بسم الله الرحمن الرحيم

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# Analysis of Bibliometrics information for selecting the best field of study


**Nader Ale Ebrahim**, PhD
Visiting Research Fellow
Centre for Research Services
Research Management & Innovation Complex
University of Malaya, Kuala Lumpur, Malaysia
aleebrahim@um.edu.my
@aleebrahim
www.researcherid.com/rid/C-2414-2009
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28th September 2016

All of my presentations are available online at:
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Link to this presentation: https://dx.doi.org/10.6084/m9.figshare.1621261.v3 (Old version)

# 4th SERIES OF INTRODUCTORY WORKSHOP ON:

# *Strategies to Enhance Research Visibility, Impact & Citations*

**Nader Ale Ebrahim, PhD**
==========
Centre for Research Services
Research Management & Innovation Complex
University of Malaya, Kuala Lumpur, Malaysia
*www.researcherid.com/rid/C-2414-2009*
*http://scholar.google.com/citations*

Read more: Ale Ebrahim, N., Salehi, H., Embi, M. A., Habibi Tanha, F., Gholizadeh, H., Motahar, S. M., & Ordi, A. (2013). Effective Strategies for Increasing Citation Frequency. International Education Studies, 6(11), 93-99. doi: 10.5539/ies.v6n11p93

# Abstract

**Abstract:**

Bibliometrics can be defined as the statistical analysis of publications. Bibliometrics has focused on the quantitative analysis of citations and citation counts which is complex. It is so complex and specialized that personal knowledge and experience are insufficient tools for understanding trends for making decisions. We need tools for analysis of Bibliometrics information for select the best field of study with promising enough attention.

This presentation will provide tools to discover the new trends in our field of study in order to select an area for research and publication which promising the highest research impact.

**Keywords:** H-index, Improve citations, Research tools, Bibliometrics, Research Visibility, Research Impact

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# Research Tools Mind Map

# World University Rankings 2016-2017

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# Visualizing Citation Cartels

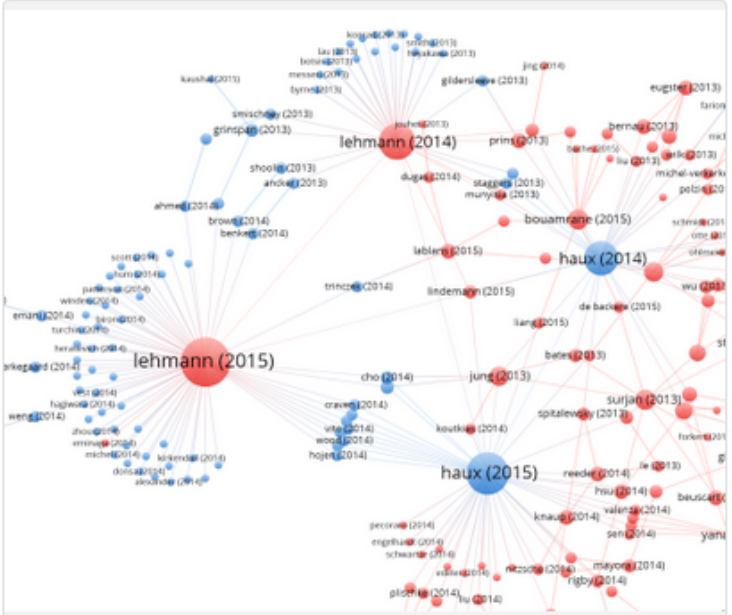
## Visualizing Citation Cartels

POSTED BY PHIL DAVIS · SEP 26, 2016 · 5 COMMENTS

**FILED UNDER** APPLIED CLINICAL INFORMATICS, CITATION CARTEL, CITATION NETWORK, JOURNAL IMPACT FACTOR, METHODS OF INFORMATION IN MEDICINE, SCHATTAUER PUBLISHERS, THOMSON REUTERS, VISUALIZATION

By their very nature, citation cartels are difficult to detect. Unlike self-citation, which can be spotted when there are high levels of references to other papers published in the same journal, cartels work by influencing incoming citations from other journals.

In 2012, I reported on the first case of a citation cartel involving four biomedical journals. Later that year, Thomson Reuters suspended three of the four titles from receiving an Impact Factor. In 2014, they suspended six business journals for similar behavior.




A citation cartel or valid study?

Source: https://scholarlykitchen.sspnet.org/2016/09/26/visualizing-citation-cartels/

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# Top 10 authors with the highest profile view counts on ResearchGate

*Table 11. Top 10 authors with the highest profile view counts on ResearchGate (9th of November, 2015), compared to the same indicator on the 10th of September, 2015.*

| AUTHOR NAME | SEPTEMBER 10th (2015) PROFILE VIEWS | NOVEMBER 9th (2015) PROFILE VIEW | MISMATCH (%) |
|---|---|---|---|
| Nader Ale Ebrahim | 19,821 | 13,281 | 67.00 |
| Chaomei Chen | 7,760 | 3,937 | 50.73 |
| Loet Leydesdorff | 4,227 | 1,758 | 41.59 |
| Bakthavachalam Elango | 2,883 | 1,756 | 60.91 |
| Zaida Chinchilla | 5,840 | 1,569 | 26.87 |
| Mike Thelwall | 4,297 | 1,568 | 36.49 |
| Lutz Bornmann | 3,129 | 1,439 | 45.99 |
| Wolfgang Glänzel | 3,012 | 1,301 | 43.19 |
| Kevin Boyack | 3,256 | 1,135 | 34.86 |
| Peter Ingwersen | 2,335 | 1,025 | 43.90 |

Source: Martín-Martín, A., Orduna-Malea, E., Ayllón, J. M., & López-Cózar, E. D. (2016). The counting house, measuring those who count: Presence of Bibliometrics, Scientometrics, Informetrics, Webometrics and Altmetrics in Google Scholar Citations, ResearcherID, ResearchGate, Mendeley, & Twitter. *EC3 Reseach Group: Evaluación de la Ciencia y de la Comunicación Científica Universidad de Granada and Universidad Politécnica de Valencia (Spain), In Progress,*. doi:10.13140/RG.2.1.4814.4402

