

New developments in bibliometrics and research assessment

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Elsevier, Amsterdam, The Netherlands

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1 Bibliometric assessment of research

2 Creating and combining large datasets

3 Conclusions

USA

Main collaborators

UK

China

Germany

Canada

Brazil

Main collaborators

Argentina

USA

Portugal

France

Chile

Malaysia

Main collaborators

Thailand

India

Singapore

Iran

UK

Romania

Main collaborators

France

Hungary

Germany

Italy

Bulgaria

South Africa

Main collaborators

UK

China

USA

Nigeria

Australia

Netherlands

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Potentialities and limitations of citation-based indicators

Henk F. Moed

**A talk at the ISSI panel "The wondrous world of
bibliometric indicators"**

Vienna, 17 July 2013

Manuscript peer review is essential

- The citations we analyze are contained in **peer reviewed** research articles
- Manuscript peer review primarily aims to ban articles that do not meet a set of **minimum quality criteria**

Citations can be conceived as manifestations of intellectual influence.....

....But.....

- Citations measure **multiple** aspects, not just one
- The nature of the influence may **vary** from one influential paper to another.

What is measured by citations and references? - 1

Principal author(s)	References conceived as	Citations measure
Garfield Salton	Descriptors of document content	
Garfield	Manifestations of scholarly information flows	Utility (quantity of information use)
Small Garfield	Elements in a symbol making process	Highly cited items as concept symbols
Merton	Registrations of intellectual property and peer recognition of the knowledge claim	Intellectual influence
Cole & Cole Zuckerman		Socially defined quality
Gilbert	Persuasion tools	Authoritativeness
Zuckerman	Referencing motives and their consequences are analytically distinct	Citations are proxies of more direct measurements

Random errors or 'individual vagaries' cancel out in analyses of large datasets.....

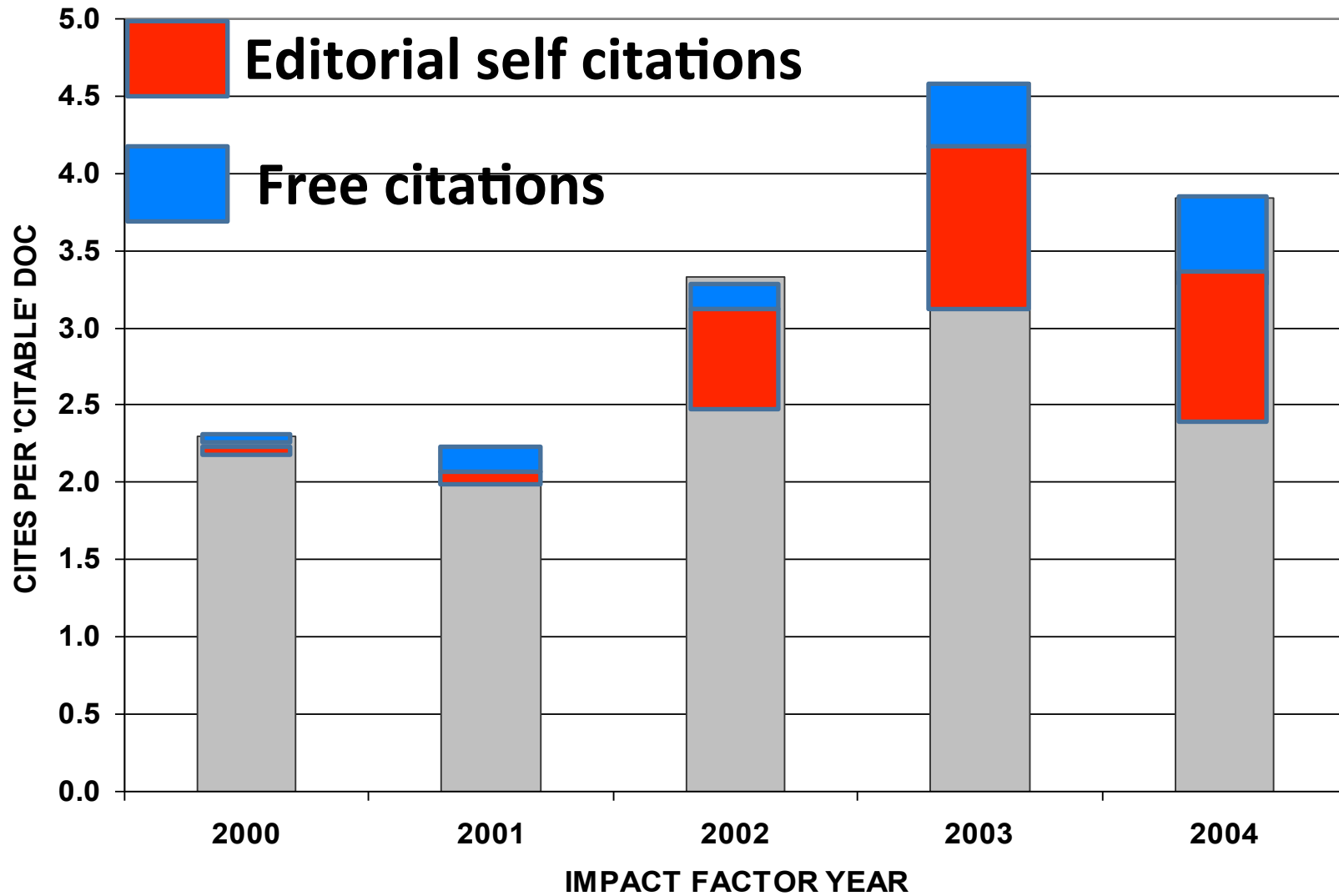
.....**but**.....

