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Danish Association of Research
Managers and Administrators

University of
Kent



DARMA 2016

The Metric Tide

30th May 2016

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 @SimonRKerridge

 @ResMetrics - <https://responsiblemetrics.org/>

Board Member  **casrai**
Connecting Research

Chair, ARMA
The Association of Research
Managers and Administrators



The Metric Tide

- **Research Assessment in the UK**
- **A (Very) Brief History of Metrics**
- **The Metric Tide / Metricide?**
- **Responsible Metrics**
- **Impact**
- **REF202~~1~~**
- **Discussion / Q&A**

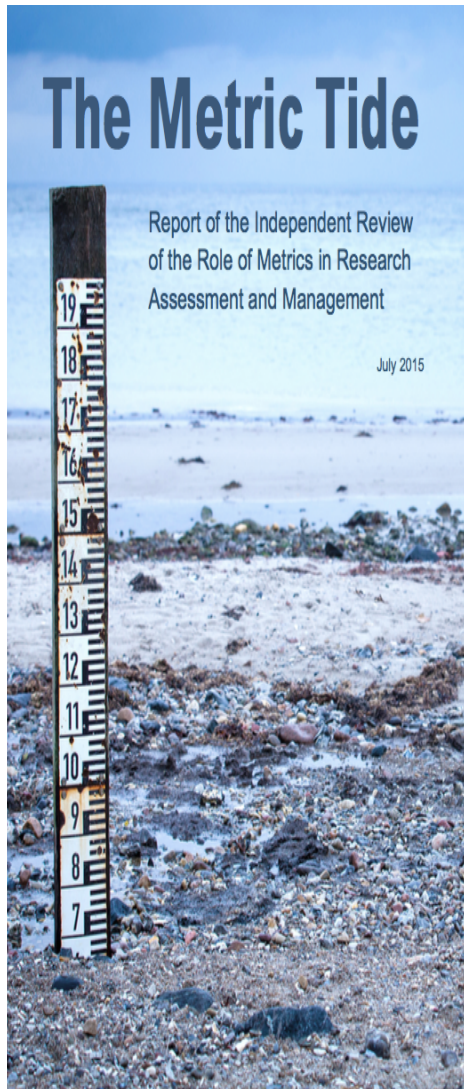
REPORT

The HEFCE *Independent Review of the Role of Metrics in Research Assessment*

Launched at the
Wellcome Trust, London,
9th July 2015

#HEFCEmetrics @ResMetrics

<http://www.hefce.ac.uk/rsrch/metrics/>



BUT First

- **ARMA conference**
 - **Birmingham 6-8 June**



- **EARMA conference**
 - **Lulea 20-22 June**



- **INORMS congress**
 - **Melbourne 11-15 Sept**



- **INORMS 2018**
 - **Edinburgh 4-8 June 2018**



Overview of (from) Kent



University of Kent

50th Anniversary



19,275 students

3,152 staff (728+145)

£200m turnover (~2bn DKK)

£14m research income + £14m QR [x10 for DKK]

Canterbury, Medway, Tonbridge, Brussels

- Paris, Athens, Rome

UK: 17th for Research Intensity, 16th for Teaching Quality

Queen's Anniversary prize for Tizard Centre

World: Top 100 under 50 (THE) [or was!]



University of Kent

Canterbury (1965)



Medway (2005)



Tonbridge (1982)



Brussels (1999)



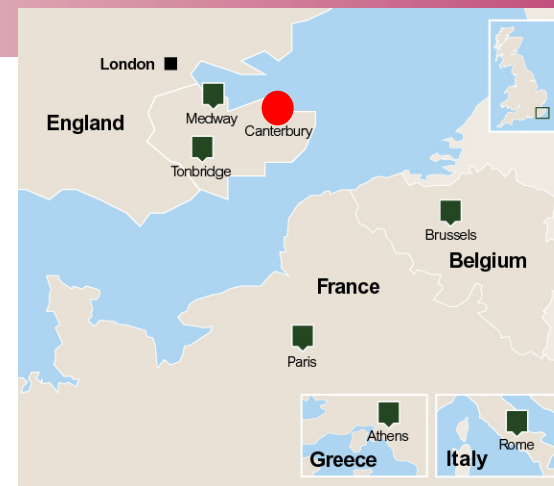
Paris (2009)



Athens (2011)



Rome (2013)



My



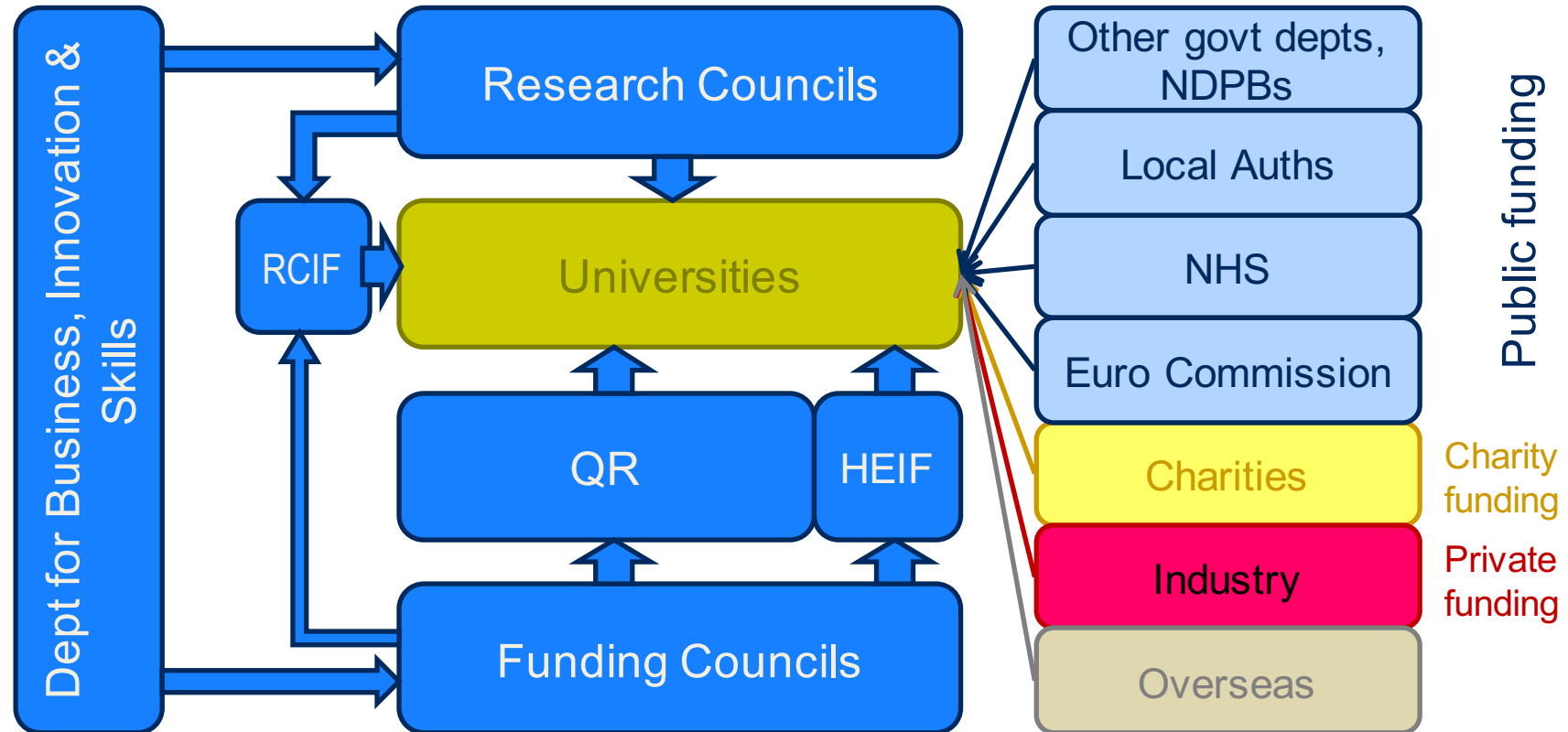
Research Assessment in the UK

- **Dual Support System**
- **fEC**
- **Project Funding**
- **Core Funding (QR)**
- **REF**

