

What's the Difference?

Analysing the relative performance of
Impact Metrics

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Electronics and Computer Science

Overview

- Bibliometrics
- Why Impact Metrics
- Publishing Paradigms
- Metrics Comparison
- Bibliometrics as an aid

Citation Analysis

“Citation analysis is the examination of the frequency, patterns and graphs of citations in articles and books.”

Impact Factor

Article Impact Factor

REF Impact Factor?

Citation Count

PageRank

Why use Impact Metrics?

Funding Bodies

Institutions

Libraries

Researchers

REF

Serials Crisis

Performance

Research Quality

Publishing Practices

Publication Impact

Why/Where Researchers Publish?

Build Networks

Enhance Science

Gain Citations

Cost

Metrics

Time Constraints

Target Audience

Effort

Job Safety

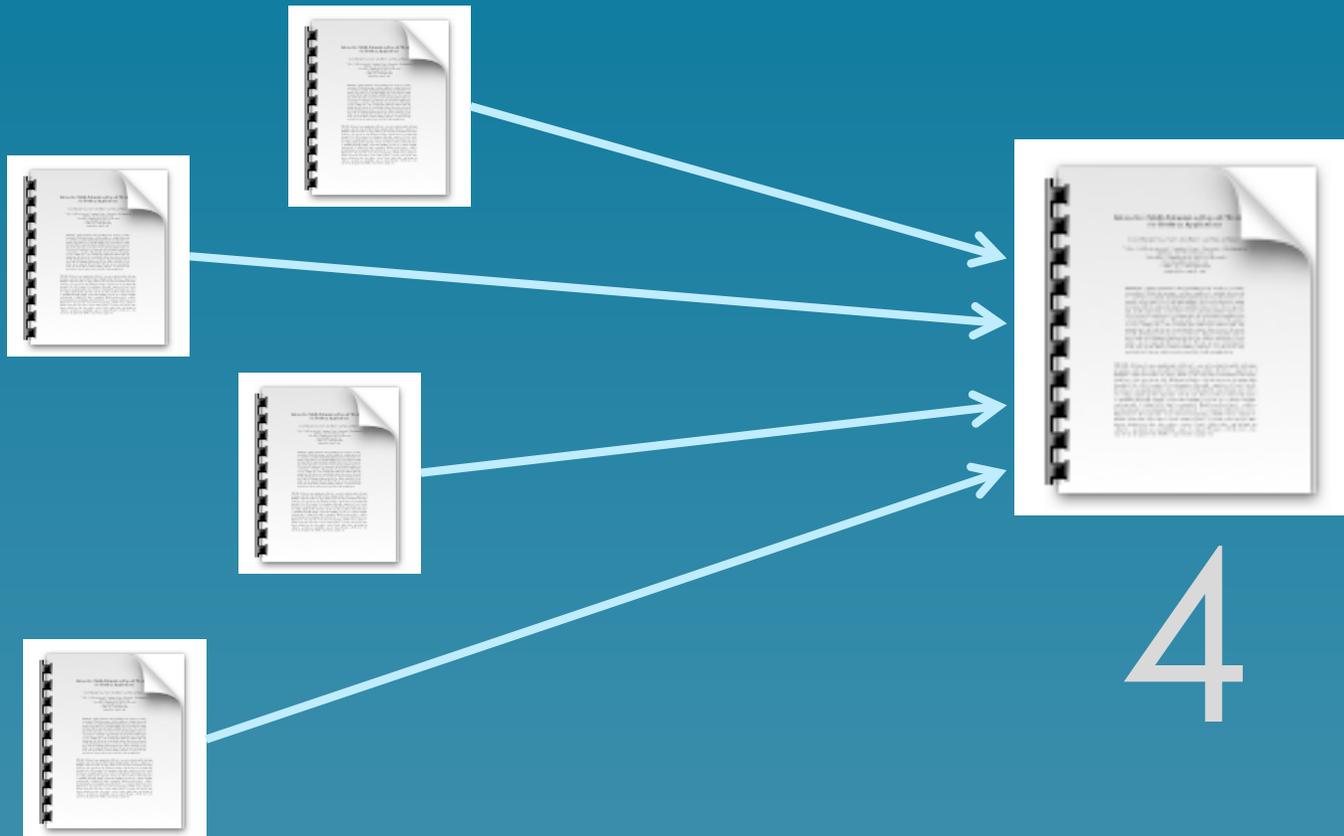
Promotion Opportunities

Publish or Perish?

Metrics (1)

Citation Count

- Total number of citations towards an item



Metrics (2)

(Journal) Impact Factor

No of citations in year X to articles published in
year $X - 1$ & year $X - 2$

Total number of citable articles from year
 $X - 1$ & year $X - 2$

Average No. of times an article published in the last 2
years has been cited this year

Metrics (3)

Eigenfactor (EF)

$$\text{EF}(\text{journal}) = \sum \frac{\text{The EF of a citing Journal}}{\text{Number of Citations in Journal}}$$

Weighted citations, like a weighted impact factor. Also takes into account reader time.

