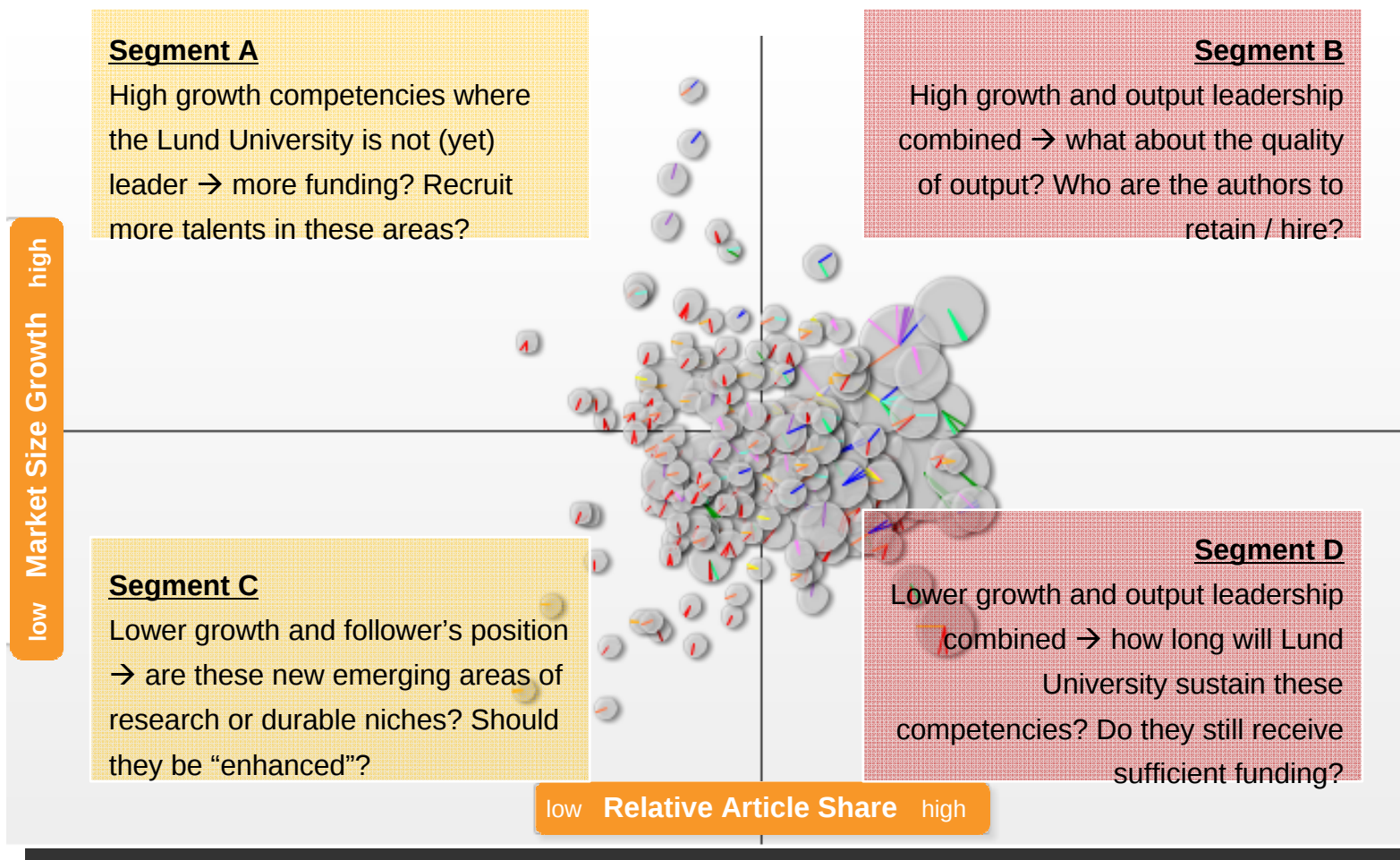


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Strategic management of multi-disciplinary research portfolios; assess research excellence



Our views on Research Assessment Matrix: rely on a Multi-dimensional, flexible framework