- An **individual** article's reference list does **not** give a full account of all influences
- **Systematic** biases remain

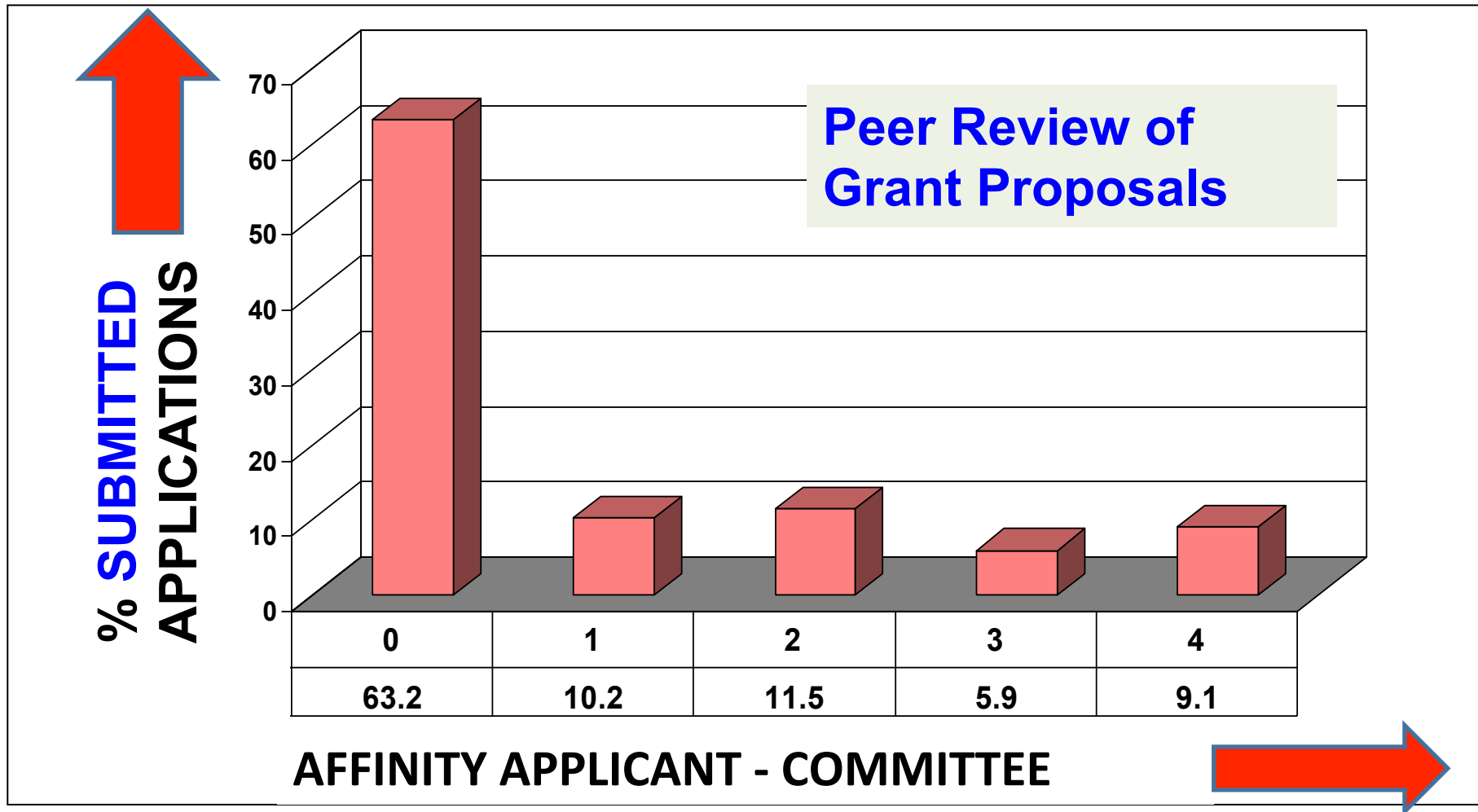
Citation analysis requires a permanent quest for biases