Metrics (4)

Article Influence Score

Journals Eigenfactor Score

Fraction of Articles Published by Journal

Designed to measure the relative importance of a JOURNAL on a per article basis. Not an indicator of article influence.

Similarity in ISI Metrics - JCR 2008

	Citations	Impact Factor	No. Of Articles	Eigenfactor
Impact Factor	0.70			
No. of Articles	0.71	0.34		
Eigenfactor	0.68	0.78	0.28	
Article Impact Score	0.94	0.97	0.70	0.75

-1 = Complete Inverse Correlation
0 = No Relation
1 = Complete Correlation

“15% of articles, account for 50%
of the citations, and the most
cited 50% of the papers account
for 90% of the citations”

P.O. Seglen. Why the impact factor of journals should not be used for evaluating research.
British medical journal, 314(7079):497, 1997.

Metrics (5)

REF Pilot Metric

No. of citations to article A

Average no. of citations to similar articles
published in the same year

If a Journal is in a subject area, then the REF denominator is essentially
the total Journal Impact Factor for all journals in an area for one
year only

Can still suffer from the long tail effect.

Centile distribution would help alleviate this.

Social Science

- The study of citations is a social science
- Whenever you measure something, you are measuring human behavior.
- You have to be very careful with how you view the outputs of such a study.
- If you can find the typical behavior you may be able to use a metric to represent it.

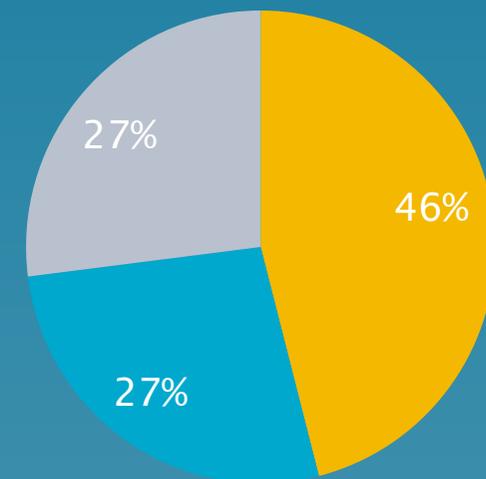
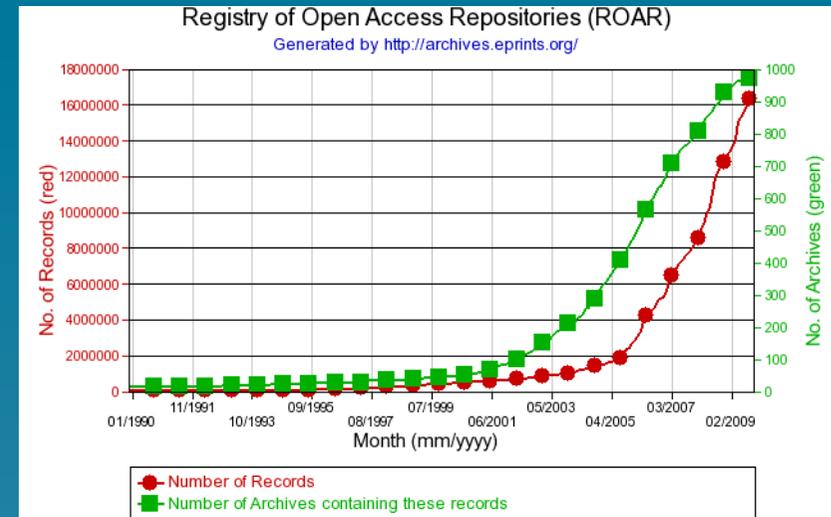
Social Science - Article Interest

- Might solve a highly complex problem which only 9 others understand
- Might open up new science but won't be the primary cited article if another gives a usage, or reviews it.
- 1/3rd of citations are copied verbatim (arXiv)

Digital Repositories

- 900+ OA Repositories
- 18 Million Records
- In Pilot Study 73% of Institutions have an IR registered with ROAR
- 46% could have sourced all their data from the repository.