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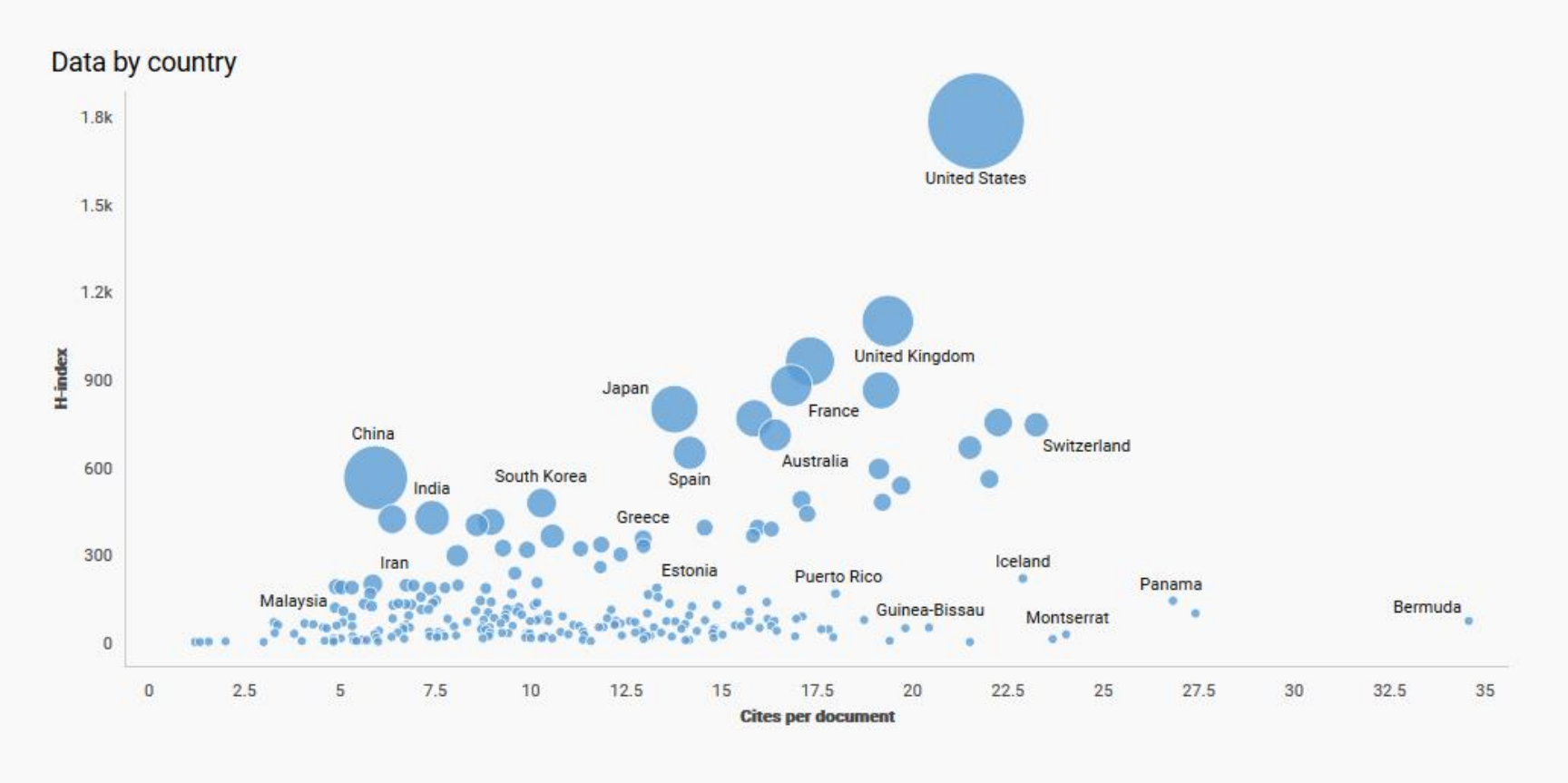
# World Report

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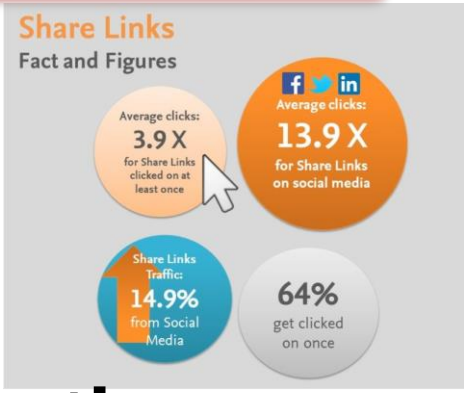
# From submission to sharing: the life cycle of an article




- **Phase 1: Conception and birth**
- **Phase 2: Submission**
- **Phase 3: Reviewers**
- **Phase 4: Production and publication**
- **Phase 5: Dissemination and archiving**
  - The article is published, but its life cycle isn't yet complete. In this phase, dissemination can start; sharing the Share Links article helps increase readership and make it more visible.

Source: https://www.elsevier.com/reviewers-update/home/featured-article/from-submission-to-sharing-the-life-cycle-of-an-article

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# Introduction of bibliometrics

- Bibliometrics can be defined as the quantitative analysis of science and technology performance and the cognitive and organizational structure of science and technology.
- Basic for these analyses is the scientific communication between scientists through (mainly) journal publications.
- Key concepts in bibliometrics are ***output*** and ***impact***, as measured through publications and citations.
- Important starting point in bibliometrics: scientists express, through citations in their scientific publications, a certain degree of influence of others on their own work.
- By large scale quantification, citations indicate influence or **(inter)national visibility** of scientific activity, but should not be interpreted as synonym for '**quality**'.

*Source: Thed van Leeuwen, (2010)* Application of bibliometric analysis: Advantages & pitfalls, Workshop on Research Evaluation in Statistical Sciences , Bologna, 25th March 2010

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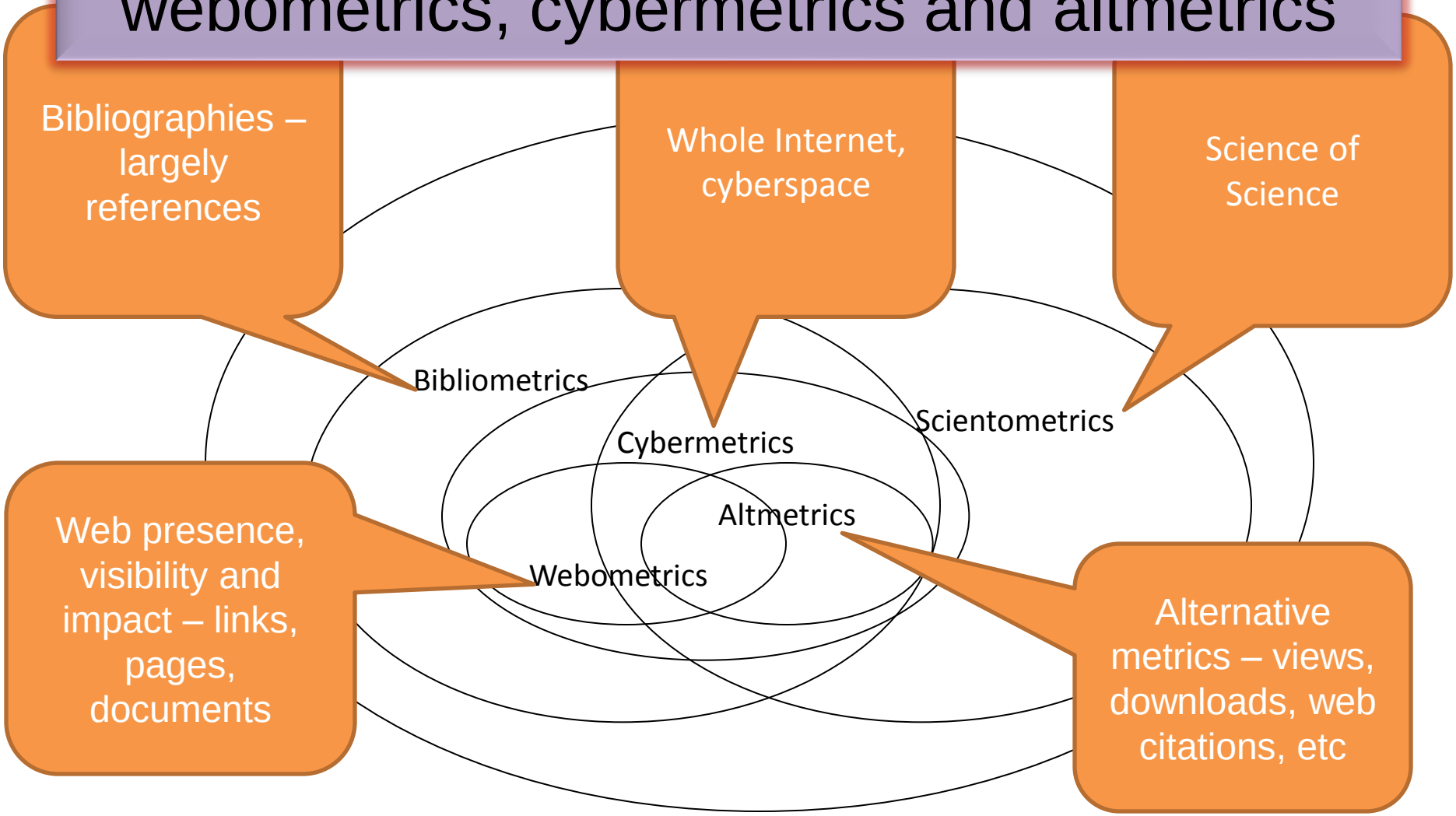
# Informetrics, scientometrics, bibliometrics, webometrics, cybermetrics and altmetrics