- It needs to include **expert knowledge** about the units of assessment
- But **Peer Review** has its biases too

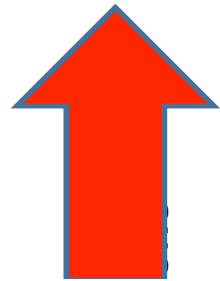
Decomposition of the IF of a Gerontology journal



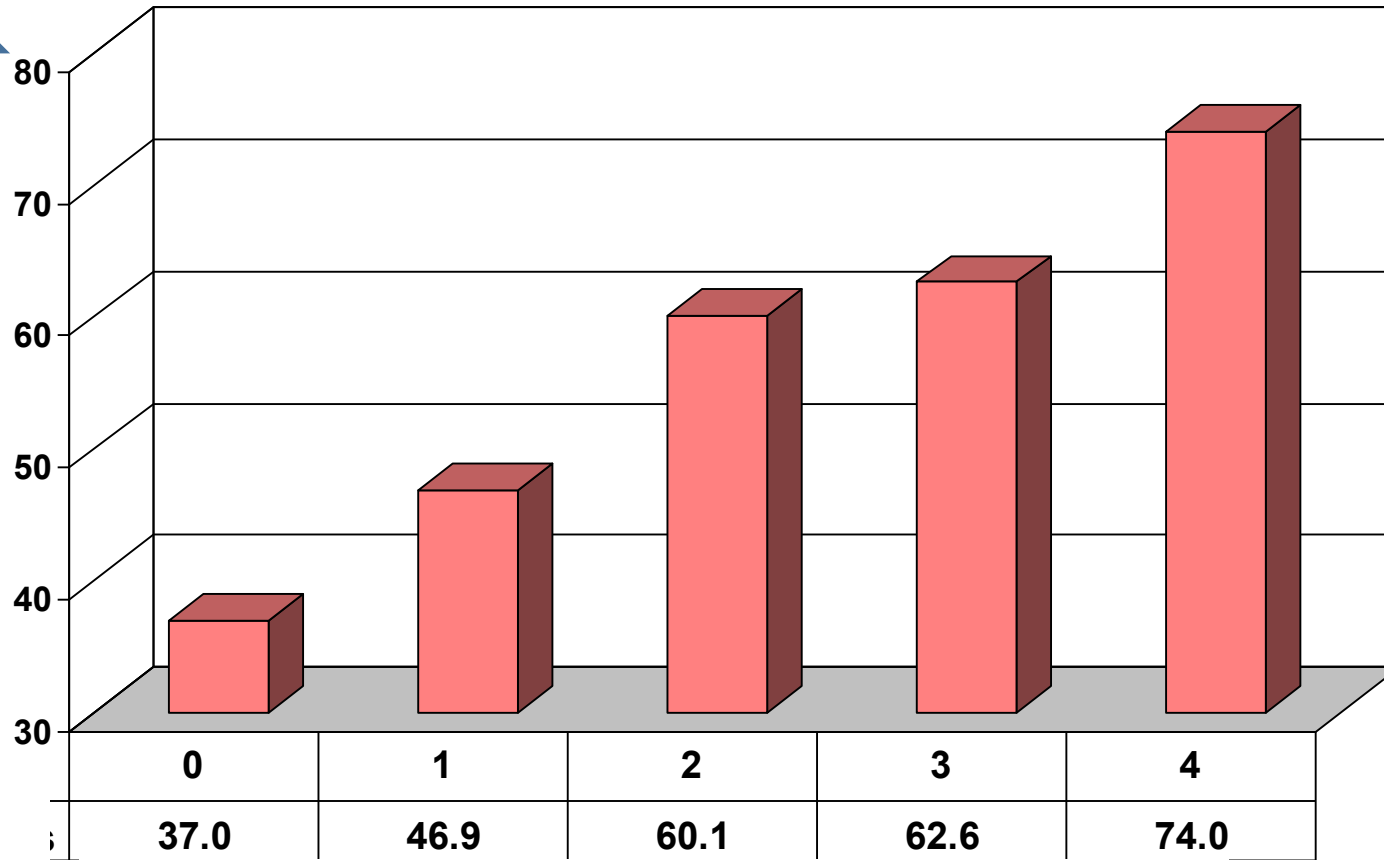
For 15 % of SUBMITTED applications an applicant is a member of the evaluating Committee (Affinity=3, 4)



Probability to be granted increases with increasing affinity applicants-Committee



% GRANTED APPLICATIONS



AFFINITY APPLICANT - COMMITTEE



**Logistic regression analysis:
Affinity Applicant-Committee has a significant effect
upon the probability to be granted**