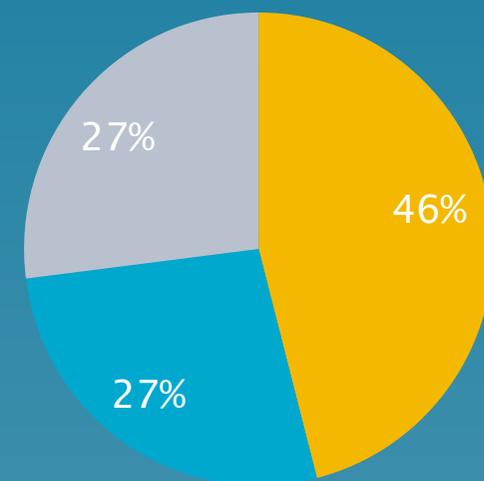
- All Resources In Digital Repository
- Some Resources in a Digital Repository
- Unknown or No Digital Repository



Digital Repositories

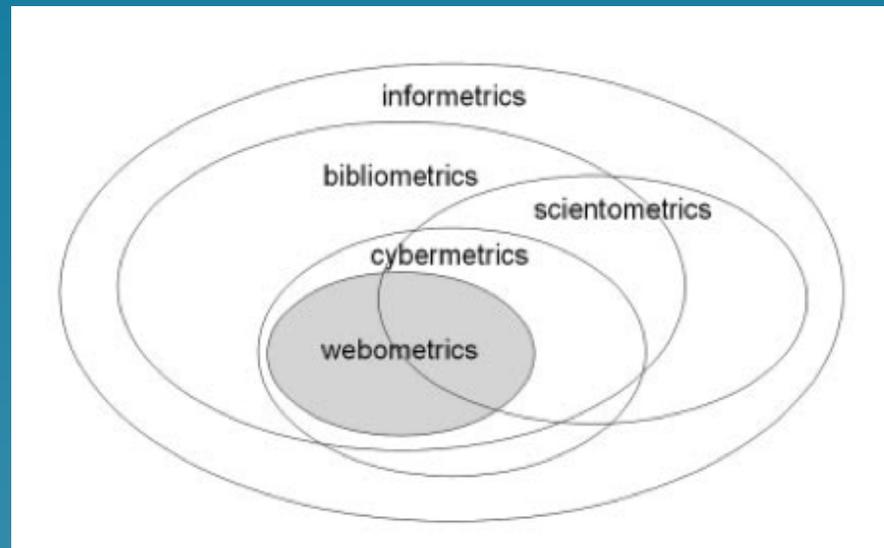
- Telling your own story
- Find out research directions
- Who are the big collaborations
- More evidence for the expert panel

- All Resources In Digital Repository
- Some Resources in a Digital Repository
- Unknown or No Digital Repository



More on metrics

- Bibliometrics gets a much wider use than simply publications, depending on what you call it:



L. Bjerneborn and P. Ingwersen. Toward a basic framework for webometrics. *Journal of the American Society for Information Science and Technology*, 55(14), 2004.

Metrics (6)

PageRank

$$PR(n) = \frac{1 - \alpha}{|V|} + \alpha \sum_{p_j \in M(p_i)} \frac{PR(p_j)}{L(p_j)}$$

PR = PageRank

L = Number of Links

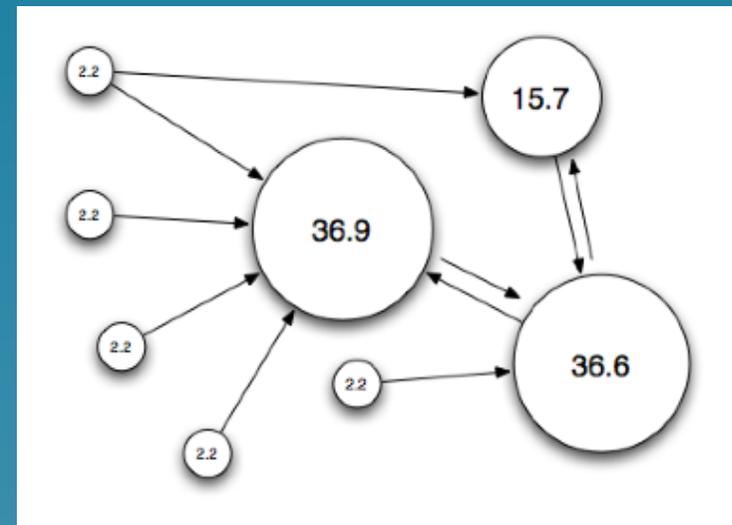
n = Our Node

p = Citing Nodes

*α = Dampning Factor
(Random Surfer)*

Offers a weighted citation to help prevent against false positives.

More applicable when there is no peer review.