Source: Onyancha, Omwoyo Bosire. "Can informetrics shape biomedical research? A case study of the HIV/AIDS research in sub-Saharan Africa ." *Inkanyiso: Journal of Humanities and Social Sciences* 6.1 (2014): 49-65.

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# Frequently Used Terms for Research Evaluation Metrics

| Term | Short Definition |
|---|---|
| **Bibliometrics** | Bibliometrics is a set of methods to quantitatively analyse academic literature and scholarly communications. |
| **Informetrics** | Informetrics is the study of quantitative aspects of information. This includes the production, dissemination, and use of all forms of information, regardless of its form or origin. |
| **Scientometrics** | Scientometrics is the study of quantitative features and characteristics of science, scientific research and scholarly communications. |
| **Webometrics** | Webometrics is the study of quantitative features, characteristics, structure and usage patterns of the world wide web, its hyperlinks and internet resources. |
| **Cybermetrics** | Cybermetrics is an alternative term for Webometrics. |
| **Librametrics** | Librametrics is a set of methods to quantitatively analyse availability of documents in libraries, their usage and impact of library services to its user community. |
| **Patentometrics** | Patentometrics is a set of methods to quantitatively analyse patent databases, patent citations and their usage patterns. |
| **Altmetrics** | Altmetrics is new metrics proposed as an alternative to the widely used journal impact factor and personal citation indices like the h-index. The term altmetrics was proposed in 2010, as a generalization of article level metrics, and has its roots in the twitter #altmetrics hashtag. |
| **Article Level Metrics (ALM)** | Article level metrics is an alternative term for Altmetrics. |

Source: Das, A.-K. (2015). *Research Evaluation Metrics*. 7, place de Fontenoy, 75352 Paris 07 SP, France: United Nations Educational, Scientific and Cultural Organization.

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# Reasons for bibliometric studies

- Understanding of ***patterns***
  - discovery  of regularities, behavior
  - “order out of documentary chaos” [Bradford, 1948]
- Analysis of ***structures & dynamics***
  - discovery of connections, relations, networks
  - search for regularities - possible predictions
- Discovery of ***impacts, effects***
  - relation between entities & amounts of their various uses
  - providing support for making of decisions, policies

Source: https://comminfo.rutgers.edu/~tefko/Courses/e530/Lectures/Lecture09%20Bibliometric%20searching.ppt

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# Use of evaluative bibliometrics

- Academic, research & government institutions for:
  - promotion and tenure, hiring, salary raising
  - decisions for support of departments, disciplines
  - grants decision; research policy making
  - visualization of scholarly networks, identifying key contributions & contributors
  - monitoring scholarly developments
  - determining journal citation impact
- Resource allocation:
  - identifying authors most worthy of support;
  - research areas most worthy of funding
  - journals most worthy of support or purchase; etc.

Source: https://comminfo.rutgers.edu/~tefko/Courses/e530/Lectures/Lecture09%20Bibliometric%20searching.ppt

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# Applications of Scientometrics and Bibliometrics in Research Evaluation

- **For Institution/ Collaborative Research Group**
- **For a scientist**:
  - **Mapping of collaborations**, collaborating institutions, collaborating countries, co-authors, highly cited papers, top publishing journals, percentage of cited vs. uncited papers, percentage of self-citations, author-level indicators such as h-index, i10-index, etc.
- **For a country**
- **For a journal**

Source: Das, A.-K. (2015). *Research Evaluation Metrics*. 7, place de Fontenoy, 75352 Paris 07 SP, France: United Nations Educational, Scientific and Cultural Organization.

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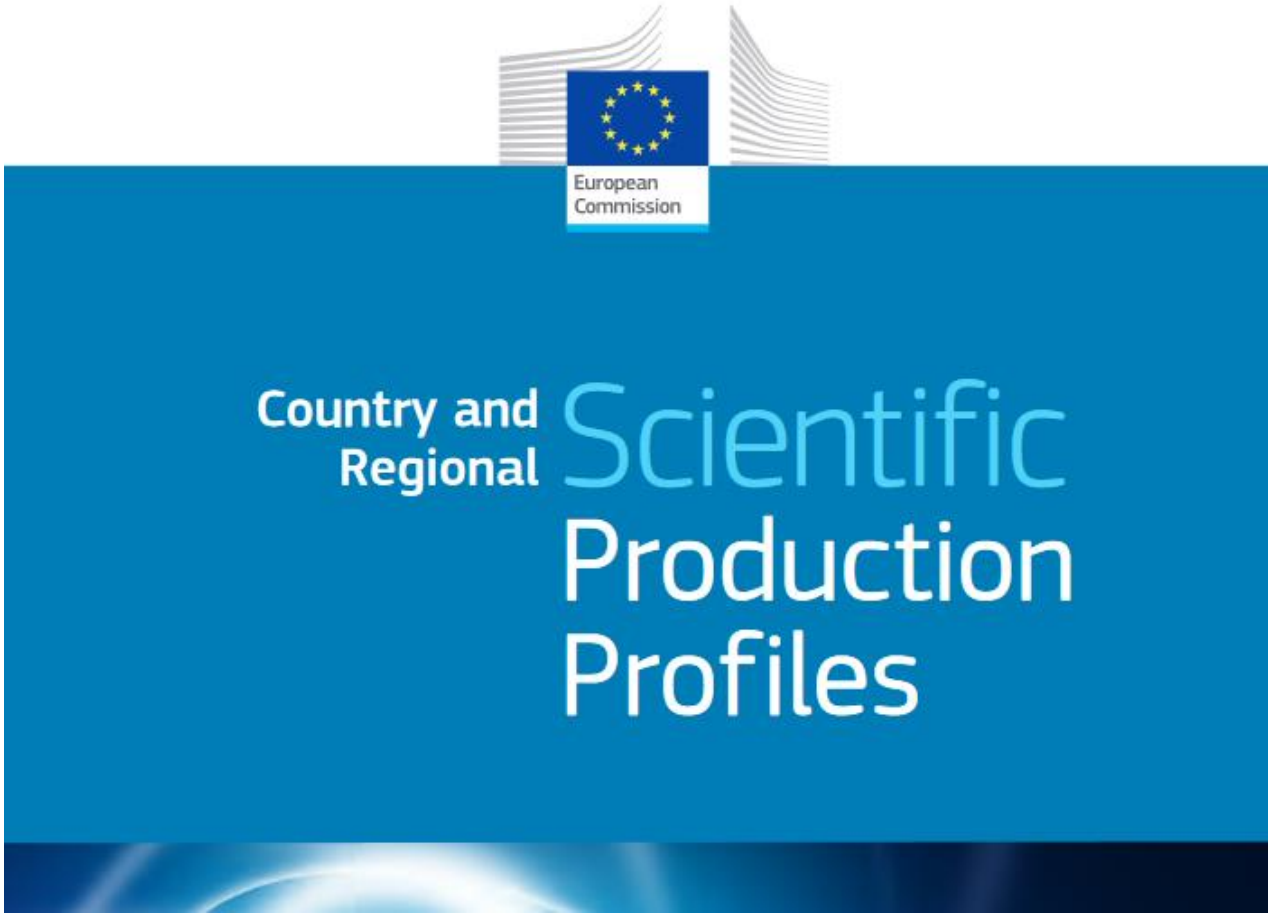
# Country and Regional Scientific Production Profiles