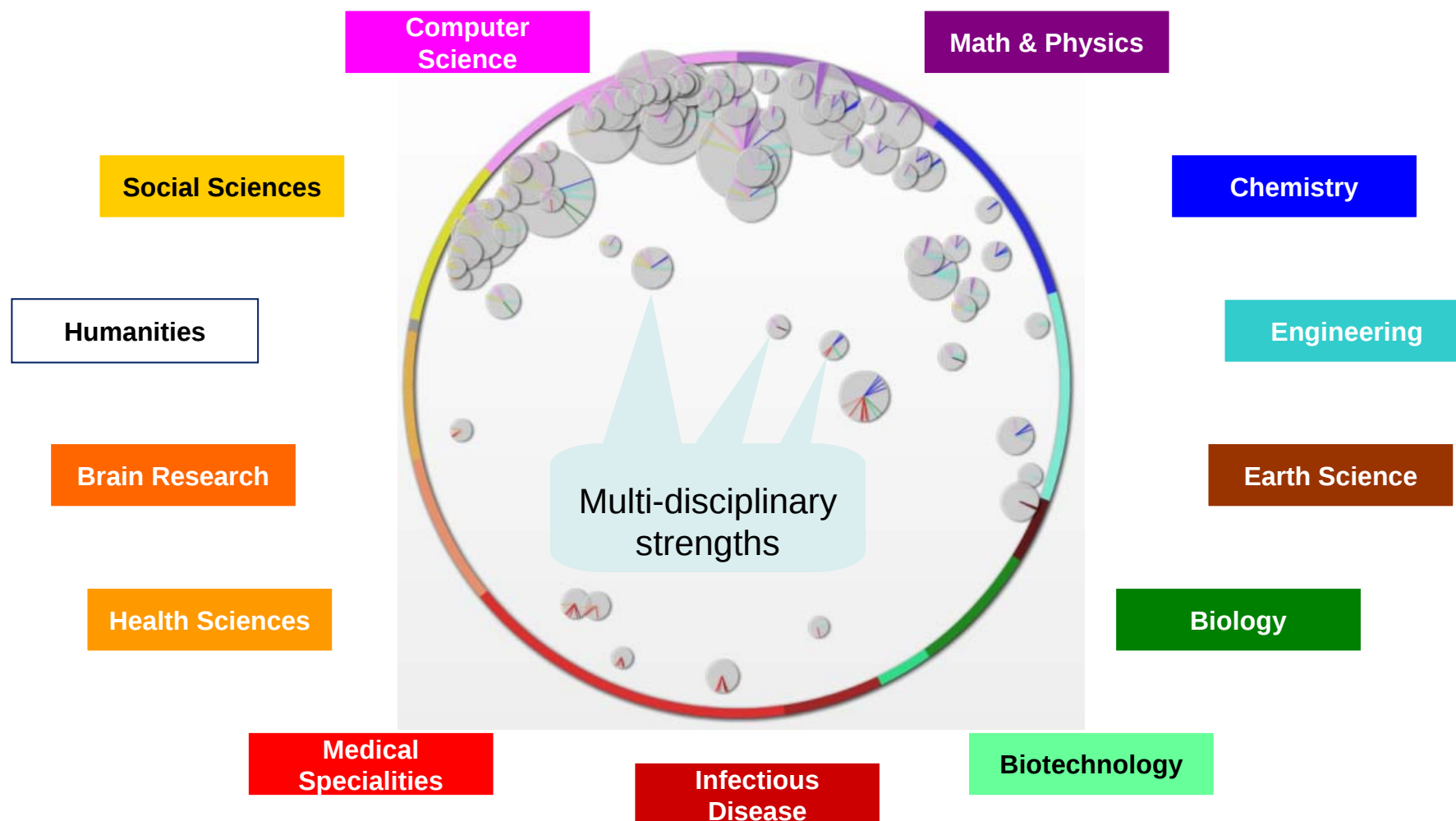


The multi dimensional research assessment matrix:

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	Department	Increase regional engagement	Innovation and social benefit	Actual citation impact	Invitations for conferences
3	Institution (multi-disciplinarity)	Stimulate international collaboration	Sustainability & Scale	International co-authorship	External research income
	Research field	Promotion, hiring	Research infrastructure	Citation 'prestige'	PhD completion rates

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Assess research-strength at country level in this specific example, multi-disciplinary research strength



Source: SciVal Spotlight Taiwan 2010 country map

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③ Evaluating an Institution: international collaboration



SciVal Spotlight

Identify collaboration
patterns

Data and analytical services to assess performance at national levels



Provide support to the research evaluation exercise processes: ARC (Australia), Hefce (UK)