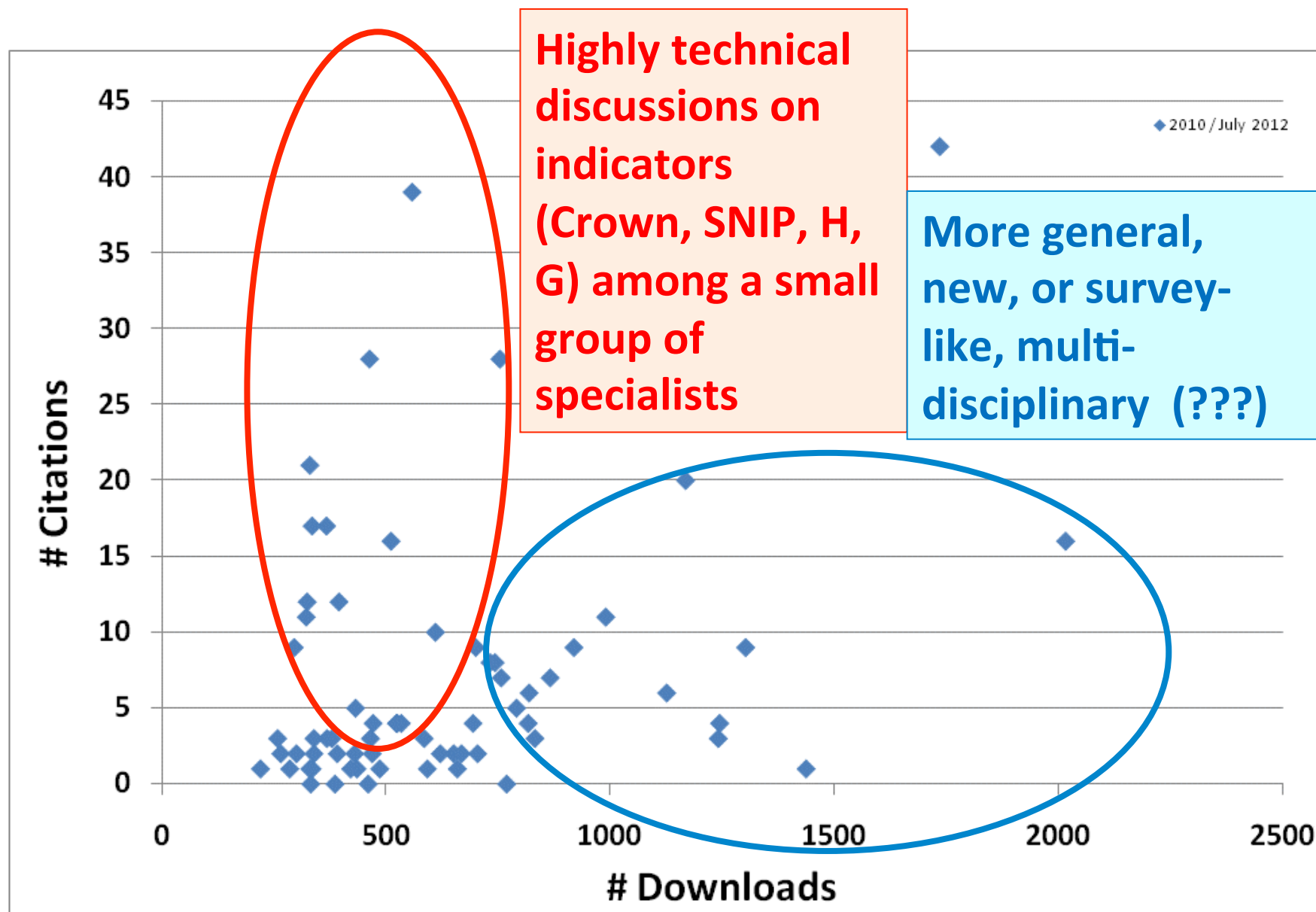
MAXIMUM-LIKELIHOOD ANALYSIS-OF-VARIANCE TABLE (N=2,499)

Source	DF	Chi-Square	Prob
INTERCEPT	1	18.47	0.0000
<u>CITATION IMPACT APPLICANT</u>	<u>3</u>	<u>26.97</u>	<u>0.0000 **</u>
Rel transdisc impact applicant	1	0.29	0.5926
<u>AFFINITY APPLICANT-COMMITTEE</u>	<u>2</u>	<u>112.50</u>	<u>0.0000 **</u>
Sum requested	1	45.47	0.0000 **
Institution applicant	4	25.94	0.0000 **
LIKELIHOOD RATIO	199	230.23	0.0638

Citations and full text downloads measure distinct aspects

- **Short term** download counts reflect browsing through newly published journal issues
- Citations tend to result from an author's **reflection** upon what he/she has downloaded and read.....
- **But there is more.....**

Downloads vs. citations for JOI 2010 articles, measured during 18 months



Altmetrics deserves to be further explored....

....but....

- It is essential to keep distinguishing between **scientific-scholarly** and **societal** impact.
- Social media mentions should **not** be used to measure the contribution to **scientific** progress

On promoting societal impact

- Societal value can **not** be assessed in a **politically neutral** manner
- Stimulate in teaching/training research students to study **scientifically relevant** aspects of societal issues