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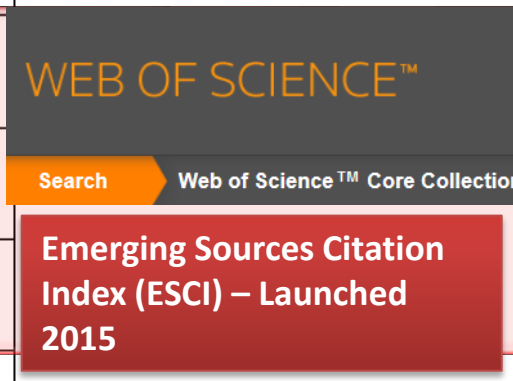
# Major Citation Databases

| Name of Citation Database | Launched | Scope | Owned by | Terms of Availability |
|---|---|---|---|---|
| *Science Citation Index (SCI)* | 1964 | Global | Thomson Reuter | Subscription-based with Web of Science |
| *Social Science Citation Index (SSCI)* | 1972 | Global | Thomson Reuter | Subscription-based with Web of Science |
| *Arts & Humanities Citation Index (A&HCI)* | 1978 | Global | Thomson Reuter | Subscription-based with Web of Science |
| *Scopus* | 2004 | Global | Elsevier B.V. | Subscription-based |
| Google Scholar Citations | 2004 | Global | Google Inc. | Freely Available Online |
| Microsoft Academic Search | 2003 | Global | Microsoft Research | Freely Available Online |
| CiteSeerX (CiteSeerX.ist.psu.edu) | 1997 | Global; Subject specific | Pennsylvania State University, USA | Freely Available Online |




**Emerging Sources Citation Index (ESCI) – Launched 2015**

Source: Das, A.-K. (2015). *Research Evaluation Metrics*. 7, place de Fontenoy, 75352 Paris 07 SP, France: United Nations Educational, Scientific and Cultural Organization.

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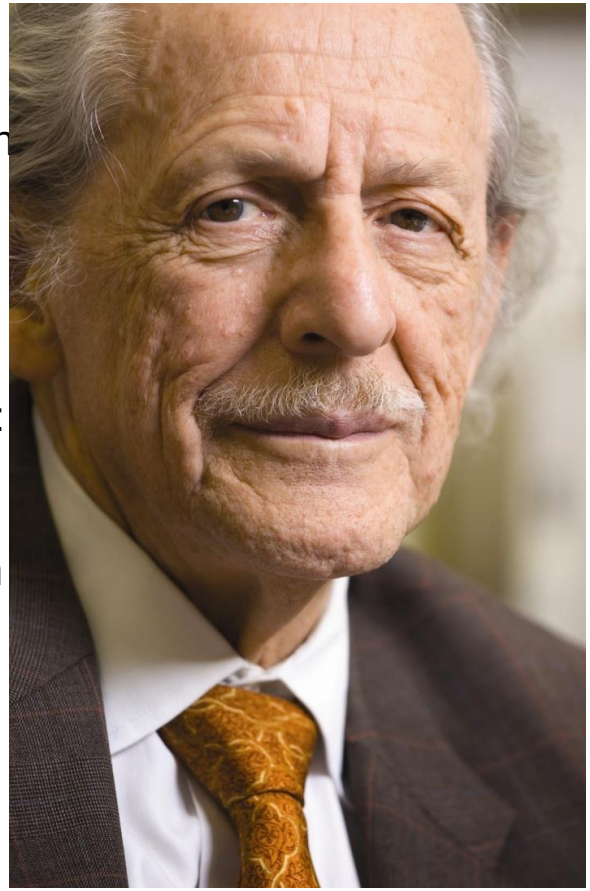
# The Institute for Scientific Information (ISI)

- The **Institute for Scientific Information** (ISI) was founded by Eugene Garfield in 1960. It was acquired by Thomson Scientific & Healthcare in 1992, became known as **Thomson ISI** and now is part of the Healthcare & Science business of the multi-billion dollar Thomson Reuters Corporation.

- ISI offered bibliographic database services. Its speciality: citation indexing and analysis, a field pioneered by Garfield. It maintains citation databases covering thousands of academic journals, including a continuation of its long time print-based indexing service the Science Citation Index (SCI), as well as the Social Sciences Citation Index (SSCI), and the Arts and Humanities Citation Index (AHCI). All of these are available via ISI's Web of Knowledge database service.



Founder & Chairman Emeritus
Institute for Scientific Information (ISI)

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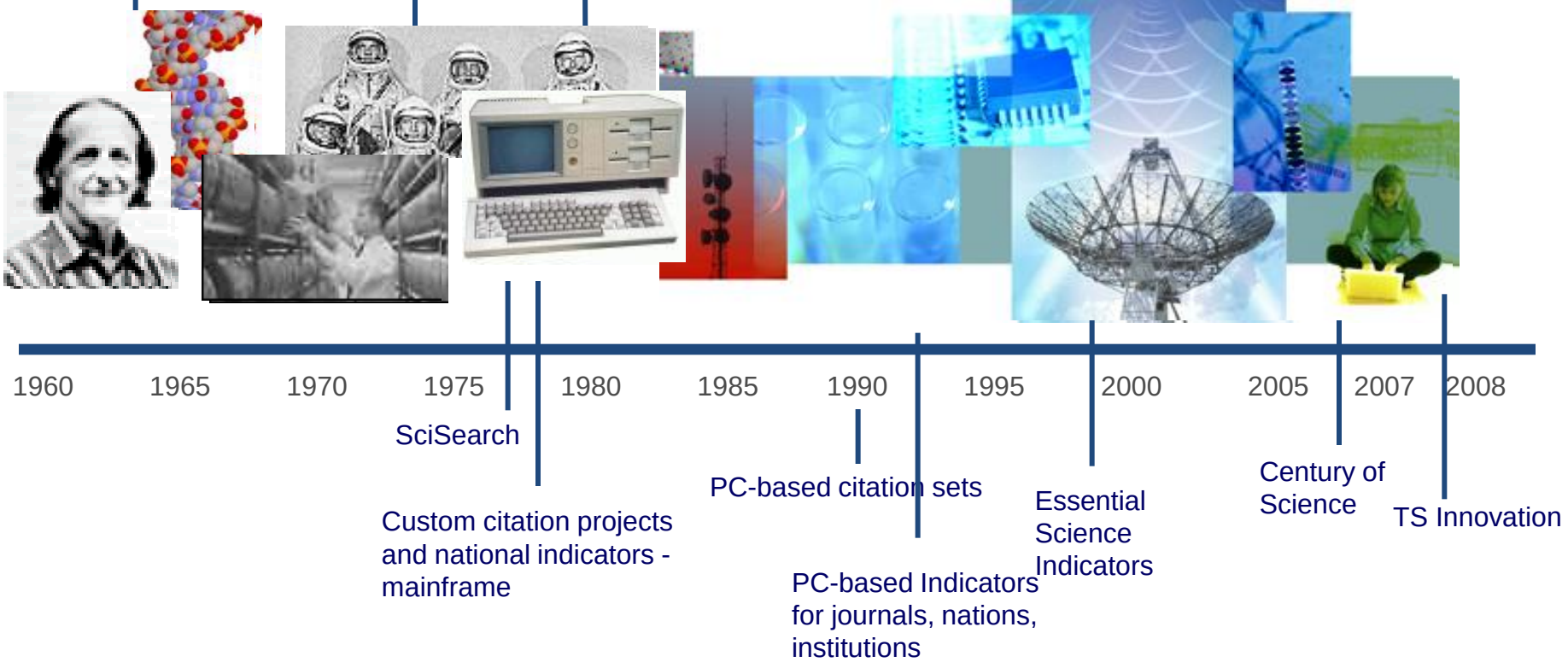
For more Info