Provide comprehensive comparative analyses for BIS, Research Ministry UK

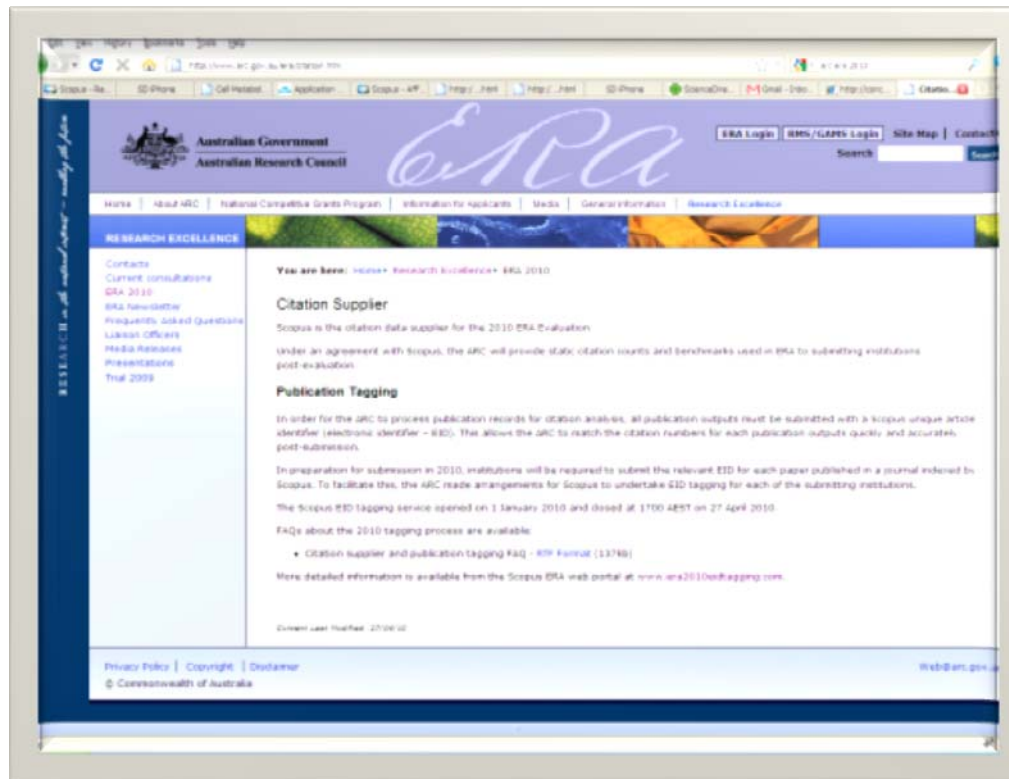


BIS | Department for Business
Innovation & Skills

For ERA 2010, 2014, and HEFCE 2014, providing data and support services for national research evaluations



Supported by Scopus data and Analytical Services to manage the assessment process



- Assessment of research quality within Australia's higher education institutions using a **combination of indicators and expert review** by committees comprising experienced, internationally-recognized experts
- ERA uses leading researchers to evaluate research in eight discipline clusters
- ERA will detail areas within institutions and disciplines that are **internationally competitive**, as well as point to emerging areas where there are opportunities for development and further investment



Key take Aways



Research assessment at the core of the research environment

Rankings an integral part

In our view – Should be qualitative, quantitative, combination of peer review and a multi dimensional framework

Elsevier's role as data, solution and analytical services provider

Working with you beyond rankings and assessment – Looking and reading at publication data to refine your research strategy