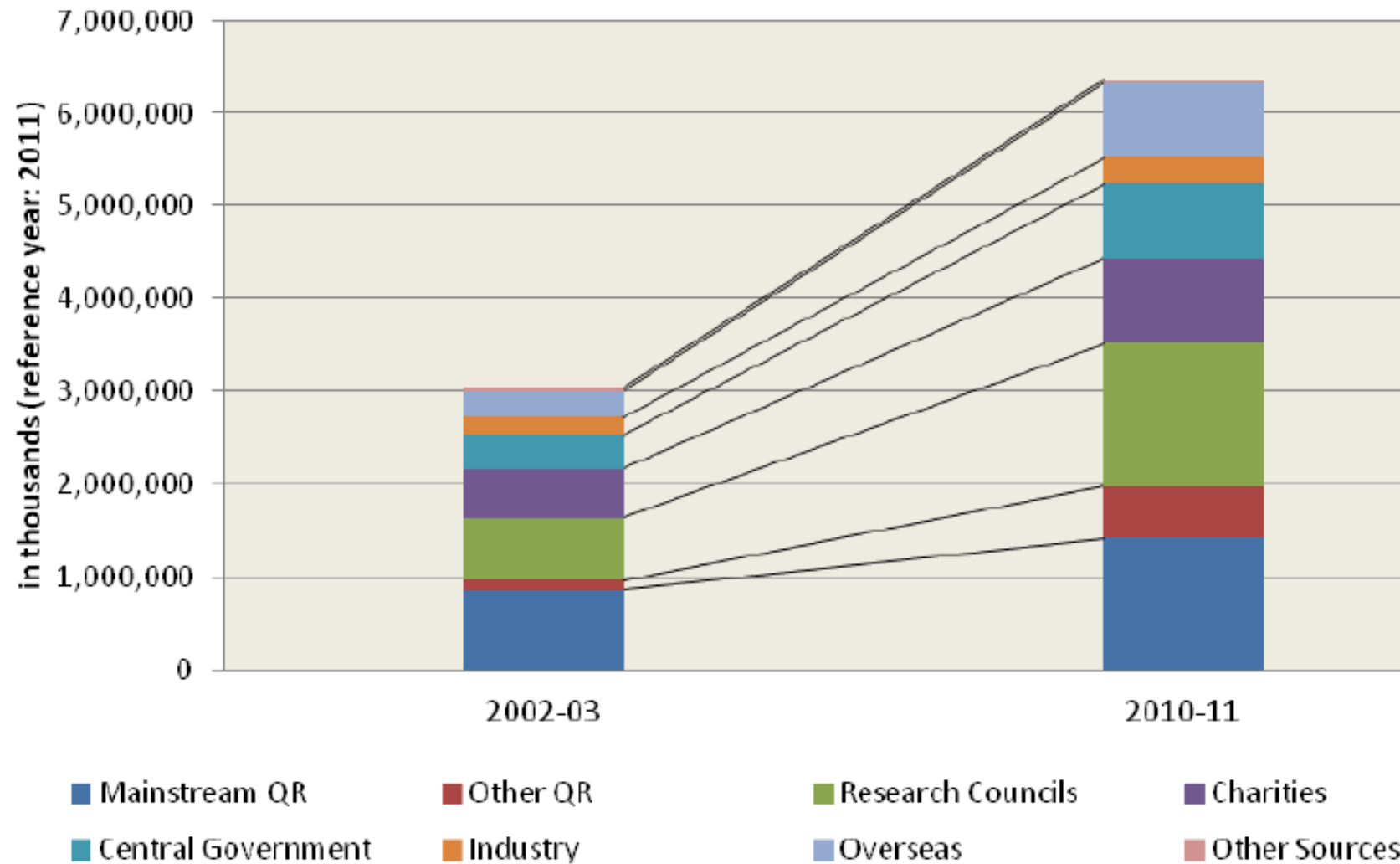
The UK Dual Support System

- **Core funding – ‘QR’ – REF**
- **Project funding**
 - **RCUK**
 - **Charities**
 - **NHS**
 - **Government departments**
 - **Industry**
 - **EU**
 - **Other...**
 - **Philanthropy**
 - **...**

Dual Support: and the rest



Dual Support System

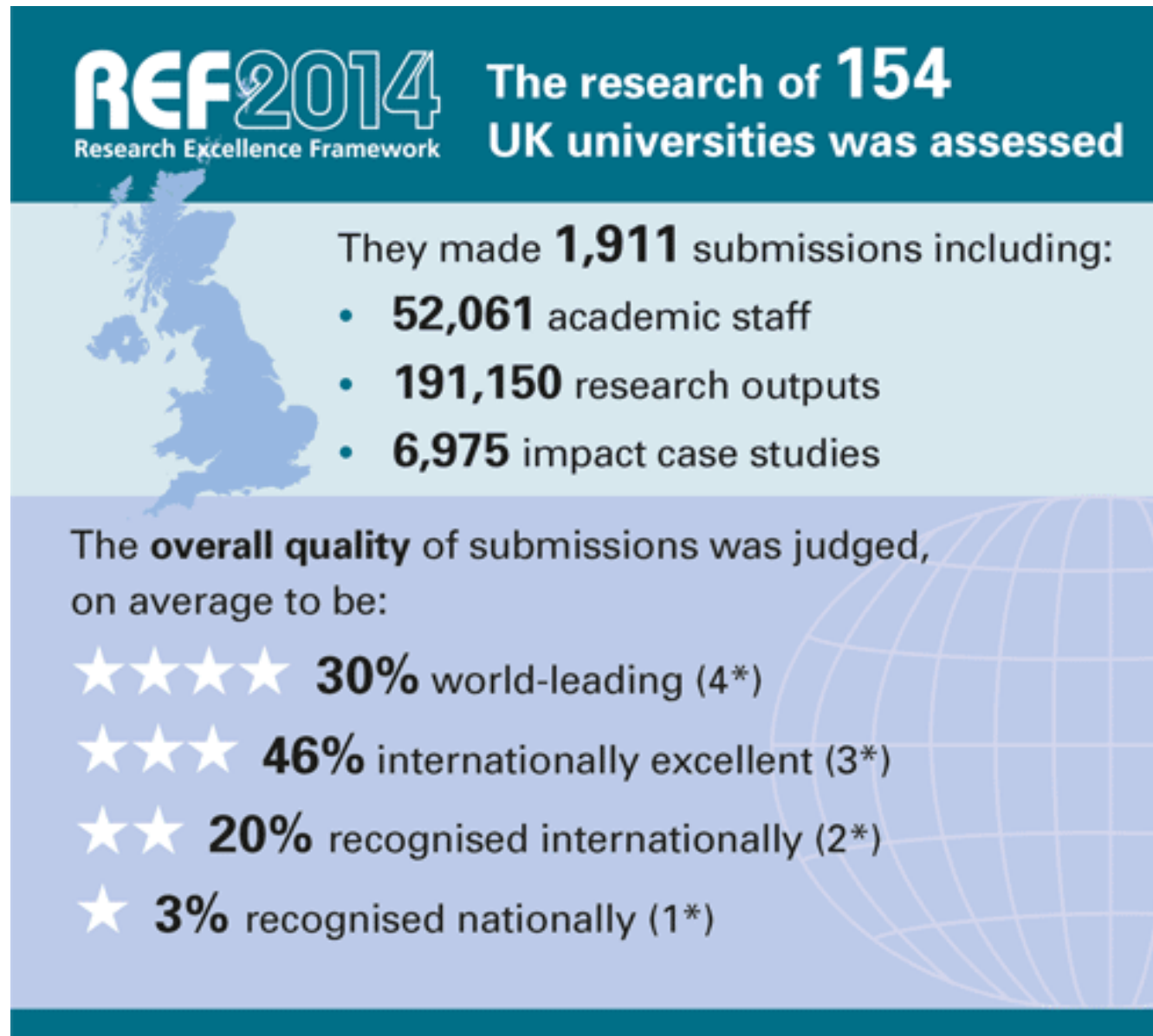


Source: CBR & UK-IRC for BIS

Slide on RAE → REF

- 1986: Research Selectivity Exercise
- 1989: RSE
- 1992: Research Assessment Exercise
- 1996: RAE (*my first...*)
- 2001: RAE
- 2008: RAE
- 2014: Research Excellence Framework

The Research Assessment and Excellence



Source: HEFCE

History of Research Metrics

We can count things, so we do

- Citations
- JIF
- h-index
 - g-, i-
- FWCI
- Income
- Doctoral students
- Altmetrics
 - Downloads
 - Reads
 - Blogs
 - Tweets
 - ...



What we do ▾

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reports

Data &
statistics

News &
events

Blog

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[Home](#) > [Research](#) > [Review of metrics](#)

Policy Guide

Independent review of the role of metrics in research assessment

We have reviewed the role of metrics in the assessment and management of research. [A report of the review's findings, 'The Metric Tide'](#), was published on 9 July 2015. This affects anyone with a professional interest in research assessment and funding.

Review of metrics

[Call for evidence](#)

[Stakeholder workshops](#)

[Conduct of the review](#)

What is metrics-based research assessment?

Metrics is the quantitative analysis of scientific and scholarly research outputs and their impacts.

Metrics include a variety of measures and statistical methods for assessing the quality and broader impact of scientific and scholarly research.

About the review

Read the report



Related content

[Metrics cannot replace peer review in the next REF](#)

[Research Excellence Framework](#)

[REF Policy development](#)

A medium shot of David Willetts, a middle-aged man with thinning hair, wearing a dark blue suit, white shirt, and a blue tie with white polka dots. He is speaking and looking slightly to his right. The background is a solid dark blue.

“I can announce today that I have asked HEFCE to undertake a review of the role of metrics in research assessment and management. The review will consider the robustness of metrics across different disciplines and assess their potential contribution to the development of research excellence and impact...”

David Willetts, Minister for Universities & Science,
Speech to UUK, 3 April
2014

Steering Group

The review will be chaired by **James Wilsdon**, Professor of Science and Democracy at the Science Policy Research Unit (SPRU), University of Sussex, *now University of Sheffield*. He will be supported by an **independent steering group** and a secretariat from HEFCE's Research Policy Team:

Dr Liz Allen (Head of Evaluation, Wellcome Trust) *now f1000*

Dr Eleonora Belfiore (Associate Professor of Cultural Policy, University of Warwick) *now Professor, Loughborough*

Dr Philip Campbell (Editor-in-Chief, Nature) *now Sir Philip*

Professor Stephen Curry (Department of Life Sciences, Imperial College London)

Dr Steven Hill (Head of Research Policy, HEFCE)

Professor Richard Jones FRS (Pro-Vice-Chancellor for Research and Innovation, University of Sheffield) – representative of the Royal Society

Professor Roger Kain FBA (Dean and Chief Executive, School of Advanced Study, University of London) – representative of the British Academy

Dr Simon Kerridge (Director of Research Services, University of Kent) – representative of the Association of Research Managers and Administrators *soon CASRAI*

Professor Mike Thelwall (Statistical Cybermetrics Research Group, University of Wolverhampton)

Jane Tinkler (London School of Economics and Political Science) *now UK Gov POST*

Dr Ian Viney (Head of Evaluation, Medical Research Council) – representative of Research Councils UK *now MBE*

Professor Paul Wouters (Centre for Science & Technology Studies, University of Leiden)

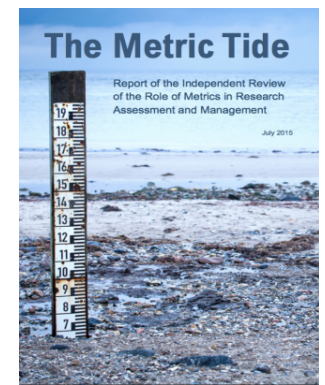


Our approach and evidence sources

- Steering group: diverse expertise and extensive involvement;
- Broad-based TORs – opening up, rather than closing down questions;
- Transparent – publishing minutes & evidence in real time;
- In-depth literature review;
- Formal call for evidence, open 1 May to 30 June 2014;
 - 153 responses; 44% HEIs; 27% individuals; 18% learned societies; 7% providers; 2% mission groups; 2% other
- Stakeholder engagement
 - 6 ‘review’ workshops – including on equality & diversity, A&H. Invite fiercest critics!
 - Intensive, ongoing stakeholder engagement;
 - Social media, especially **#hefcemetrics**;
- Quantitative exercise relating REF outcomes to indicators of research;
- Linkage to HEFCE’s evaluations of REF projects;
- Interim findings; followed by full report in July.