# Thomson Reuters (formerly ISI) has been the authority on citation data for over 50 years.



# **Scopus** (Launched 2004)

- Scopus is the largest abstract and citation database of peer-reviewed literature: scientific journals, books and conference proceedings. Delivering a comprehensive overview of the world's research output in the fields of science, technology, medicine, social sciences, and arts and humanities, Scopus features smart tools to track, analyze and visualize research.
- As research becomes increasingly global, interdisciplinary and collaborative, you can make sure that critical research from around the world is not missed when you choose Scopus.

Source: http://www.elsevier.com/online-tools/scopus

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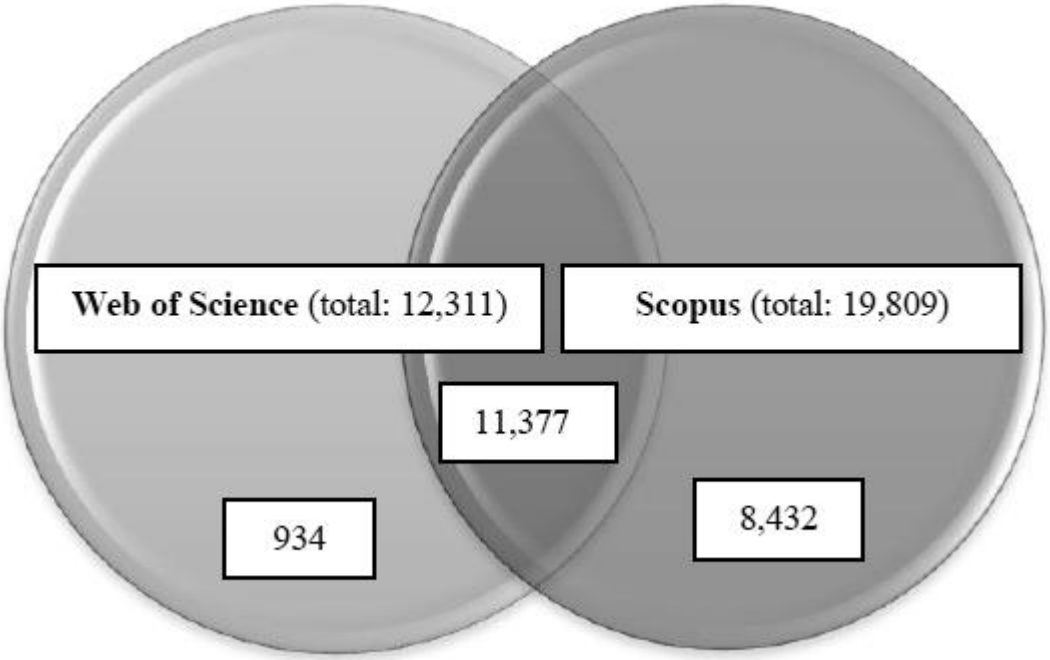
# A Comparison between Two Main Academic Literature Collections: Web of Science and Scopus Databases




Source: Aghaei Chadegani, Arezoo and Salehi, Hadi and Yunus, Melor Md and Farhadi, Hadi and Fooladi, Masood and Farhadi, Maryam and Ale Ebrahim, Nader, A Comparison between Two Main Academic Literature Collections: Web of Science and Scopus Databases (April 7, 2013). Asian Social Science, Vol. 9, No. 5, pp. 18-26, April 27, 2013. Available at SSRN: http://ssrn.com/abstract=2257540

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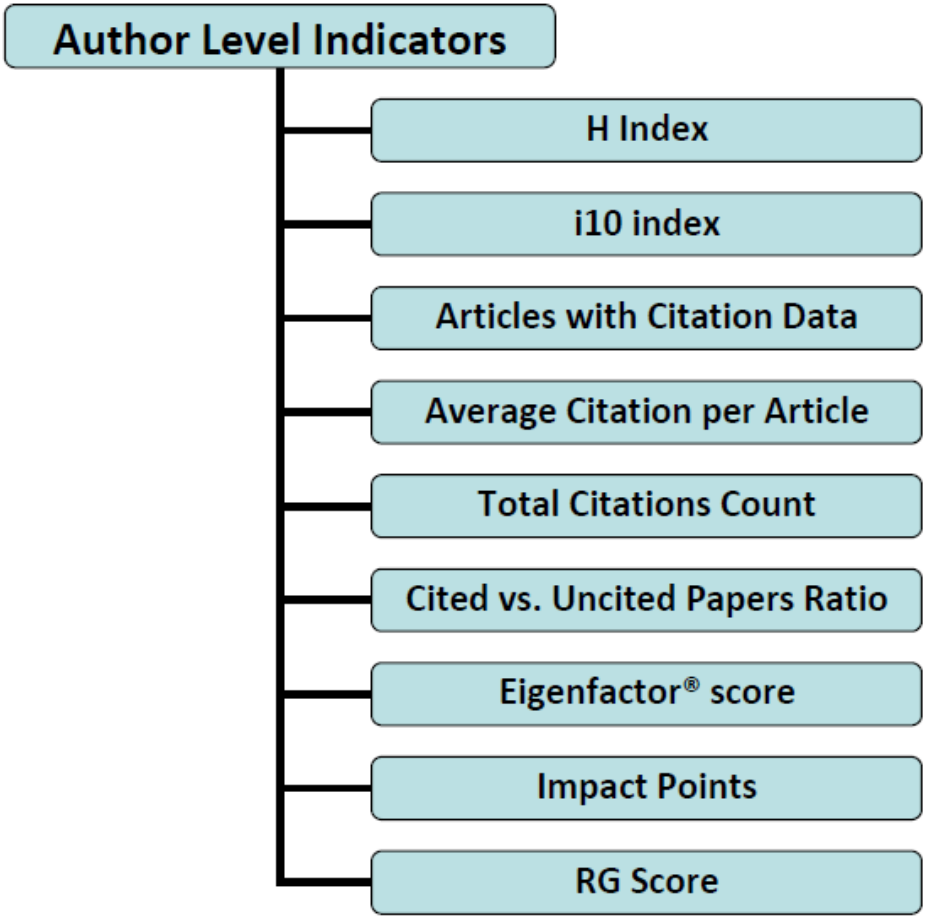
# Author Level Indicators




Source: Das, A.-K. (2015). *Research Evaluation Metrics*. 7, place de Fontenoy, 75352 Paris 07 SP, France: United Nations Educational, Scientific and Cultural Organization.