**A framework is needed to
characterize and position
bibliometric indicators and products**

The Multi-Dimensional Research Assessment Matrix

**Expert Group on the Assessment of
University-Based Research (AUBR, 2010)**

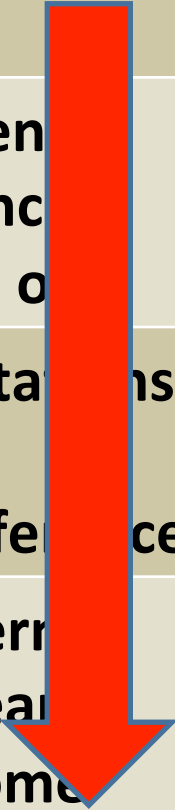
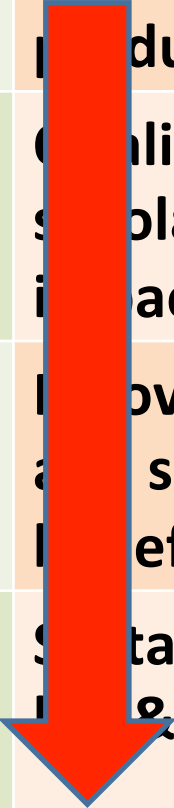
Multi-dimensional Research Assessment Matrix (Part)

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

Multi-dimensional Research Assessment Matrix (Part)

Unit of assessment	Purpose	Output dimensions	Bibliometric indicators	Other indicators
Individual	Allocate resources	Research products	Publications	Peer review
Research group	Improve performance	Quality, scholarly impact		enrichment of research
Department	Increase multi-discipl. research	Innovation, social benefit		collaborations, conferences
Institution	Increase regional engagement	Sustainability, Soc.		error rates, research outcomes
Research field	Promotion, hiring	Research infrastruct.	'prestige'	completion rates

Read column-wise



Multi-dimensional Research Assessment Matrix (Part)

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Base notions

The choice of indicators depends upon:

- **What unit is to be assessed**
- **Why is the assessment done?**
- **Which aspect is being assessed?**

Indicators that are appropriate in one type of assessment may be inappropriate in another

Author Level Bibliometrics

Henk F. Moed

**A talk at a Special Session on Author Level
Bibliometrics at ISSI2013**

Vienna, 17 July 2013

A base problem

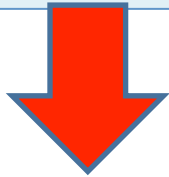
- **How to assess the performance of an individual by analyzing products that are the result of teamwork?**
- **Most research articles are the result of collaboration within or between teams**

CASE 1

**Meta level :
Policy issue**



Policy measure



**Bibliometric
operationali-
zation**

**More and more individual
researchers have to be objectively
evaluated for promotion and hiring**



Use easily available metrics



**Count total publications or #
articles in journals with the highest
impact factors in the field**

CASE 2

**Meta level :
Policy issue**



Policy measure



**Bibliometric
operationali-
zation**

**Research community is not
sufficiently oriented toward
international networks**



**Stimulate publication in good
international journals**



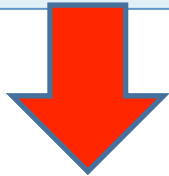
**Count # articles in first impact
quartile of journals in subject field**

CASE 3

**Meta level :
Policy issue**



Policy measure



**Bibliometric
operationali-
zation**

Professors are legally bound to do research but many of them don't



Allow only research active professors to decide on recruitment of new research staff



Select only professors with ≥ 3 publications in 7 years in recruitment committees

Base notions

- A set of “**meta**” assumptions is required that determine which assessment methodology is to be used
- Bibliometrics can **help** formulating and testing such assumptions
- Bibliometric researchers should explain better what “**correlations**” mean