Report structure



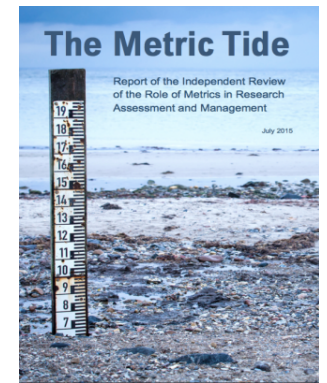
- Chapter 1: Measuring up
- Chapter 2: The rising tide
- Chapter 3: Rough indications
- Chapter 4: Disciplinary dilemmas
- Chapter 5: Judgement and peer review
- Chapter 6: Management by metrics
- Chapter 7: Cultures of counting
- Chapter 8: Sciences in transition
- Chapter 9: Reflections on the REF
- Chapter 10: **Responsible metrics**

<https://responsiblemetrics.org/> @ResMetrics



Ch1: Measuring up

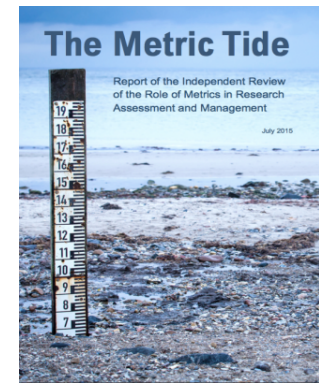
- how and why the review came into being
- who conducted it
- and how we did it



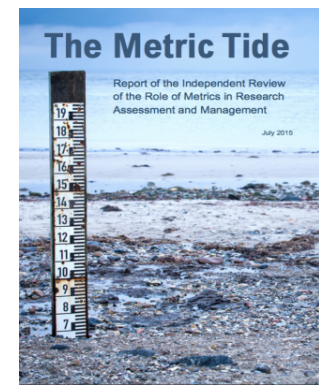
Ch2: The rising tide

Gives a brief history of the role of metrics in research management, and the evolution of data infrastructure and standards to underpin more complex and varied uses of quantitative indicators.

It also surveys the main features of research assessment systems in a handful of countries: Australia, Denmark, Italy, Netherlands, New Zealand and the United States.



Ch3: Rough indications



looks in greater detail at the development, uses and occasional abuses of four categories of quantitative indicators:

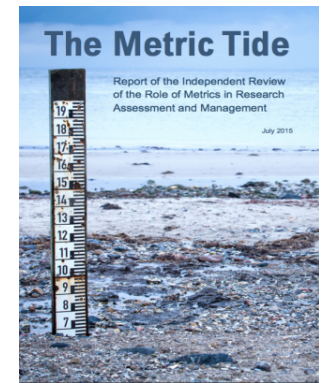
- bibliometric indicators of research quality;
- alternative indicators of quality;
- input indicators;
- and indicators of impact



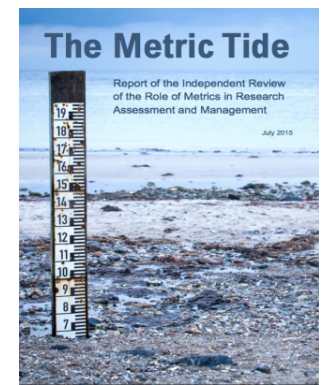
Ch4: Disciplinary dilemmas

Maps the diversity in types of research output, publication practices and citation cultures across different disciplines, and the implications these have for any attempts to develop standardized indicators across the entire research base.

It also considers the extent to which quantitative indicators can be used to support or suppress multi- or interdisciplinary research.



Ch5: Judgement and peer review

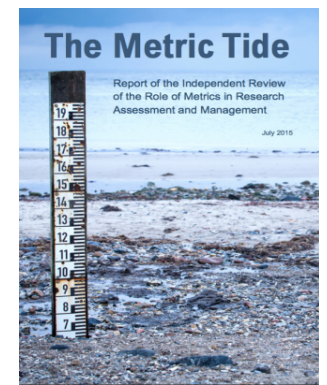


Compares the strengths and weaknesses of the peer review system with metric-based alternatives, and asks how we strike an appropriate balance between quantitative indicators and expert judgement.

It also explores whether metrics exacerbate problems of gaming and strategic approaches to research assessment.



Ch6: Management by metrics



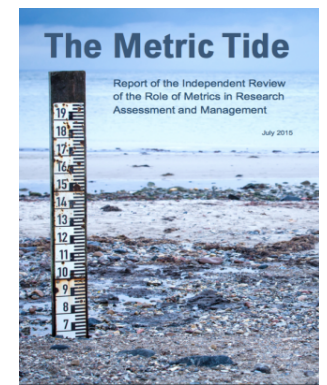
Charts the rise of more formal systems of research management within HEIs, and the growing significance that is being placed on quantitative indicators, both within institutions and as a way of benchmarking performance against others.

It looks specifically at university rankings and league tables as a visible manifestation of these trends, and considers how these can be applied in more responsible ways across the sector.



Ch7: Cultures of counting

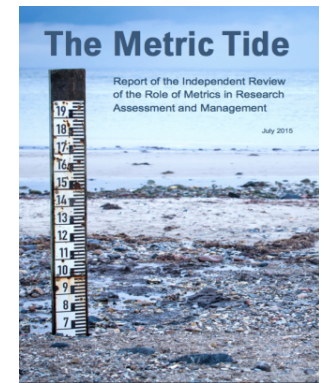
Assesses the wider effects this heightened emphasis on quantitative indicators may have on cultures and practices of research, including concerns over systems for performance management, and negative effects on interdisciplinarity, equality and diversity.



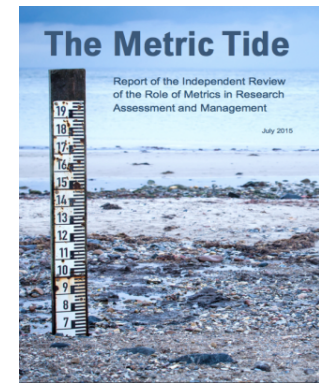
Ch8: Sciences in transition

Looks beyond HEIs to examine changes in the way key institutions in the wider research funding system are using quantitative indicators, including the Research Councils, research charities such as the Wellcome Trust, and the national academies.

It also looks to developments at the European level, and considers how government could make greater use of newly available quantitative data sources to inform horizon scanning and policies for research and innovation.



Ch9: Reflections on REF

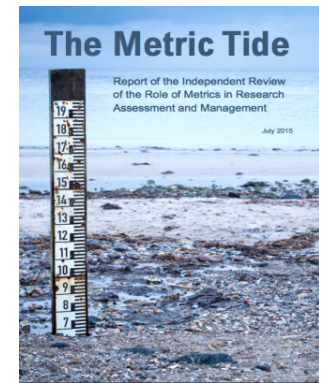


Provides a detailed analysis of the modest role that quantitative indicators played in REF2014, and considers a range of scenarios for their use in future assessment exercises.

It also outlines the results of our own quantitative analysis, which correlated the actual outcomes of REF2014 against 15 metrics-based indicators of research performance.



Ch10: Responsible metrics



Summarizes our headline findings, and makes a set of targeted recommendations to HEIs, research funders (including HEFCE), publishers and data providers, government and the wider research community.

Within a framework of ***responsible metrics***, the report concludes with clear guidance on how quantitative indicators can be used intelligently and appropriately to further strengthen the quality and impacts of UK research.



REF chapter: general points

- Diverse views on:
 - purposes of the REF;
 - how and whether quantitative indicators of research quality should feature in the assessment;
- Concerns over perceived and actual burden of REF, including opportunity costs;
- Some see metrics and indicators as a means to reduce burden/costs;
- Recognition that there are increasing opportunities to gather and use indicators and quant data within research assessment than in the past;
- Metrics as well as peer review?
 - A majority feel that peer review should remain central. So adding metrics means burden increase, rather than dilution!
- Concerns over unintended consequences of metrics/indicators;
- Concerns that some disciplines will be disadvantaged.



Outputs

- It is not currently feasible to assess the quality of research outputs using quantitative indicators alone;
- Disciplinary coverage of citation databases still falls short of what is required, especially for outputs that are not journal articles;
- Real concerns over bias and resultant effects on equality and diversity;
- No set of numbers, however broad, is likely to be able to capture the multifaceted and nuanced judgments on the quality of research outputs that the REF currently provides;
- However, quantitative data do have a place in informing peer review judgments. This approach has been used successfully in REF2014, and we recommend that it be continued and enhanced in future exercises.



Correlation project

analyses were done... for all submitted outputs...

Why?

- To establish the extent to which the outcome of the REF assessment correlates with a range of metrics-based indicators of research

Analysis/data

- Analysis by Analytical Services Directorate, HEFCE;
- Analysis is being undertaken at the level of individual outputs., using article level scores from REF for all outputs with a DOI (149,670 out of 191,080 REF outputs);
- Article level metrics were provided by Scopus (Elsevier);
- The data was linked into staff characteristics from HESA;
- Data anonymised [DOIs and staff identifiers removed, HEI identifiers anonymised].



List of indicators

Variable name	Description	Type
citation_count	Absolute number of citations per publication	Numeric, continuous
fwci	Field weighted citation impact - this normalises citations in a field using the world benchmark in that field	Numeric, continuous, bounded
Percentile	Top 1st, 5th, 10th, 25th, 50th, over 50th percentile of highly cited publications	Categorical, numeric
SNIP	Source normalized impact per paper	Numeric, continuous, bounded
SJR	SCImago Journal Rank	Numeric, continuous, bounded
Collaboration	Single author, Same institution, Same country, At least one author from outside UK	Categorical, character
Authors	Number of distinct authors	Numeric, continuous
AuthorCountries	Number of distinct countries associated with authors	Numeric, continuous, bounded
CrossAcademicCorporate	At least one author from academia and one from the corporate sector	Binary
WIPO_patent_citations	Number of times cited by World Intellectual Property Organization	Numeric, continuous
MendeleyRead	Number of Mendeley article bookmarks/article sharing	Numeric, continuous
SciDir_Dwnld	Number of ScienceDirect publication downloads or full-text views	Numeric, continuous
ScopusFullTextClicks	No of full text requests on scopus.com (user must be subscribed to journal)	Numeric, continuous
Tweet	No of times tweeted (this is not restricted to the reference REF dates)	Numeric, continuous
GS_count	No of times cited on Google Scholar (this is not restricted to the reference REF dates)	Numeric, continuous