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# CHECK YOUR SCORE

- H-Index?
- i10-Index?
- g-Index?
- Citations Count?
- Articles with citation?
- Average citations per article?
- Impact Points?
- RG Score?

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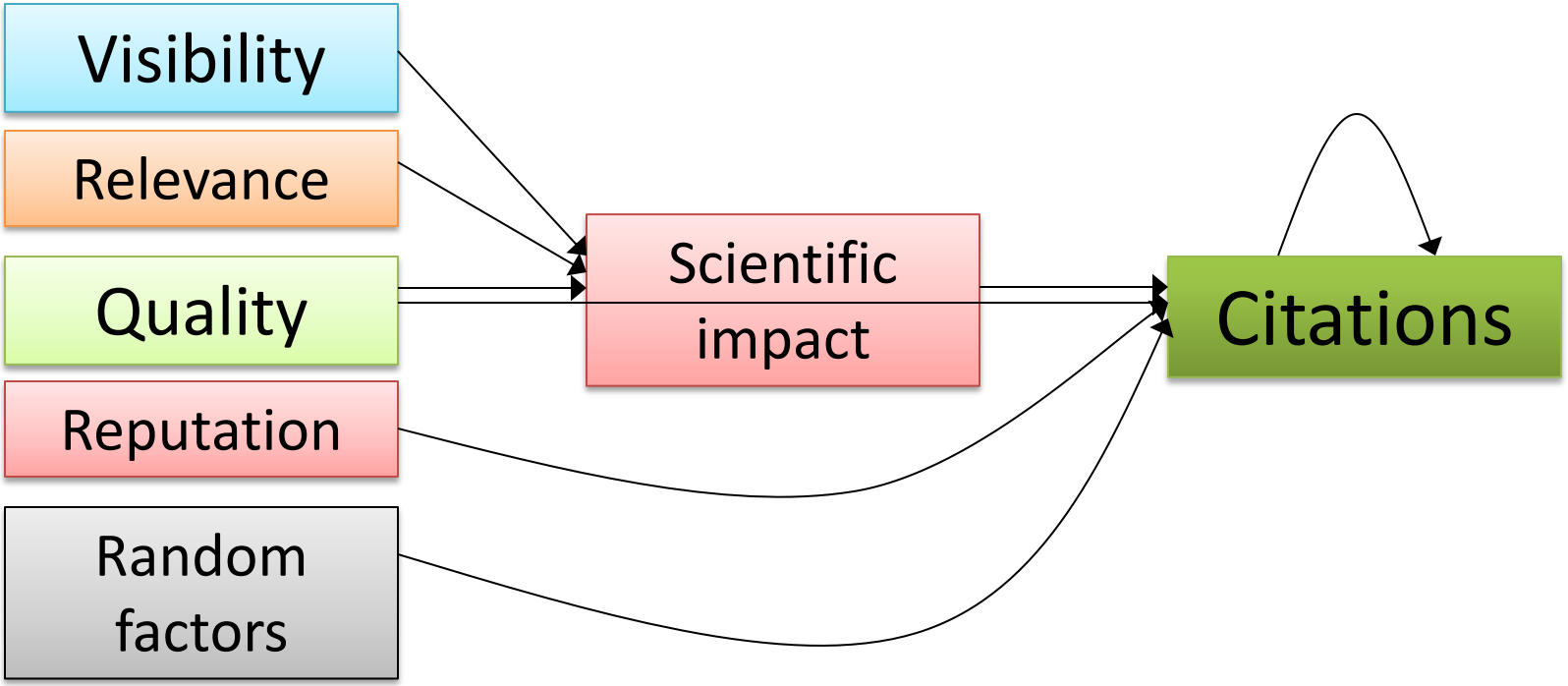
# Citations as a proxy of scientific impact




Source: Martijn S. Visser, (2012) Measuring UNL Research: The use and interpretation of bibliometric indicators, Lisbon, 29 June 2012

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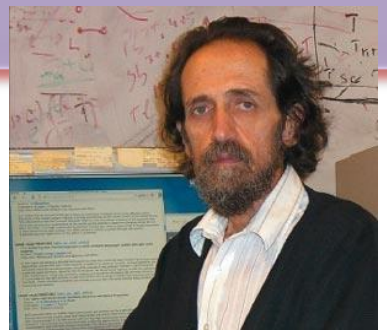
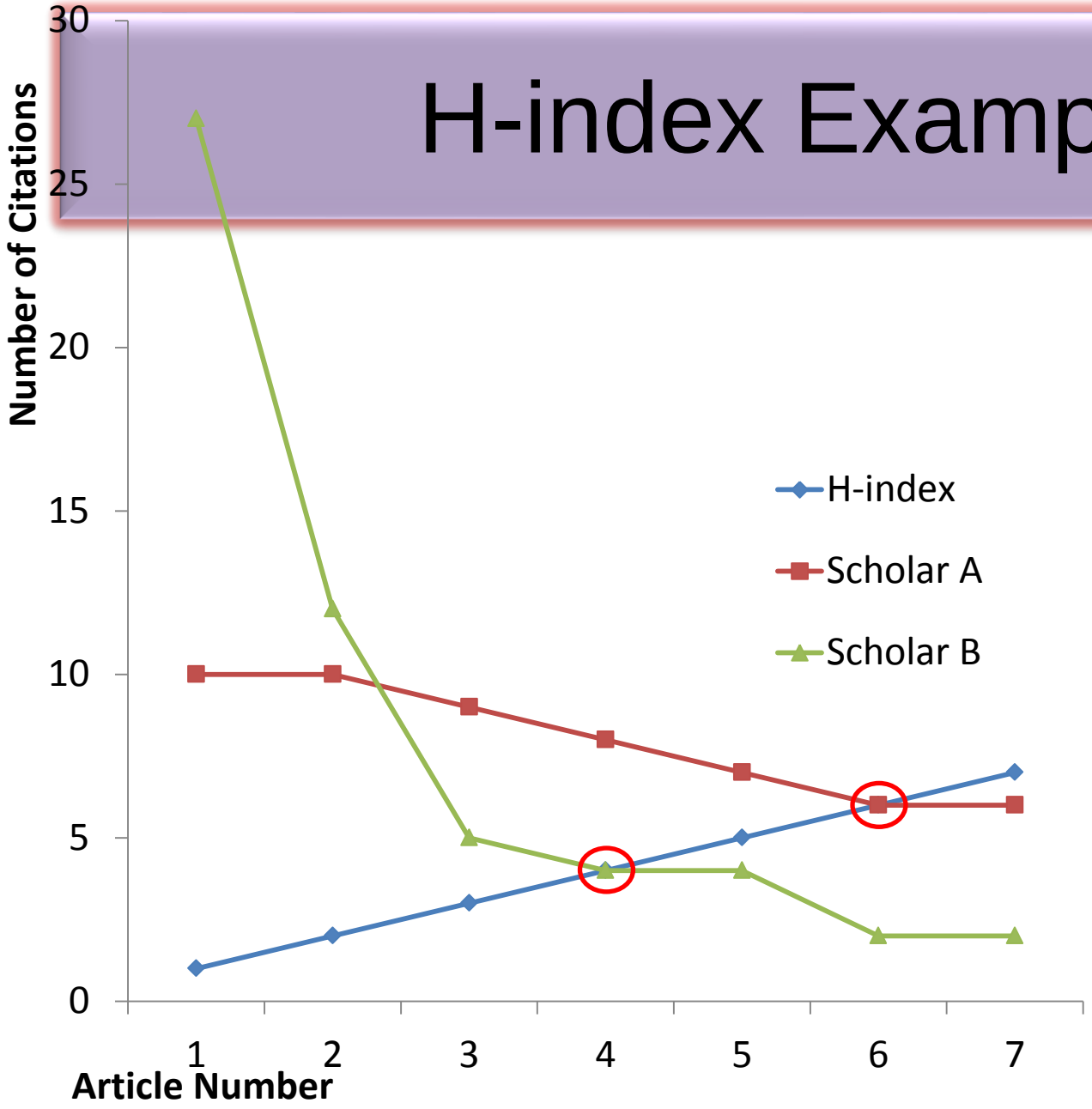
# H and g-index