Wider issues

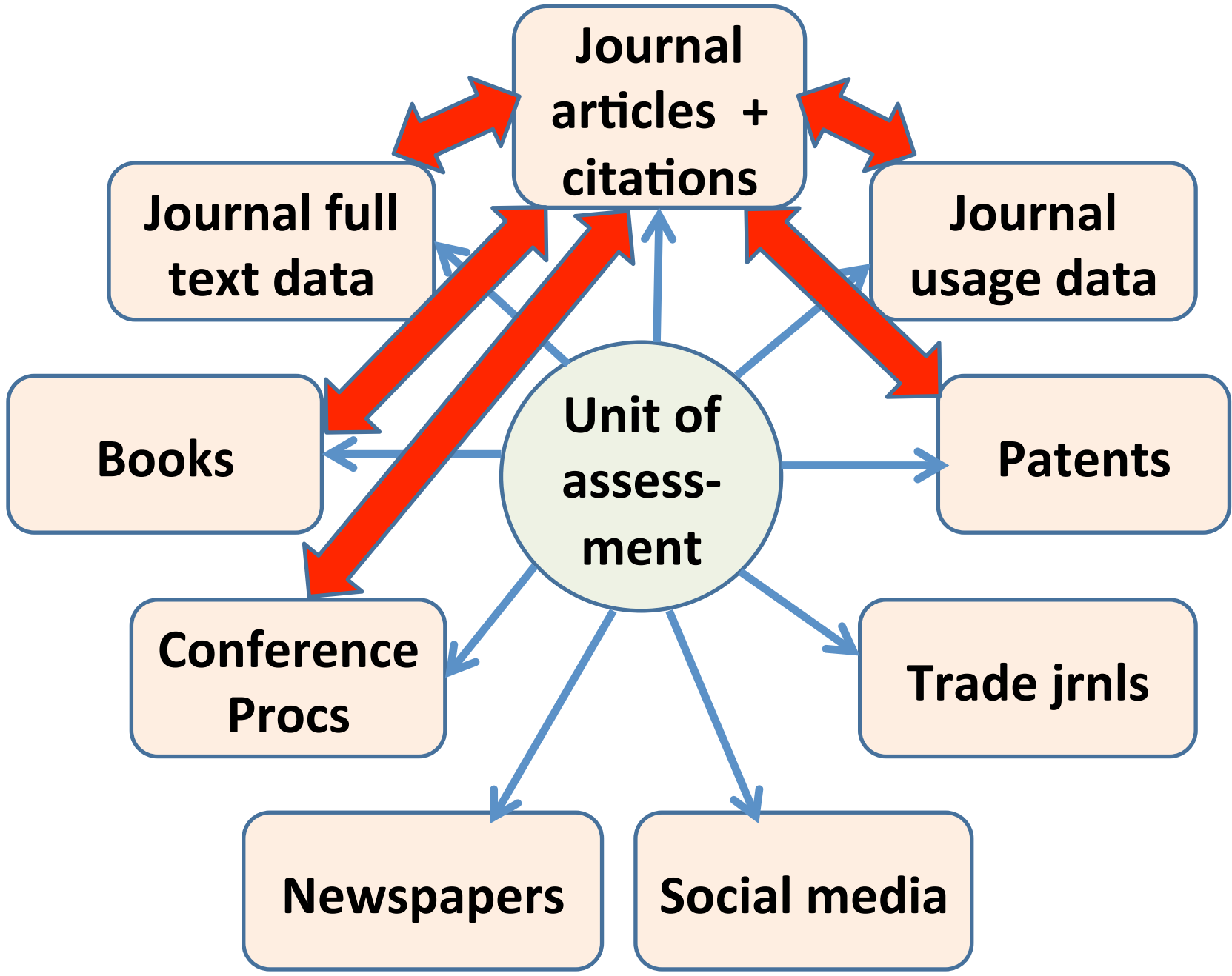
- **Change** an assessment methodology every 5-10 years
- What is an **acceptable** “error rate” in the assessment process?
- Wrong in **individual cases** ⇔ beneficiary for the **system as a whole**
- What is a **fair** assessment process?

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What types of impact do the data sets indicate?

Data set	Type of impact	Quality control
journal articles	Scientific	Peer review
Patents	Technological	Pat. examiners
Books	Scholarly; Educational	Book publishers
Conf. Procs.	Scientific	Program chairs
Newspapers	Cultural; Enlightenment	Journalists
Trade journals	Technological?	?
Usage/ full text downloads	Scientific; societal?	?
Social media	?	?

**Thank you for your
attention!**

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www.ebrp.elsevier.com