Correlation project - overall

Table 4 Descriptive statistics for numerical metrics data

Variable name	Number non-missing	Standard		Median	Minimum	Maximum	Spearman correlation coefficient	Kendall's Tau-b correlation
		Mean	Deviation					
REF quality profile	148,755	2.9	0.8	3.0	0.0	4.0	1.000	1.000
SJR	112,450	2.5	2.8	1.6	0.0	21.6	0.340	0.269
SNIP	112,045	2.0	1.5	1.6	0.0	17.8	0.327	0.257
Percentile	135,310	39.1	35.8	25.0	1.0	100.0	-0.293	-0.250
FWCI	131,895	3.2	8.2	1.5	0.0	451.7	0.284	0.226
GS_count	148,690	34.2	95.4	13.0	0.0	9,579.0	0.273	0.217
Citation_count	148,755	15.7	46.0	4.0	0.0	2,656.0	0.246	0.201
MendeleyRead	148,685	11.3	41.5	0.0	0.0	3,251.0	0.165	0.146
Authors	148,755	10.3	110.8	3.0	0.0	3,222.0	0.151	0.123
AuthorCountries	148,755	1.6	2.2	1.0	0.0	43.0	0.142	0.125
ScopusFullTextClicks	148,755	10.6	17.0	6.0	0.0	1,166.0	0.107	0.085
Tweet	148,690	2.1	15.8	0.0	0.0	1,443.0	0.090	0.081
WIPO_patent_citations	148,755	0.0	0.2	0.0	0.0	13.0	0.069	0.065
SciDir_Dwnld	41,210	1,256.0	2,247.0	664.0	0.0	59,243.0	-0.017	-0.013

Notes: All correlations were statistically significant. Percentile has been treated as a numeric field for this analysis, so that 1 refers to outputs in the top 1% of highly cited papers and 100 refers to the bottom 50% of highly cited papers. Hence the calculated correlations are negative, because 'good' outputs have a low percentile value.



Correlation project - overall

Table 5 Correlation statistics for numerical metrics data by publication year

Metric	Spearman correlation coefficient		
	Publication year = 2008	Publication year = 2013	Difference
Citation_count	0.382	0.154	-0.228
FWCI	0.376	0.169	-0.207
Percentile	-0.394	-0.172	0.222
SNIP	0.350	0.136	-0.214
SJR	0.372	0.177	-0.195
Authors	0.168	0.114	-0.054
AuthorCountries	0.164	0.100	-0.064
WIPO_patent_citations*	0.108	-	-
MendeleyRead	0.190	0.196	0.006
SciDir_Dwnld	0.029	-0.042	-0.071
ScopusFullTextClicks	0.143	0.057	-0.086
Tweet	0.065	0.153	0.088
GS_count	0.357	0.247	-0.110

Notes: WIPO patent citations were not calculated for outputs in the most recent publication year.



**Table 6 Summary of prediction statistics for most predictive unit of assessment
(publication year = 2008) for ordinal metrics**

Metric (ordinal)	UOA with highest Spearman correlation				
	UOA name	Spearman correlation coefficient	Precision	Sensitivity	Number of outputs
Citation_count	Clinical Medicine	0.676	48.8%	93.3%	2,070
FWCI	Clinical Medicine	0.635	60.9%	76.6%	2,025
Percentile	Clinical Medicine	-0.670	74.7%	64.7%	2,040
SNIP	Economics and Econometrics	0.665	68.6%	67.8%	265
SJR	Economics and Econometrics	0.751	71.1%	73.6%	265
WIPO_patent_citations	Clinical Medicine	0.229	55.3%	24.3%	2,070
MendeleyRead	Clinical Medicine	0.441	55.0%	60.0%	2,070
SciDir_Dwnld	Chemistry	-0.593	12.0%	7.0%	120
ScopusFullTextClicks	Clinical Medicine	0.376	68.4%	30.1%	2,070
Tweet	Art and Design: History, Practice and Theory	0.234	75.0%	15.8%	130
GS_count	Clinical Medicine	0.600	51.1%	84.8%	2,070

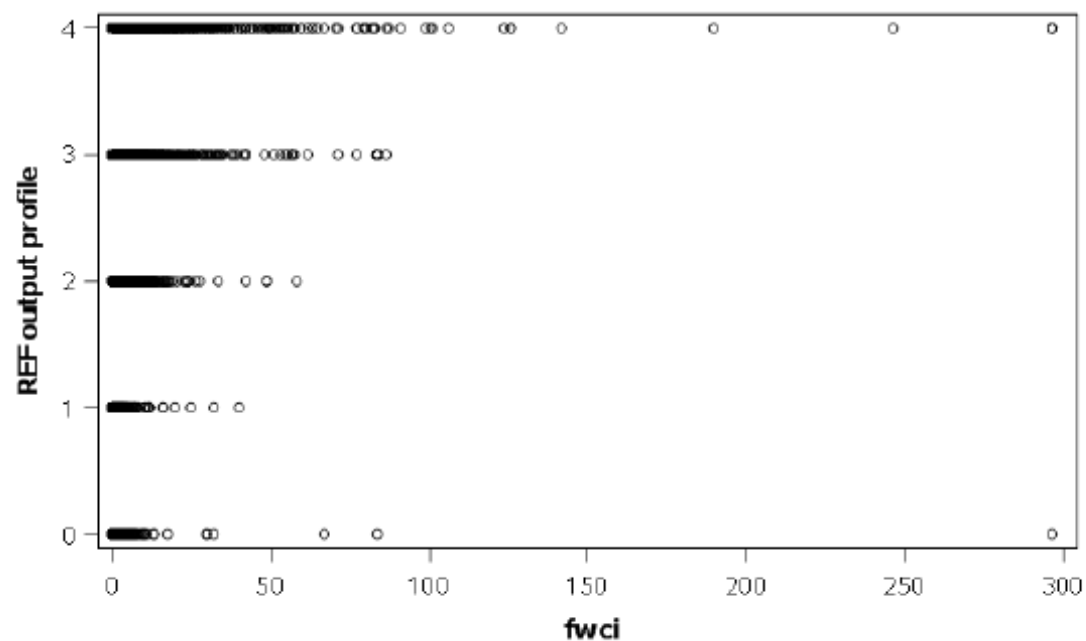
Table 6 shows that for some UOAs, correlation did exceed 0.5 when considering the relationship between the REF quality profile and ordinal metrics. The UOAs with consistently high correlation scores across a range of metrics were Clinical Medicine, and Economics and Econometrics.



REF quality profile	Frequency	Mean	Minimum	Median	Maximum	Missing
4	4785	6.8	0.0	3.7	296.4	255
3	10225	2.8	0.0	1.8	86.2	660
2	3905	1.8	0.0	1.1	58.3	450
1	425	1.9	0.0	0.9	39.7	100
0	240	4.5	0.0	1.6	296.4	15
Total	19580	3.6	0.0	1.8	296.4	1475

Figure A2 Scatterplot of FWCI against REF quality profile (publication year = 2008)

(Spearman correlation= 0.3760)



Correlation project - Engineering

UOA	REF Outputs	With DOI	%
Aeronautical, Mechanical, Chemical and Manufacturing Engineering	4,155	4,050	98%
Electrical and Electronic Engineering, Metallurgy and Materials	4,030	3,965	98%
Civil and Construction Engineering	1,385	1,315	95%
General Engineering	8,685	8,470	97%

Notes: Numbers rounded to the nearest five.

All units of assessment (UOAs) in main panels A and B had over 90 per cent of research outputs with a DOI. By contrast almost all UOAs in main panel D had less than 50% coverage, with Classics getting only 17 per cent coverage.



Correlation project - Engineering

UOA	REF Outputs	% Journal Articles	% with DOI
Aeronautical, Mechanical, Chemical and Manufacturing Engineering	4,155	99%	98%
Electrical and Electronic Engineering, Metallurgy and Materials	4,030	99%	98%
Civil and Construction Engineering	1,385	97%	95%
General Engineering	8,685	98%	97%

Notes: Numbers rounded to the nearest five.

The final column of the percentage of journal articles with a DOI. Again, classics lowest with 66%.



Correlation project - Headlines

Publication year effect

Each metric presented a summary of the effect of publication year on the results. This demonstrated that publications from the most recent year (2013) generally had much lower metric scores than those in the earliest year (2008). The detailed analysis focused on publication outputs from the earliest year available (2008) to ensure that the effect of year on the analysis was minimised. However, this means that the correlations presented are likely to be the highest available from this data and should not be assumed to be typical of all REF submissions.



Correlation project - Headlines

Publication year effect

Each metric presented a summary of the effect of publication year on the results. This demonstrated that publications from the most recent year (2013) generally had much lower metric scores than those in the earliest year (2008). The detailed analysis focused on publication outputs from the earliest year available (2008) to ensure that the effect of year on the analysis was minimised. However, this means that the correlations presented are likely to be the highest available from this data and should not be assumed to be typical of all REF submissions.

The metric most impacted by the publication year was citation count, but most metrics saw significant decreases in correlation for more recent outputs. The notable exception to this was the number of tweets metric. The UOAs with consistently high correlation scores across a range of metrics were Clinical Medicine, and Economics and Econometrics.

No correlation above 0.5 in the four engineering UOAs

[Only chemistry in Panel B (ScienceDirect Downloads)]



Impact

- It is not feasible to assess the quality of research impact using quantitative indicators alone;
- Research impact in the REF is broadly defined, however, quantitative data and indicators are highly specific to the type of impact concerned;
- Viewing quantitative data about impact needs to be seen in context, and is likely to require a narrative element;
- There is potential to enhance the use of quantitative data as supporting evidence within a narrative case-study-based approach to impact assessment;
- HE Funding Bodies should build on the analysis of the impact case studies from REF 2014 to develop a set of guidelines on the use of quantitative evidence of impact (cf Digital Science/KCL study);
- These guidelines should provide suggested data to evidence specific types of impact and could also include standards for the collection of data.



Environment

- There is scope for enhancing the use of quantitative data for the assessment of research environment if:
 - panels are provided with sufficient context to enable their interpretation. As a minimum this needs to include information on the total size of the unit to which the data refers, and in some cases the collection of data specifically relating to staff submitted to the exercise may be preferable, albeit more costly.
- The HE Funding Bodies should consider increased use of quantitative data for the assessment of research environment in the next national exercise. As well as collecting data on doctoral student numbers and research income, consideration should be given to other sources of data including, but not limited to:
 - the age profile of staff; the representation of people with protected characteristics; bibliometrics measures of the academic impact of the whole set of publications from the assessed unit; quantitative data on broader research impact that is collected in the Higher Education Business and Community Interaction Survey (HEBCIS).