# H-index Example



Jorge E. Hirsch




| Scholar A | Scholar B |
|---|---|
| 10 | 27 |
| 10 | 12 |
| 9 | 5 |
| 8 | 4 |
| 7 | 4 |
| 6 | 2 |
| 6 | 2 |
| 56 citations | 56 citations |
| 6 h-index | 4 h-index |

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Source: http://www.slideshare.net/librarian68/overview-of-citation-metrics

**A scientist has index h if h of his/her Np papers have at least h citations each, and the other (Np-h) papers have no more than h citations each.**

As an example, a researcher with an H-index of 15 has (of their total number of publications) 15 papers which have been cited at least 15 times each.

| Researcher A | | | Researcher B | |
|---|---|---|---|---|
| Paper rank | Citations | | Paper rank | Citations |
| 1 | 10 | | 1 | 1348 |
| 2 | 8 | | 2 | 159 |
| 3 | 6 | | 3 | 50 |
| 4 | 5 | | 4 | 4 |
| 5 | 4 | | 5 | 4 |
| 6 | 0 | | 6 | 3 |

**Neither researcher can have an H-index of more than 6.**

Source: http://guides.is.uwa.edu.au/content.php?pid=372347&sid=3050052

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# *h*-index importance

“Hirsch, who has a *h*-index of 49, says that a "**successful scientist**" will have an index of 20 after 20 years; an "**outstanding scientist**" will have an index of 40 after 20 years; and a "**truly unique individual**" will have an index of 60 after 20 years.”

Source: Ball, P. (2005). Index aims for fair ranking of scientists. *Nature 436*(7053), 900-900.

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Table 2: Publication and citation list of scientist S1

| Rank (squared) - Publications | Citations | Sum |
|---|---|---|
| 1 (1) A | 20 | 20 |
| 2 (4) B | 10 | 30 |
| 3 (9) C | 9 | 39 |
| 4 (16) D | 8 | 47 |
| 5 (25) E | 6 | 53 |
| 6 (36) F | 6 | 59 |
| 7 (49) G | 6 | 65 |
| 8 (64) H | 5 | 70 |
| 9 (81) I | 5 | 75 |

Source: Rousseau, Ronald. "New developments related to the Hirsch index." (2006).

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# Normalized citation metrics put citation information in context

Citation rates vary among fields. What is good or average in mathematics is very different from what is good or average in biochemistry.

**23.3 cites/paper**
**H-index: 13**

**14.5 cites/paper**
**H-index: 7**

**9.8 cites/paper**
**H-index: 7**

**4.2 cites/paper**
**H-index: 3**

**How "good" is this? What is the context?**

**Additional metrics are needed to understand research performance.**

Source: Ann Kushmerick (May 3, 2013), Bibliometric Analysis Tools for Research Portfolio Analysis and Management, Manager, Research Evaluation and Bibliometric Data

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# All three publication lists have a Hirsch Index of 5

| | Author 1 | | Author 2 | | Author 3 | |
|---|---|---|---|---|---|---|
| 1 | 30 | P1 | 30 | P1 | 100 | P1 |
| 2 | 10 | P2 | 10 | P2 | 70 | P2 |
| 3 | 8 | P3 | 8 | P3 | 8 | P3 |
| 4 | 6 | P4 | 6 | P4 | 6 | P4 |
| 5 | 5 | P5 | 5 | P5 | 5 | P5 |
| 6 | 1 | P6 | 4 | P6 | 1 | P6 |
| 7 | 0 | P7 | 4 | P7 | 0 | P7 |
| 8 | | | 4 | P8 | | |
| 9 | | | 4 | P9 | | |
| | H=? | 5 | H=? | 5 | H=? | 5 |

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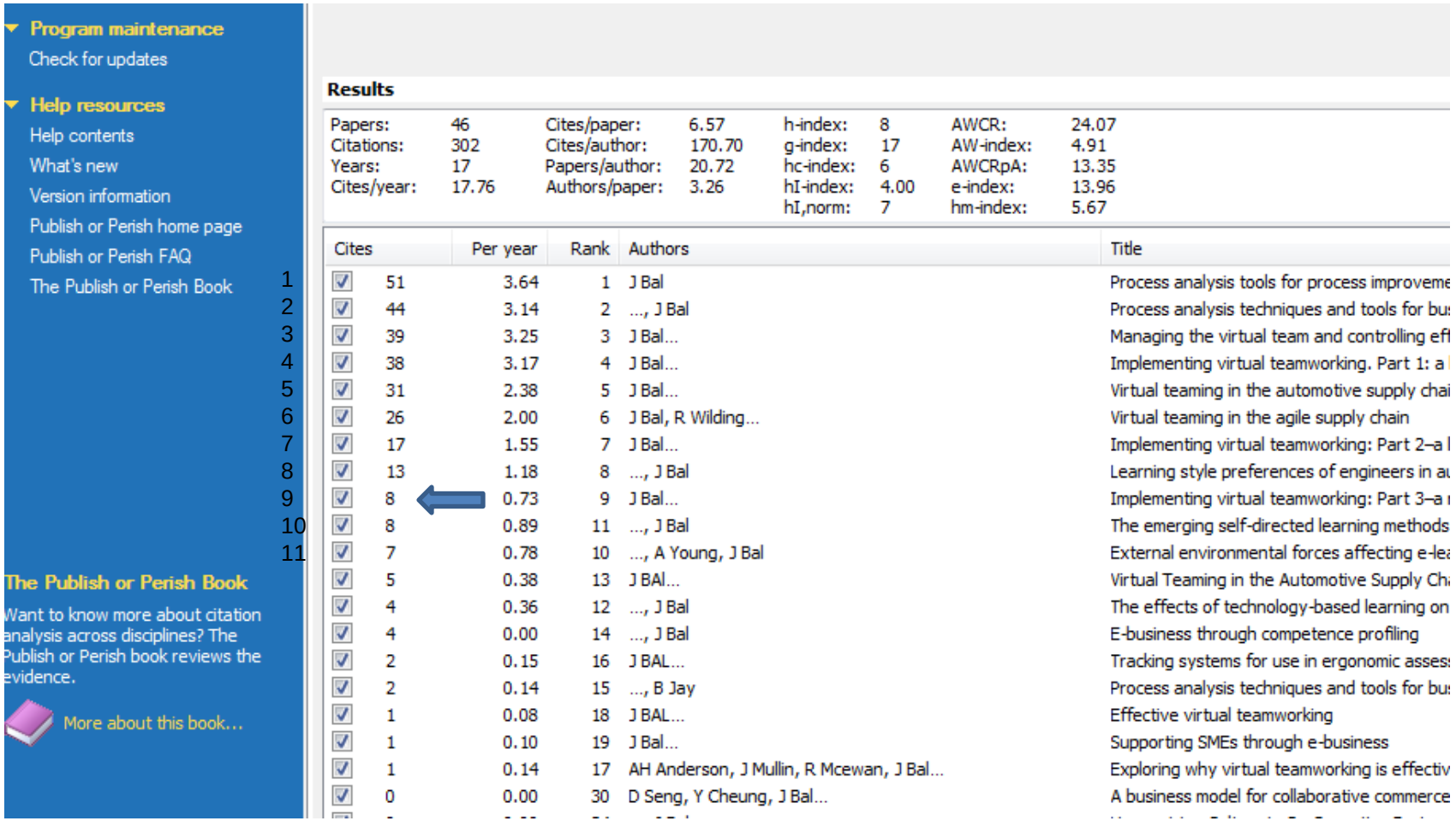
Source: Henk F. Moed, (2011) "New developments in electronic publishing and bibliometrics", CWTS, Leiden University, Netherlands & Elsevier, Amsterdam, Netherlands