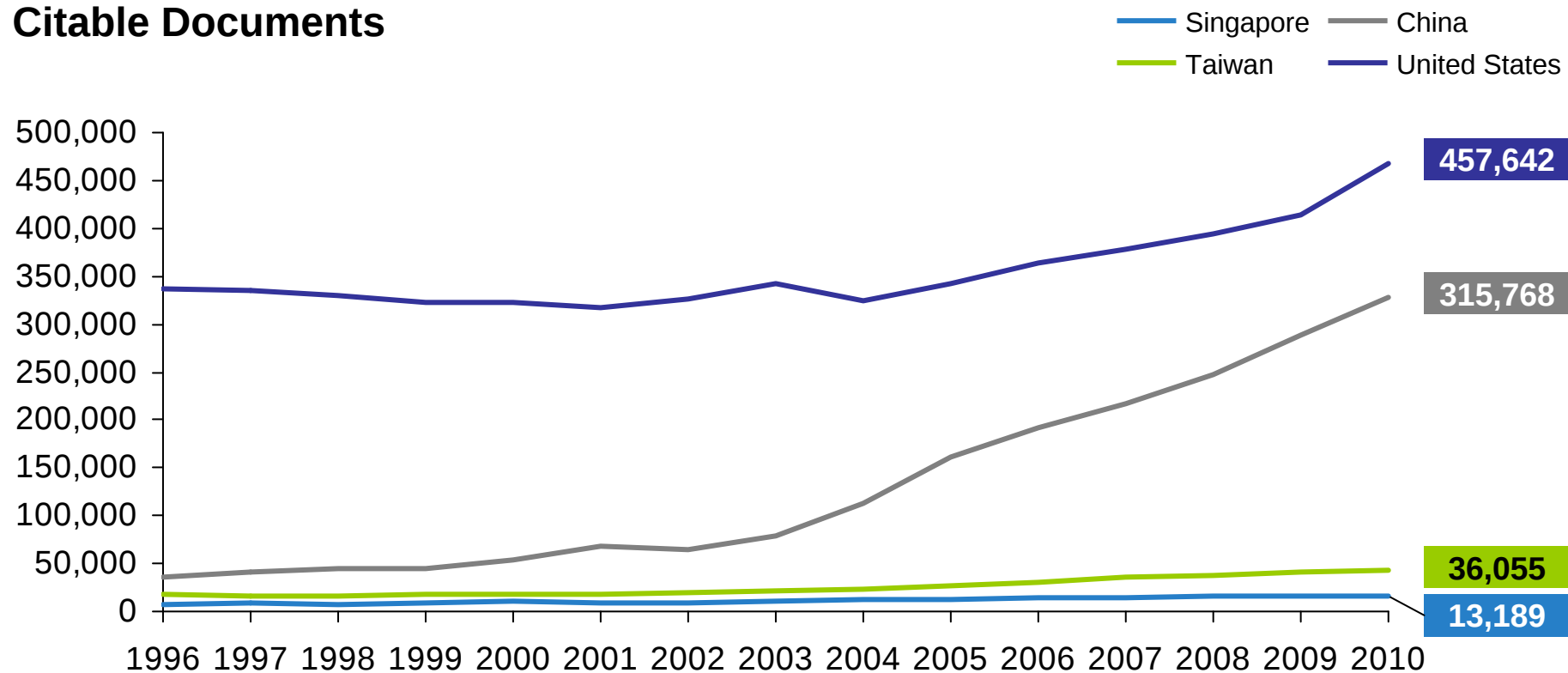
Thank you



Some further research output data



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