Costs of metrics-based research

- Common assumption that a metrics-based exercise would cost less;
- The collection of quantitative data and its processing to produce metrics and indicators is not itself cost free;
- Experience from REF2014 suggests that even relatively straightforward data sources often require considerable effort to validate and sometimes correct (eg citation data & HESA statistics);
- We understand that use of citation data in REF2014 encouraged HEIs to use this information in their preparations for the exercise, which may have resulted in additional costs locally;
- Some costs of assessment are related to the structure, rather than the mechanism of assessment, e.g. significant costs to HEIs associated with selecting staff or outputs to be submitted for assessment
- If these features remain, the reduction in cost that resulted in using bibliometrics to assess outputs might be rather modest.



Underpinning infrastructure

- If metrics are to be used, it is critical that they are as accurate & reliable as possible, otherwise they will be mistrusted
- **How** underlying data is collected/processed is very important
- We therefore need:
 - Unique, disambiguated, persistent, verified **identifiers**
 - Agreed standard **data formats**
 - Agreed standard **data semantics**
- If we are to end up with:
 - Agreed **standard metrics**

ORCID



Metric Tide recommendations on REF

Outputs

- Continue providing panel members with bibliometric and other data to support peer review judgments;
- Increase sophistication of information provided;
- Provide more quantitative data to all panels, but leave them to decide how much (if any) is used.

Impact

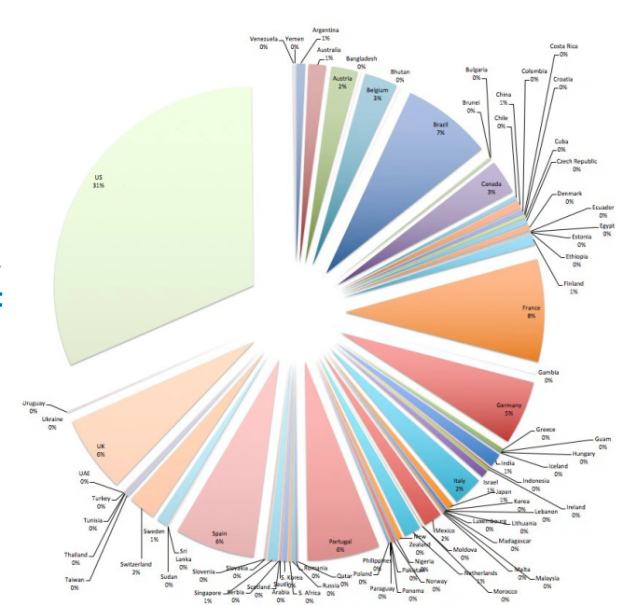
- Encourage use of quantitative evidence to support case studies; build on DS/KCI work to specify sets of quantitative data that can be used in specific types of case study.

Environment

- Considerably enhance the use of quantitative data in the environment section, such as....
- Increase the amount of contextual information to help panels interpret data.

Cost of the exercise would increase if more quantitative data was added alongside existing peer review.





- **San Francisco Declaration on Research Assessment (DORA)**
- **12,616 individuals, 592 organisations** (18 Nov 2015)
- **12,742 individuals, 591 organisations** (27 May 2016)
 - Do not use journal-based metrics, such as Journal Impact Factors, as a surrogate measure of the quality of individual research articles, to assess an individual scientist's contributions, or in hiring, promotion, or funding decisions.
- **18 recommendations**



- **For funding agencies**

- 2. Be explicit about the criteria used in evaluating the scientific productivity of grant applicants and clearly highlight, especially for early-stage investigators, that the scientific content of a paper is much more important than publication metrics or the identity of the journal in which it was published.
- 3. For the purposes of research assessment, consider the value and impact of all research outputs (including datasets and software) in addition to research publications, and consider a broad range of impact measures including qualitative indicators of research impact, such as influence on policy and practice.



Leiden Manifesto

- “Research metrics can provide crucial information that would be difficult to gather or understand by means of individual expertise. But this quantitative information must not be allowed to morph from an instrument into the goal.”



Leiden Manifesto

- 1) Quantitative evaluation should support qualitative, expert assessment.
- 2) Measure performance against the research missions of the institution, group or researcher. *(or country?)*
- 3) Protect excellence in locally relevant research.
- 4) Keep data collection and analytical processes open, transparent and simple.
- 5) Allow those evaluated to verify data and analysis.
- 6) Account for variation by field in publication and citation practices.
- 7) Base assessment of individual researchers on a qualitative judgement of their portfolio.
- 8) Avoid misplaced concreteness and false precision.
- 9) Recognize the systemic effects of assessment and indicators.
- 10) Scrutinize indicators regularly and update them.



Responsible Metrics

- DORA, Leiden, etc
- Understand what the metrics measure
- How they are derived
- And how accurate they are(n't)
 - “In bibliometrics, 12 is not a bigger number than 10”**
- Don't use a single metric in isolation
- Metric Tide Steering Group
 - Are continuing to promote responsible metrics
 - Responded to the HE Green Paper consultation
 - Analysed the HE White Paper
 - Inputting into the Stern Review of the REF

* Professor Mike Thelwall



REF2020¹

- This is what we know...
- Erm... well there are the OA requirements...
- Stern Review

Open Access: REF2021

- This is what we know about the next REF – 2 things
- Stern review expected to report July 2016
 - Then HEFCE consultation, then rules... late 2017?
- **IF** there is a 'next-REF' then:
 - <http://www.hefce.ac.uk/pubs/year/2014/201407/>
 - For all articles (with ISSNs) accepted 1st April 2016+
 - From **acceptance***, the full text must be
 - Discoverable and free to read & download
 - From an Institutional or Subject repository
 - Meta data immediately
 - Full text* embargo up to 24 months allowable
 - Over & above rewarded in Environment

*Date of publication for the first year

*Authors' Final Peer Reviewed Manuscript

Staffing for REF2020¹

- Staff selection v All staff ?
- Publications tied to staff ?
- Publication selection ?
- Too many publications to assess? → metrics? / sampling?
- Individual staff circumstances?
- Or just h-index for department ?
- ... ???

Environment for REF2020¹

- h-index for department ?
- Athena SWAN ?
- Open Access metric / support ?
- Open Data / Science ?
- Continue to have
 - Size
 - Income
 - Doctoral awards

Impact for REF2020¹

- Some reflections on the possible future of REF Impact
- Assuming:
 - [pending consultation] a 'next-REF' in 2020 or 2021
 - The same general rules (some tweaks...?)
 - The same timescales (relative)
 - The same format / evidence (more meta data?)
 - The same number (some EDI issues!)
 - The same weighting (seems unlikely)
- No effects of major overhauls in other areas (staff selection?)

Impact for REF2020¹: Conjectures

- Generally Impact scored well and was reasonably well understood, so we assume that it will continue.
- Academic impact unlikely to be allowable [REF2, 5e]
- No reason to assume that impact will ‘travel’ [REF2]
- “Continuing impact” – no reason to exclude... anyway how?
- Evidence might need to be more robust
 - Panels favoured evidence rather than long lists
- Average time to impact (3-9 years) might increase
- **Something needs to be done...**

... to discriminate at the top end

Impact Conjectures: Timescales

- No reason to change...?
- Underpinning research Jan 1999 – Dec 2019 (or 2020)
 - The research is more than likely to have been done...
 - ... or at least be underway
 - But also more likely to include (relatively) older research?
- Impact Jan 2014 – Jul 2019 (or 2020)
 - So we are 29/67 months... ie nearly $\frac{1}{2}$ of the way through...
 - Or at least... over $\frac{1}{3}$ rd (29/79)
 - Baseline data – you will have this from Jan 2014 already?
 - And ongoing evidence collection... a robust system...?

Impact Conjectures: Format

- 4 pages seemed generally acceptable
- Clarity over the CC-BY licence
- More (some!) metadata, eg DOIs at least!
- Metadata around 'type of impact'... Too restrictive?
- Metadata for evidence? Eg £, QUALY... Too restrictive?
- IDs for people [ORCID?], organisations [ISNI?]
 - To aid analysis

Measurement Effect – Impact example

- REF2014: minimum 2 ICSs needed (up to 14.99 FTE)
- +1 ICS for each additional 10 FTE
- So for 15 FTE 3 ICSs were needed
- At 25 FTE, 4 were needed; 35 FTE → 5; 45 FTE → 6
- And so on...

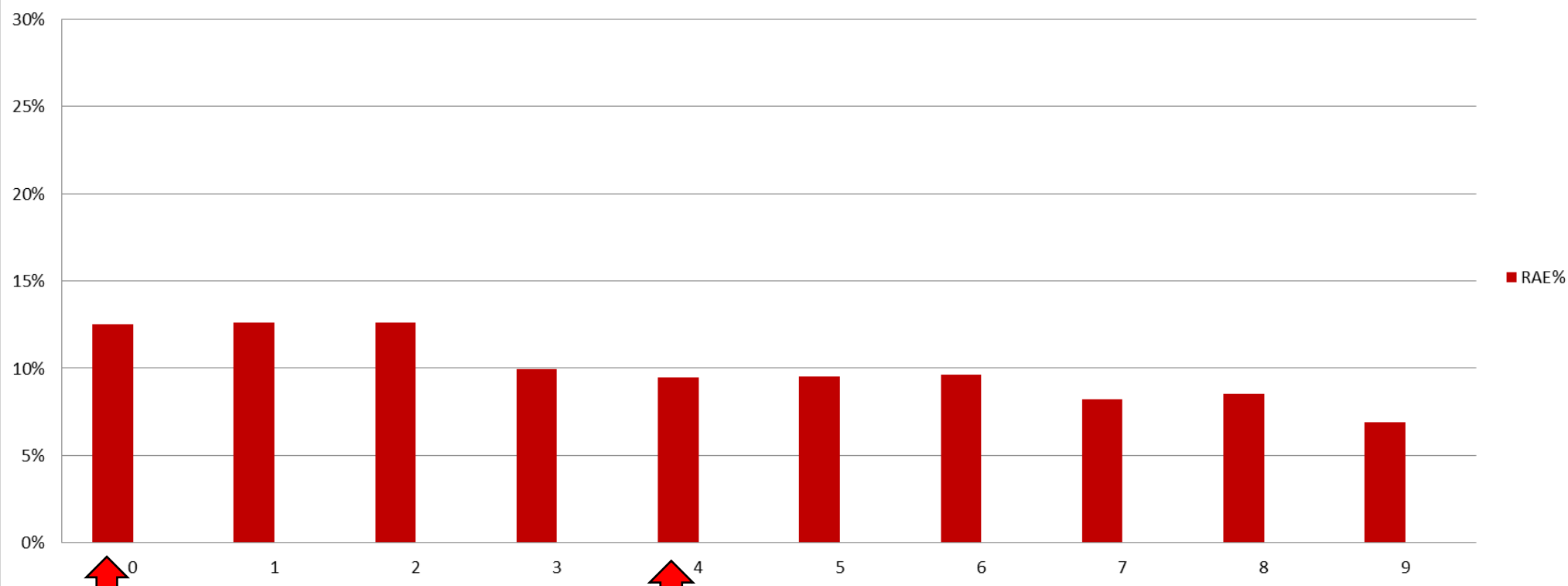
So the question arises, if you had 14 (or 24 or 34 or indeed any number ending in 4) FTE staff and 2 (or 3 or 4 ...) viable case studies, then that was fine...