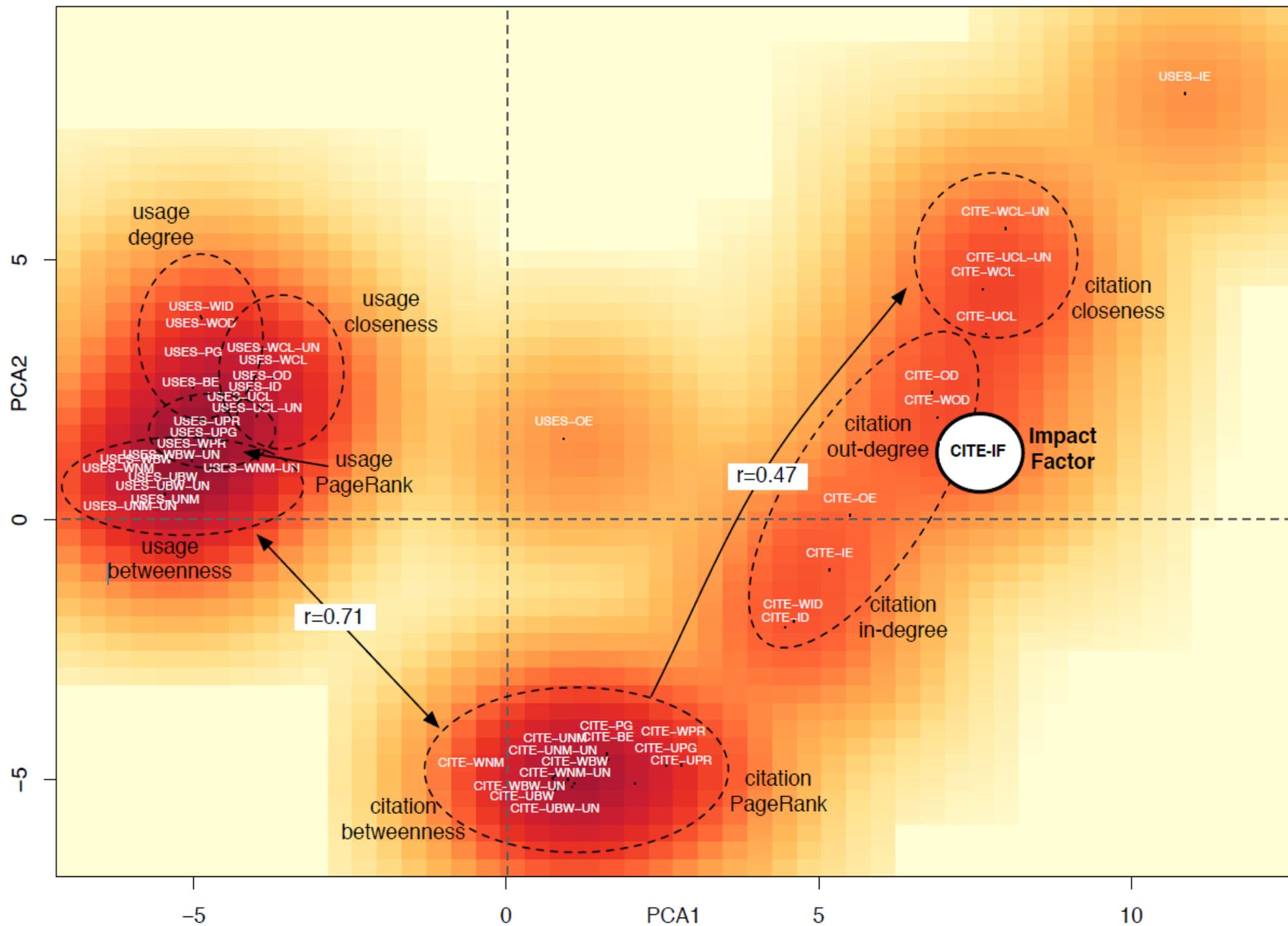


More Correlations (AIF)

	Citation Count	PageRank
Download Count	(~0.4*)	
PageRank	0.58	
Hits (Authority)	0.73	0.10

- Correlation of Rank Order
- Based upon data obtained from citebase.org

* T. Brody and S. Harnad. Earlier web usage statistics as predictors of later citation impact. *Journal of the American Society for Information Science and Technology*, 57 (8):1060-1072, 2006.



Complimentary Bibliometric Methods

- Bibliographic Coupling
 - The idea of being able to relate things via links
 - e.g. A Paper's field can be determined:
 - From the authors departmental affiliation.
 - From that papers citations.
 - From that papers usage.
 - From which papers it is most often co-cited with.
- The last point is the only one related to impact

Co-Citations

- A bridge paper can be found if it is Co-Cited with Publications in many disparate areas.
- What I want to know is can you use these Co-Citations as an indicator of Impact?

Summary

- Advise on Human Behavior
- Many metrics tell you different things
- Important to match the best metric to your study
- Examine the landscape

Summary (2)

- Researcher & The Institution
- Gathering Data

Wooldridge, M. J. and Jennings, N. R. (1995) ~~Intelligent Agents: Theory and Practice~~. *The Knowledge Engineering Review*, 10 (2). pp. 115-152. Cited 1076 times in ISI and 4695 times in Google Scholar.



- More usage of metrics
 - Building your institutional story
 - Discover new research collaborations
 - Early indicators



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