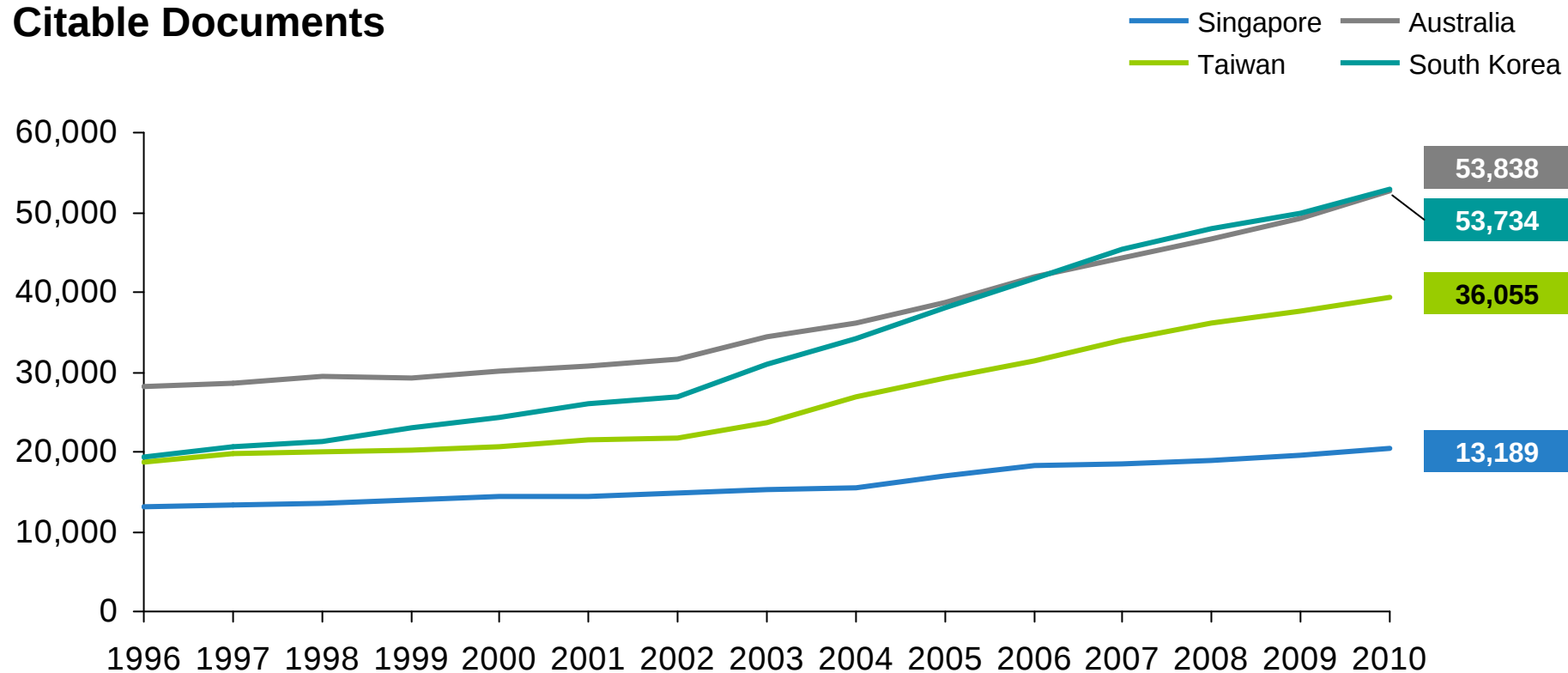
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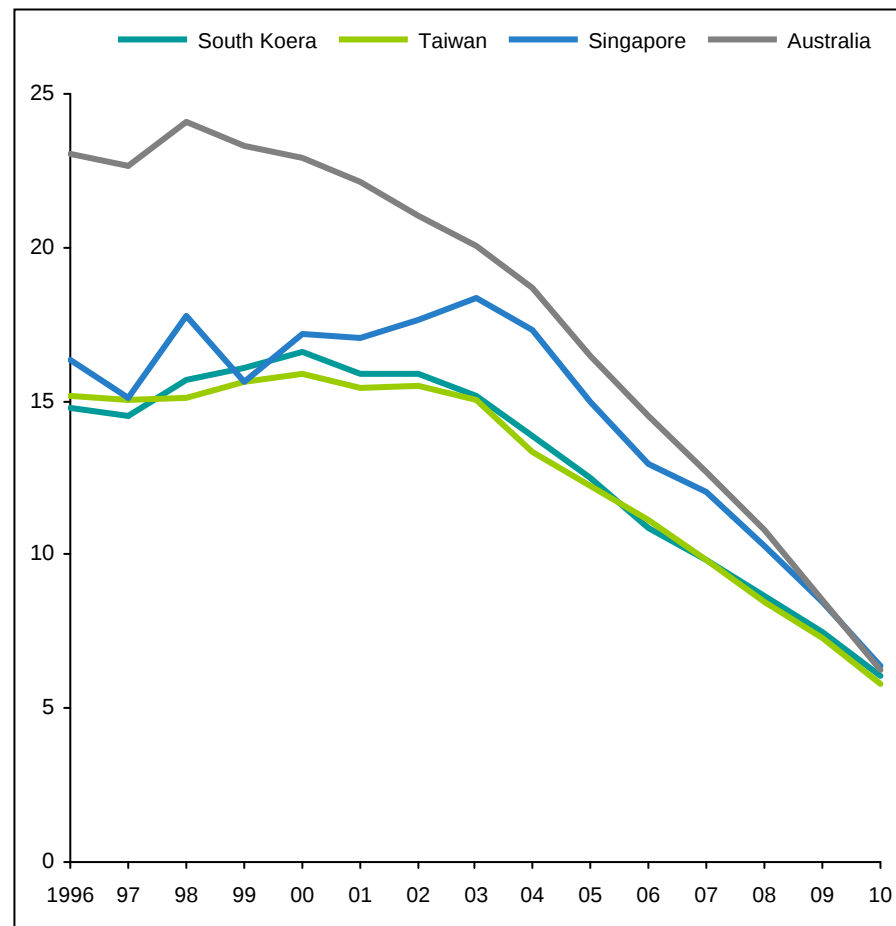