But what if you have an extra person...

... but no extra viable case study?

Impact Case Study Threshold

UOA FTE submission sizes $\{\text{INT}(\text{FTE})\text{MOD}10\}$ where $\text{FTE} \geq 10.00$ & < 110.00
RAE2008 (n=1,689)

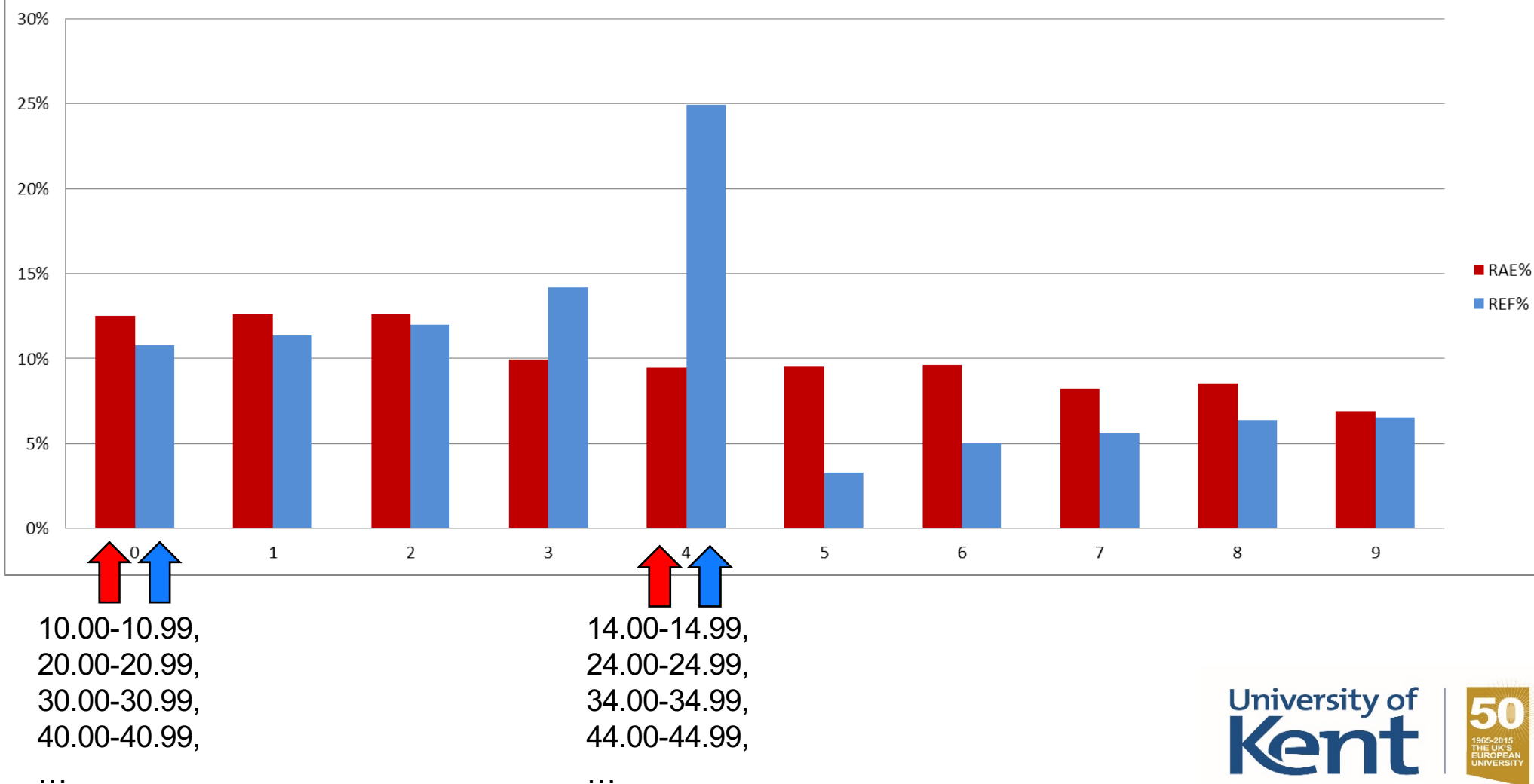


10.00-10.99,
20.00-20.99,
30.00-30.99,
40.00-40.99,
...

14.00-14.99,
24.00-24.99,
34.00-34.99,
44.00-44.99,
...

Impact Case Study Threshold

UOA FTE submission sizes $\{\text{INT}(\text{FTE})\text{MOD}10\}$ where $\text{FTE} \geq 10.00$ & < 110.00
Comparison between RAE2008 (n=1,689) and REF2014 (n=1,521)



Case Study Worth

UOA	#Outputs	Cat A FTE	#ICs		65% Output%	16% ICS%	REF2014 Ratio		20% ICS%	REF2020? Ratio
3	65	16.3	3		1.00	5.33	5.33		6.67	6.67
4	115	33.13	4		0.57	4.00	7.08		5.00	8.85
5	89	24.2	3		0.73	5.33	7.30		6.67	9.13
8	57	17	3		1.14	5.33	4.68		6.67	5.85
9	17	5	2		3.82	8.00	2.09		10.00	2.62
10	117	33.08	4		0.56	4.00	7.20		5.00	9.00
11	117	29.1	4		0.56	4.00	7.20		5.00	9.00
15	84	24	3		0.77	5.33	6.89		6.67	8.62
16	40	11.4	2		1.63	8.00	4.92		10.00	6.15
18	79	21.9	3		0.82	5.33	6.48		6.67	8.10
19	158	43.3	5		0.41	3.20	7.78		4.00	9.72
20	150	43.6	5		0.43	3.20	7.38		4.00	9.23
21	111	30.75	4		0.59	4.00	6.83		5.00	8.54
22	199	54.58	6		0.33	2.67	8.16		3.33	10.21
24	103	27.27	4		0.63	4.00	6.34		5.00	7.92
26	32	11	2		2.03	8.00	3.94		10.00	4.92
28	79	24.7	3		0.82	5.33	6.48		6.67	8.10
29	123	38.1	5		0.53	3.20	6.06		4.00	7.57
30	120	31.4	4		0.54	4.00	7.38		5.00	9.23
31	48	12.4	2		1.35	8.00	5.91		10.00	7.38
32	45	13.2	2		1.44	8.00	5.54		10.00	6.92
33	26	7.88	2		2.50	8.00	3.20		10.00	4.00
35	118	38	5		0.55	3.20	5.81		4.00	7.26
23	2092	591.29	80	average	1.03	5.19	5.03		6.49	6.29
				weighted av	0.71	4.60	6.44		5.75	8.05
						Min	2.09		Min	2.62
						Max	8.16		Max	10.21
						Ave	6.09		Ave	7.61

Impact Conjectures: Numbers

It seems unlikely to me that this will be allowed to continue

- Possible solutions:
 - More case studies – lessens the effect; but more effort
 - Lower weighting to case studies – lessens effect; BIS unhappy!
 - Finer grained ICS assessment – robust?
 - Fewer outputs – lessens effect; less discrimination at the top
 - Remove FTE#-ICS# linkage – how!?
- Whilst more burdensome (how much more?), more ICSs:
 - Good for HEI ‘good news stories’
 - Good for BIS
 - Addresses *discrimination at the top* issue (4*)...or add 5* [&REF2]?
 - More easily allows for ‘continuing impact’
 - Lessens ICS cliff edge issue
 - But would adversely affect grade profiles...

Impact Conjectures: Weighting

The original suggestion was that Impact be worth 25%

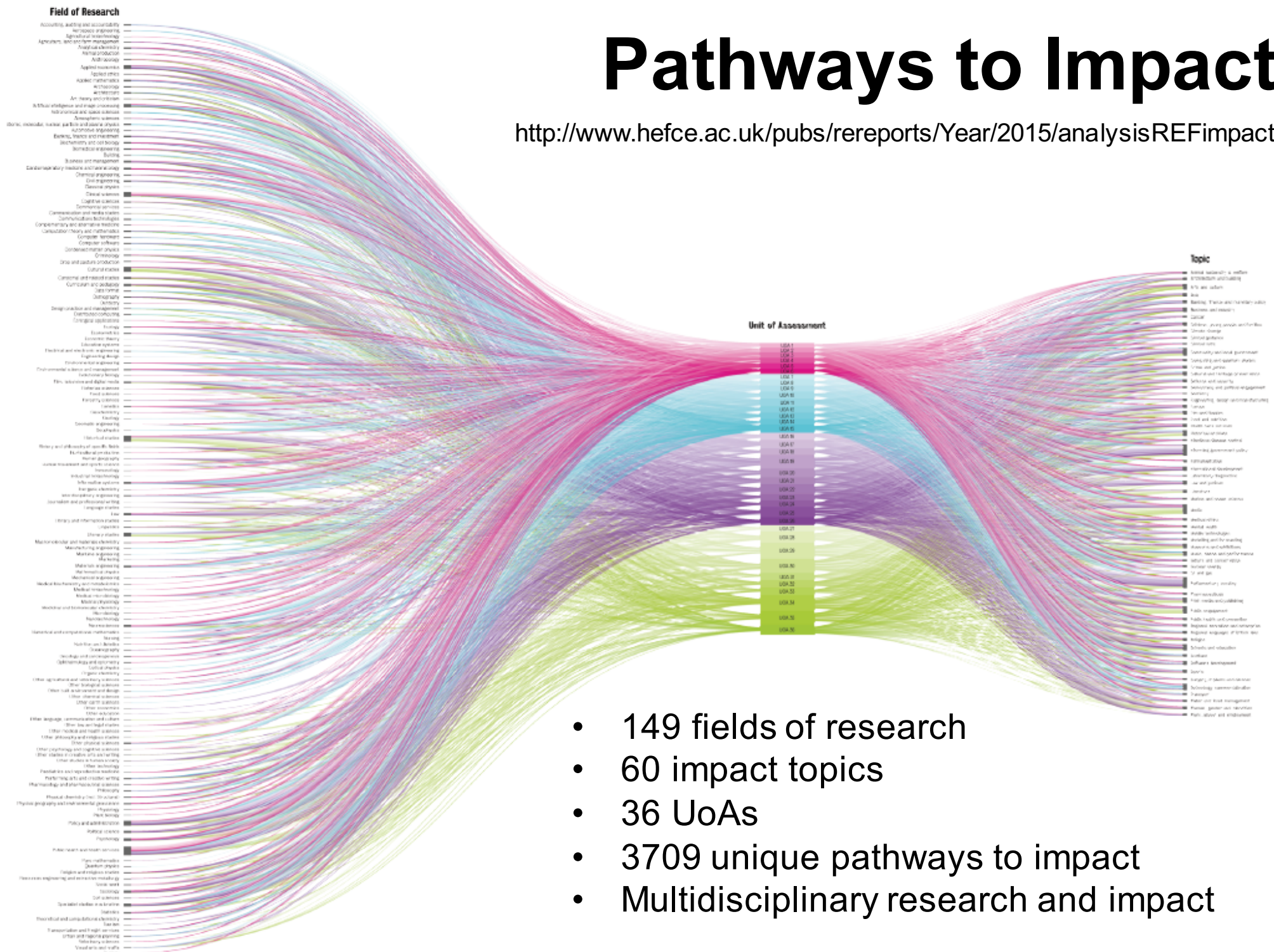
- It was argued down to 20% as it was untried
- It seems to have worked rather well, so
- Many expect it to be worth 25% in REF2020
- Another option is to remove the (useless) Impact Template
 - Or rather incorporate it into the Environment Template
- And hence Case Studies would go up from 16% to 20%
 - Without changing the overall weightings
 - This of course exacerbates the “numbers” cliff edge issue
- Or both would means ICSs worth 25%
ie up 56¼%! Surely too much?

Impact Conjectures: Other Factors

- Staff selection v All staff
- Publications unlinked directly from 4 per staff ?
- Impact Case Study numbers (somehow) unlinked from FTE ?
- Joint (with other UOAs / HEIs) Impact Case Studies...?
- Impact metrics? (→ into Environment...?)

Pathways to Impact

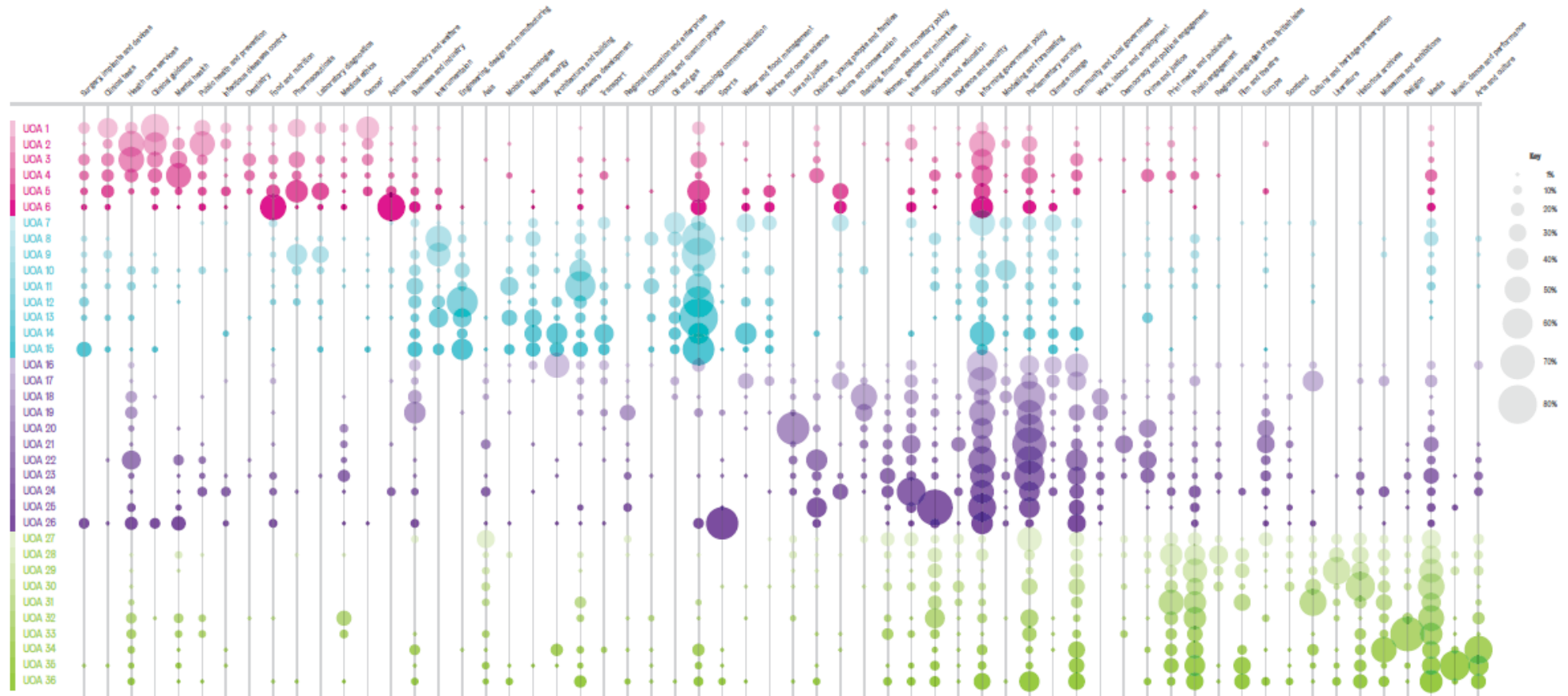
<http://www.hefce.ac.uk/pubs/rereports/Year/2015/analysisREFimpact/>



- 149 fields of research
- 60 impact topics
- 36 UoAs
- 3709 unique pathways to impact
- Multidisciplinary research and impact

Impact from all areas of research

<http://www.hefce.ac.uk/pubs/rereports/Year/2015/analysisREFimpact/>



- Relationship between the type of impact and the UoA [Research Area]
- Some topics cut across several UoAs
 - (e.g. Technology commercialization, Informing Government policy)

Metric Tide - Recommendations

- Supporting the effective leadership, governance and management of research cultures
- Improving the data infrastructure that supports research information management
- Increasing the usefulness of existing data and information sources
- Using metrics in the next REF
- Coordinating activity and building evidence



Supporting the effective leadership, governance and management of research cultures

- **1. The research community should develop a more sophisticated and nuanced approach to the contribution and limitations of quantitative indicators.** Greater care with language and terminology is needed. The term ‘metrics’ is often unhelpful; the preferred term ‘indicators’ reflects a recognition that data may lack specific relevance, even if they are useful overall. (*HEIs, funders, managers, researchers*)
- **2. At an institutional level, HEI leaders should develop a clear statement of principles on their approach to research management and assessment, including the role of quantitative indicators.** On the basis of these principles, they should carefully select quantitative indicators that are appropriate to their institutional context. Where institutions are making use of league tables and ranking measures, they should explain why they are using these as a means to achieve particular ends. Where possible, alternative indicators that support equality and diversity should be identified and included. Clear communication of the rationale for selecting particular indicators, and how they will be used as a management tool, is paramount. As part of this process, HEIs should consider signing up to DORA, or drawing on its principles and tailoring them to their institutional contexts. (*Heads of institutions, heads of research, HEI governors*)



Supporting the effective leadership, governance and management of research cultures

- **3. Research managers and administrators should champion these principles and the use of responsible metrics within their institutions.** They should pay due attention to the equality and diversity implications of research assessment choices; engage with external experts such as those at the Equality Challenge Unit; help to facilitate a more open and transparent data infrastructure; advocate the use of unique identifiers such as ORCID iDs; work with funders and publishers on data interoperability; explore indicators for aspects of research that they wish to assess rather than using existing indicators because they are readily available; advise senior leaders on metrics that are meaningful for their institutional or departmental context; and exchange best practice through sector bodies such as ARMA. (*Managers, research administrators, ARMA*)
- **4. HR managers and recruitment or promotion panels in HEIs should be explicit about the criteria used for academic appointment and promotion decisions.** These criteria should be founded in expert judgement and may reflect both the academic quality of outputs and wider contributions to policy, industry or society. Judgements may sometimes usefully be guided by metrics, if they are relevant to the criteria in question and used responsibly; article-level citation metrics, for instance, might be useful indicators of academic impact, as long as they are interpreted in the light of disciplinary norms and with due regard to their limitations. Journal-level metrics, such as the JIF, should not be used. (*HR managers, recruitment and promotion panels, UUK*)



Supporting the effective leadership, governance and management of research cultures

- **5. Individual researchers should be mindful of the limitations of particular indicators** in the way they present their own CVs and evaluate the work of colleagues. When standard indicators are inadequate, individual researchers should look for a range of data sources to document and support claims about the impact of their work. *(All researchers)*
- **6. Like HEIs, research funders should develop their own context-specific principles for the use of quantitative indicators in research assessment and management** and ensure that these are well communicated, and easy to locate and understand. They should pursue approaches to data collection that are transparent, accessible, and allow for greater interoperability across a diversity of platforms. *(UK HE Funding Bodies, Research Councils, other research funders)*



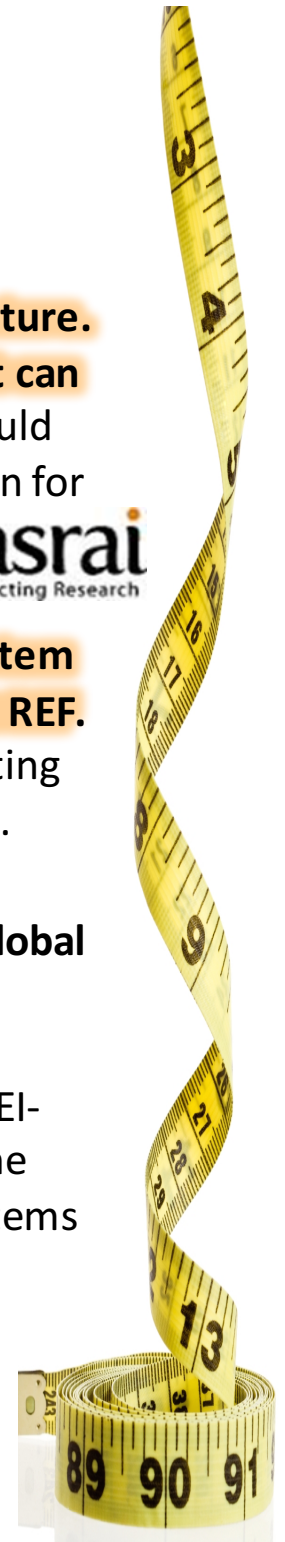
Supporting the effective leadership, governance and management of research cultures