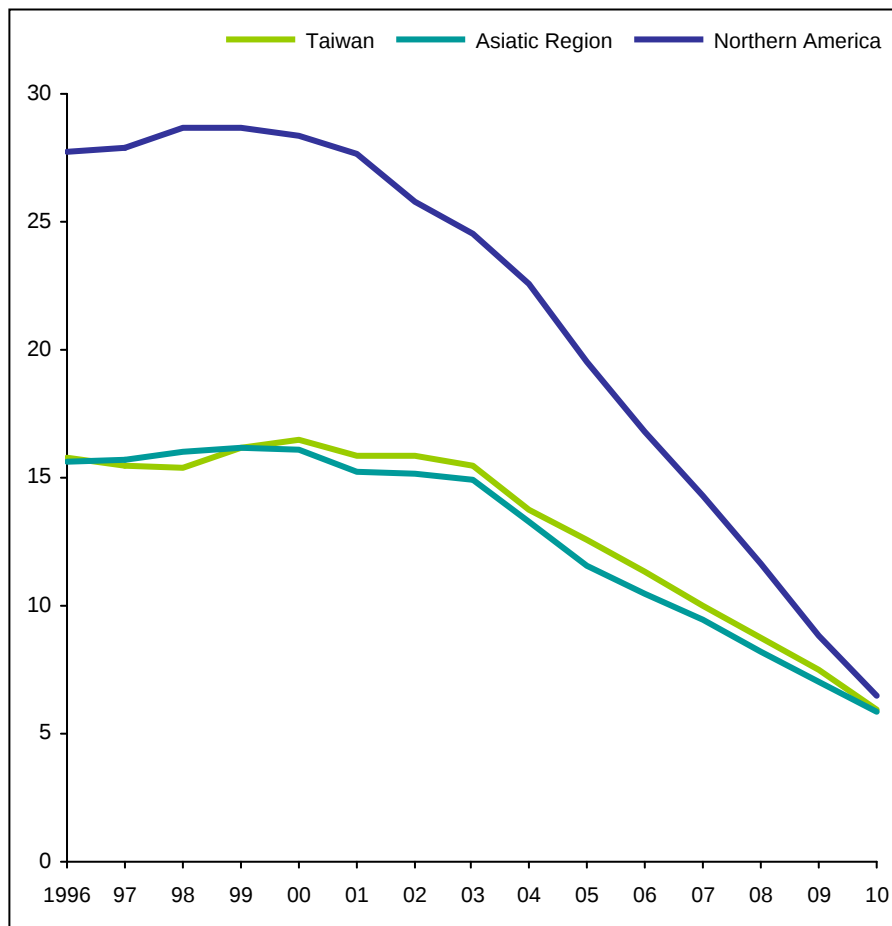
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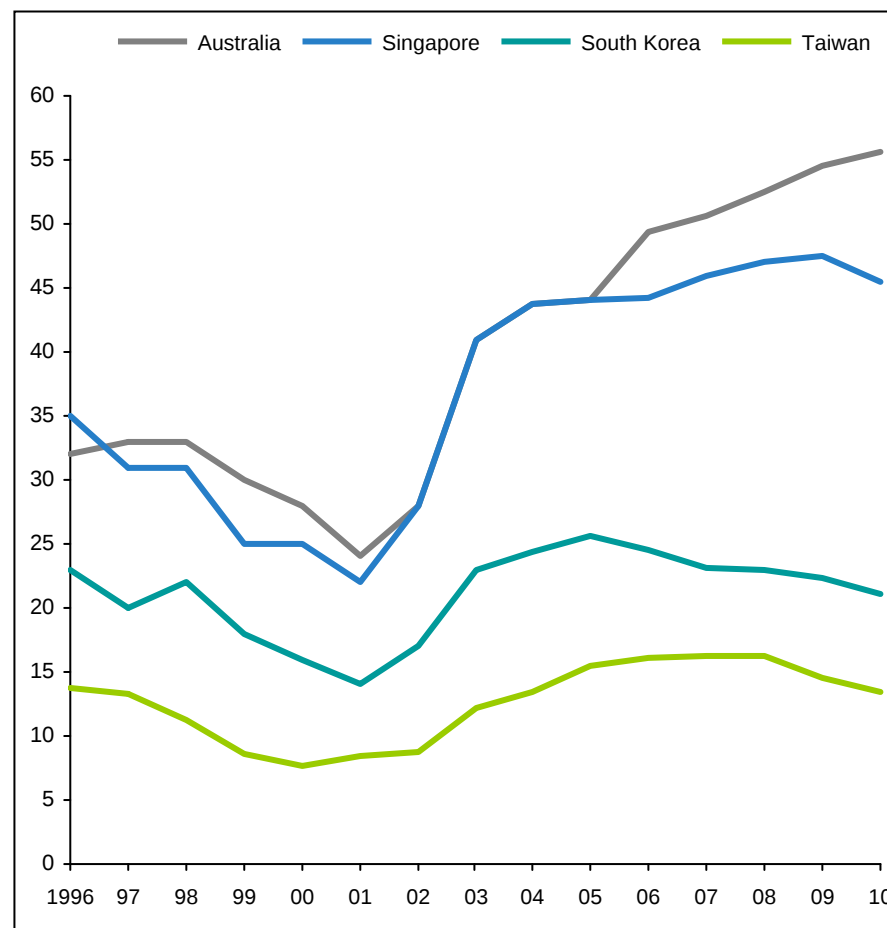