- **7. Data providers, analysts and producers of university rankings and league tables should strive for greater transparency and interoperability between different measurement systems.** Some, such as Times Higher Education, have taken commendable steps to be more open about their choice of indicators and the weightings given to these, but other rankings remain opaque and ‘black-boxed’. *(Data providers, analysts and producers of university rankings and league tables)*
- **8. Publishers should reduce emphasis on journal impact factors as a promotional tool, and only use them in the context of a variety of journal-based metrics that provide a richer view of performance.** As suggested by DORA, this broader indicator set could include 5-year impact factor, EigenFactor, SCImago, editorial and publication times. Publishers, with the aid of Committee on Publication Ethics (COPE), should encourage responsible authorship practices and the provision of more detailed information about the specific contributions of each author. Publishers should also make available a range of article-level metrics to encourage a shift toward assessment based on the academic quality of an article rather than JIFs. *(Publishers)*



Improving the data infrastructure that supports research information management

- **9. There is a need for greater transparency and openness in research data infrastructure. A set of principles should be developed for technologies, practices and cultures that can support open, trustworthy research information management.** These principles should be adopted by funders, data providers, administrators and researchers as a foundation for further work. *(UK HE Funding Bodies, RCUK, Jisc, data providers, managers, administrators)*
- **10. The UK research system should take full advantage of ORCID as its preferred system of unique identifiers. ORCID IDs should be mandatory for all researchers in the next REF.** Funders and HEIs should utilise ORCID for grant applications, management and reporting platforms, and the benefits of ORCID need to be better communicated to researchers. *(HEIs, UK HE Funding Bodies, funders, managers, UUK, HESA)*
- **11. Identifiers are also needed for institutions, and the most likely candidate for a global solution is the ISNI, which already has good coverage of publishers, funders and research organisations.** The use of ISNIs should therefore be extended to cover all institutions referenced in future REF submissions, and used more widely in internal HEI- and funder-management processes. One component of the solution will be to map the various organisational identifier systems against ISNI to allow the various existing systems to interoperate. *(UK HE Funding Bodies, HEIs, funders, publishers, UUK, HESA)*



Improving the data infrastructure that supports research information management

- **12. Publishers should mandate ORCIDs and ISNIs and funder grant references for article submission, and retain this metadata throughout the publication lifecycle.** This will facilitate exchange of information on research activity, and help deliver data and metrics at minimal burden to researchers and administrators. (*Publishers and data providers*)
- **13. The use of DOIs should be extended to cover all research outputs.** This should include all outputs submitted to a future REF for which DOIs are suitable, and DOIs should also be more widely adopted in internal HEI and research funder processes. DOIs already predominate in the journal publishing sphere – they should be extended to cover other outputs where no identifier system exists, such as book chapters and datasets. (*UK HE Funding Bodies, HEIs, funders, UUK*)
- **14. Further investment in research information infrastructure is required.** Funders and Jisc should explore opportunities for additional strategic investments, particularly to improve the interoperability of research management systems. (*HMT, BIS, RCUK, UK HE Funding Bodies, Jisc, ARMA*)



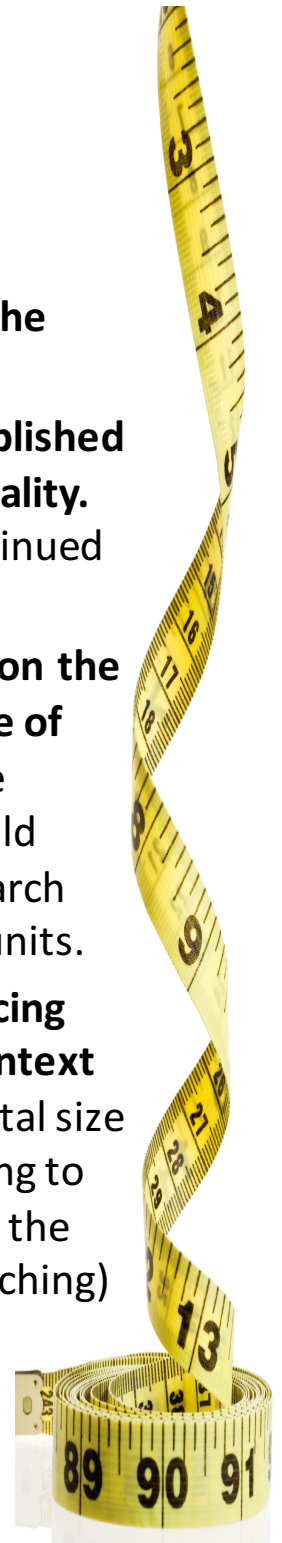
Increasing the usefulness of existing data and information sources

- **15. HEFCE, funders, HEIs and Jisc should explore how to leverage data held in existing platforms to support the REF process, and vice versa.** Further debate is also required about the merits of local collection within HEIs and data collection at the national level. *(HEFCE, RCUK, HEIs, Jisc, HESA, ARMA)*
- **16. BIS should identify ways of linking data gathered from research-related platforms (including Gateway to Research, Researchfish and the REF) more directly to policy processes in BIS and other departments,** especially around foresight, horizon scanning and research prioritisation. *(BIS, other government departments, UK HE Funding Bodies, RCUK)*



Using metrics in the next REF

- **17. For the next REF cycle, we make some specific recommendations to HEFCE and the other UK HE Funding Bodies, as follows. (*UK HE Funding Bodies*)**
 - a. **In assessing outputs, we recommend that quantitative data – particularly around published outputs – continue to have a place in informing peer review judgements of research quality.** This approach has been used successfully in REF2014, and we recommend that it be continued and enhanced in future exercises.
 - b. **In assessing impact, we recommend that HEFCE and the UK HE Funding Bodies build on the analysis of the impact case studies from REF2014 to develop clear guidelines for the use of quantitative indicators in future impact case studies.** While not being prescriptive, these guidelines should provide suggested data to evidence specific types of impact. They should include standards for the collection of metadata to ensure the characteristics of the research being described are captured systematically; for example, by using consistent monetary units.
 - c. **In assessing the research environment, we recommend that there is scope for enhancing the use of quantitative data, but that these data need to be provided with sufficient context to enable their interpretation.** At a minimum this needs to include information on the total size of the unit to which the data refer. In some cases, the collection of data specifically relating to staff submitted to the exercise may be preferable, albeit more costly. In addition, data on the structure and use of digital information systems to support research (or research and teaching) may be crucial to further develop excellent research environments.



Coordinating activity and building evidence

- **18. The UK research community needs a mechanism to carry forward the agenda set out in this report. We propose the establishment of a Forum for Responsible Metrics, which would bring together research funders, HEIs and their representative bodies, publishers, data providers and others to work on issues of data standards, interoperability, openness and transparency.** UK HE Funding Bodies, UUK and Jisc should coordinate this forum, drawing in support and expertise from other funders and sector bodies as appropriate. The forum should have preparations for the future REF within its remit, but should also look more broadly at the use of metrics in HEI management and by other funders. This forum might also seek to coordinate UK responses to the many initiatives in this area across Europe and internationally – and those that may yet emerge – around research metrics, standards and data infrastructure. It can ensure that the UK system stays ahead of the curve and continues to make real progress on this issue, supporting research in the most intelligent and coordinated way, influencing debates in Europe and the standards that other countries will eventually follow. *(UK HE Funding Bodies, UUK, Jisc, ARMA)*



Coordinating activity and building evidence

- **19. Research funders need to increase investment in the science of science policy.**
There is a need for greater research and innovation in this area, to develop and apply insights from computing, statistics, social science and economics to better understand the relationship between research, its qualities and wider impacts. (*Research funders*)
- **20. One positive aspect of this review has been the debate it has generated. As a legacy initiative, the steering group is setting up a blog (www.ResponsibleMetrics.org) as a forum for ongoing discussion of the issues raised by this report.** The site will celebrate responsible practices, but also name and shame bad practices when they occur. Researchers will be encouraged to send in examples of good or bad design, or application of metrics and indicators across the research system. Adapting the approach taken by the Literary Review's "Bad Sex in Fiction" award, every year we will award a "Bad Metric" prize to the most egregious example of an inappropriate use of quantitative indicators in research management. (*Review steering group*)



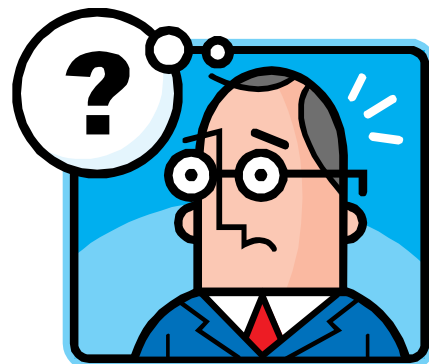
Metric Tide Summary Issues (RMA)

1. Indicators rather than Metrics
2. Statement of principles
3. Champion *Responsible Metrics*
9. Open and Transparent Research Data Infrastructure
10. Utilise ORCID iDs
11. Promote Org iDs (eg ISNI)
14. Investment in Research Information Infrastructure
15. Streamline data collection processes
18. Forum for Responsible Metrics
20. Bad Sex Prize

Research Metrics Summary Issues

- Coverage (WoS/Scopus)
- Accuracy (Errors, iDs)
- Interpretation (8/10 Cats)
- Usage (IF → article)
- Proxy (more citations means...)
- Pervasiveness (league tables...)
- Ease of misuse (apple + orange)
- Subject area / cultural differences

Questions



If not, I have a joke I could tell...

Or check out the RMA survey I'm conducting at
RAAAPworldwide.wordpress.com

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NORDP
National Organisation of Research Development Professionals



Association of Research Management Academics



COLUMBIA UNIVERSITY
IN THE CITY OF NEW YORK



SARIMA

ARMS

Australasian Research Management Society



EARMA



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