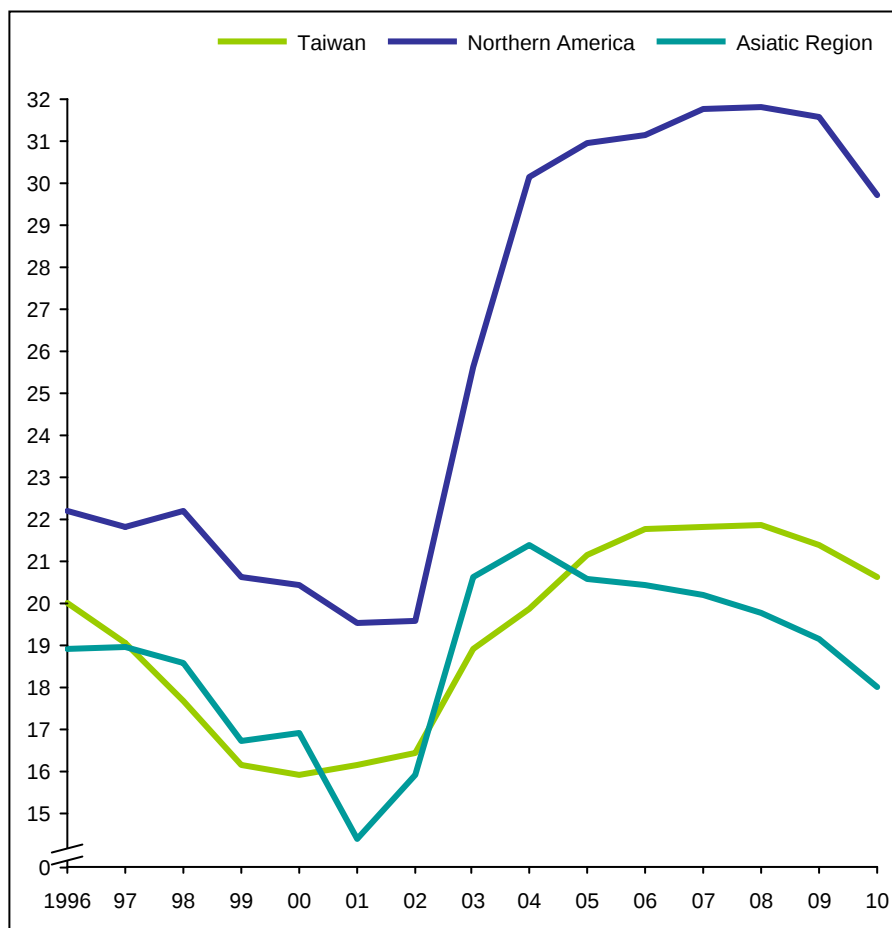
Cites per Document



Some research collaboration data



International Collaboration



Note: Based on Scopus data