# Different bibliometric distributions have the same H-Index

Source: Henk F. Moed, (2011) "New developments in electronic publishing and bibliometrics", CWTS, Leiden University, Netherlands & Elsevier, Amsterdam, Netherlands

# Targeted advertising

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# Predicting scientific success

## H-index prediction

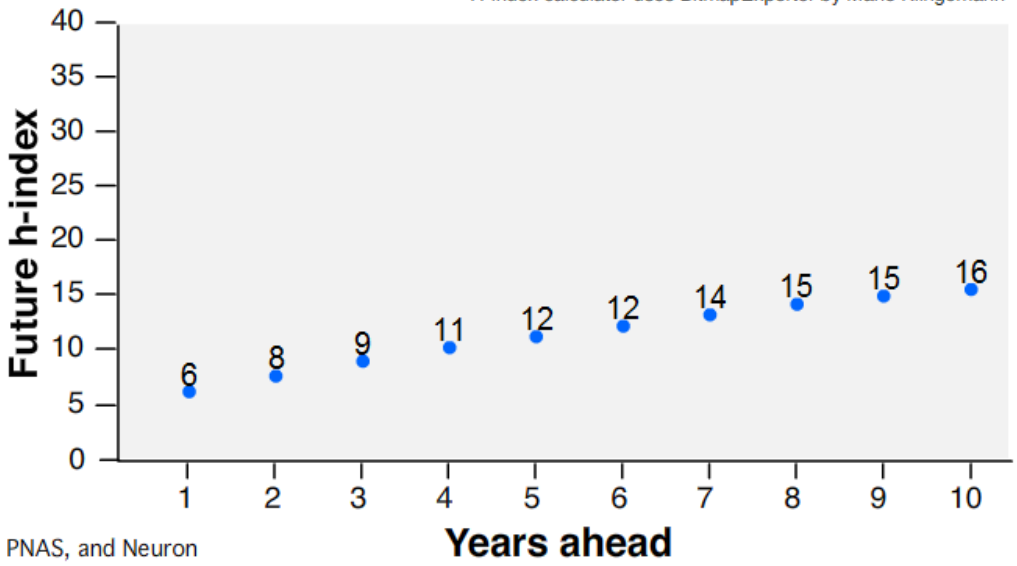
Read details in Acuna, Allesina, Kording, Nature, 489, 201-202 (2012)

Save to file

H-index calculator uses BitmapExporter by Mario Klingemann

| | |
|---|---|
| H-index | 5 |
| # articles | 12 |
| Years since first article | 8 |
| # distinct journals | 5 |
| # articles in 'top' journals* | 1 |

Reset features




* Nature, Science, Nature Neuroscience, PNAS, and Neuron

*# distinct journals*: number of different journals where you have published in.

**Note:** The equations and the calculator model people that are in Neurotree, have an h-index 5 or more, and are between 5 to 12 years after publishing first article.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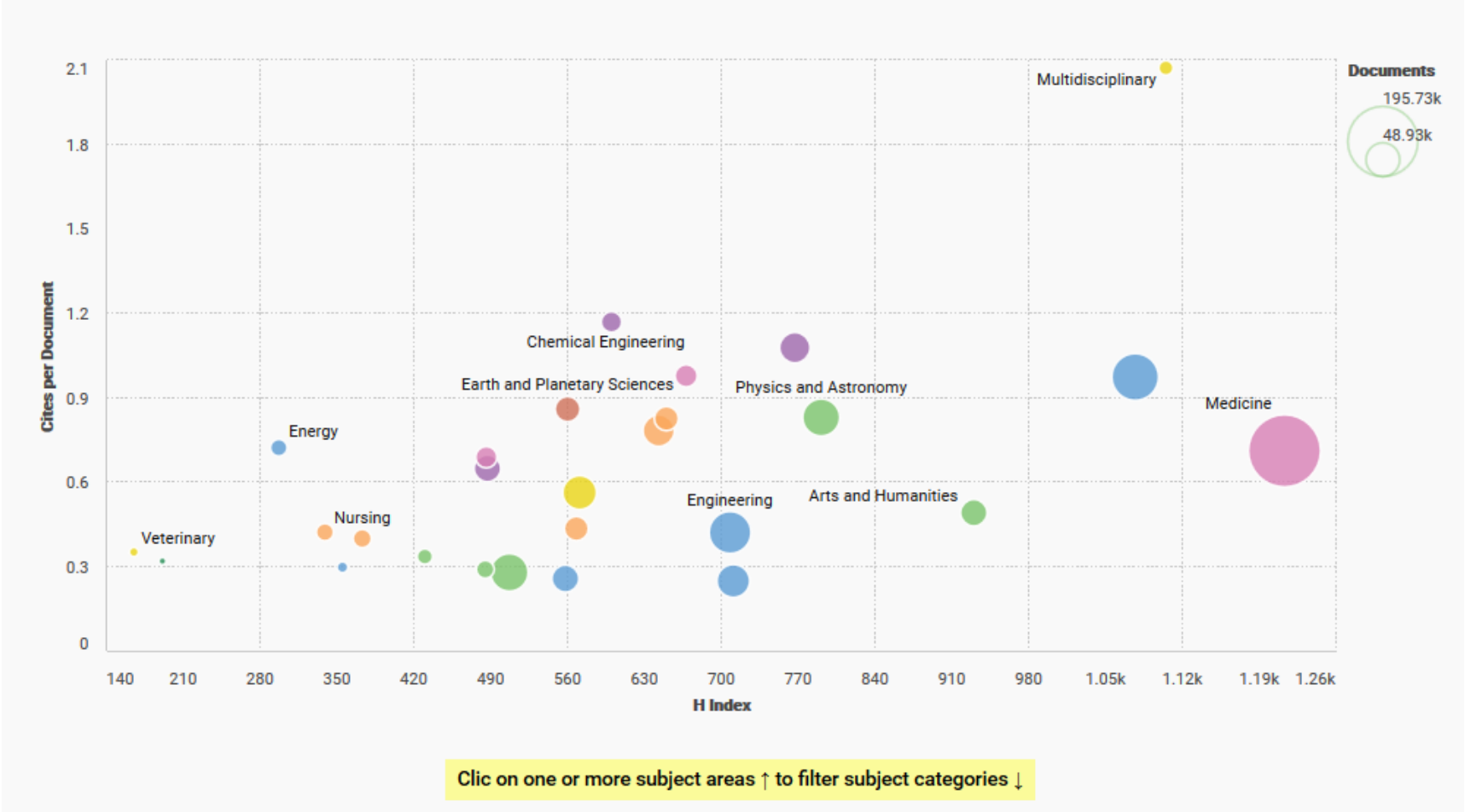
# Subject Bubble Chart - US

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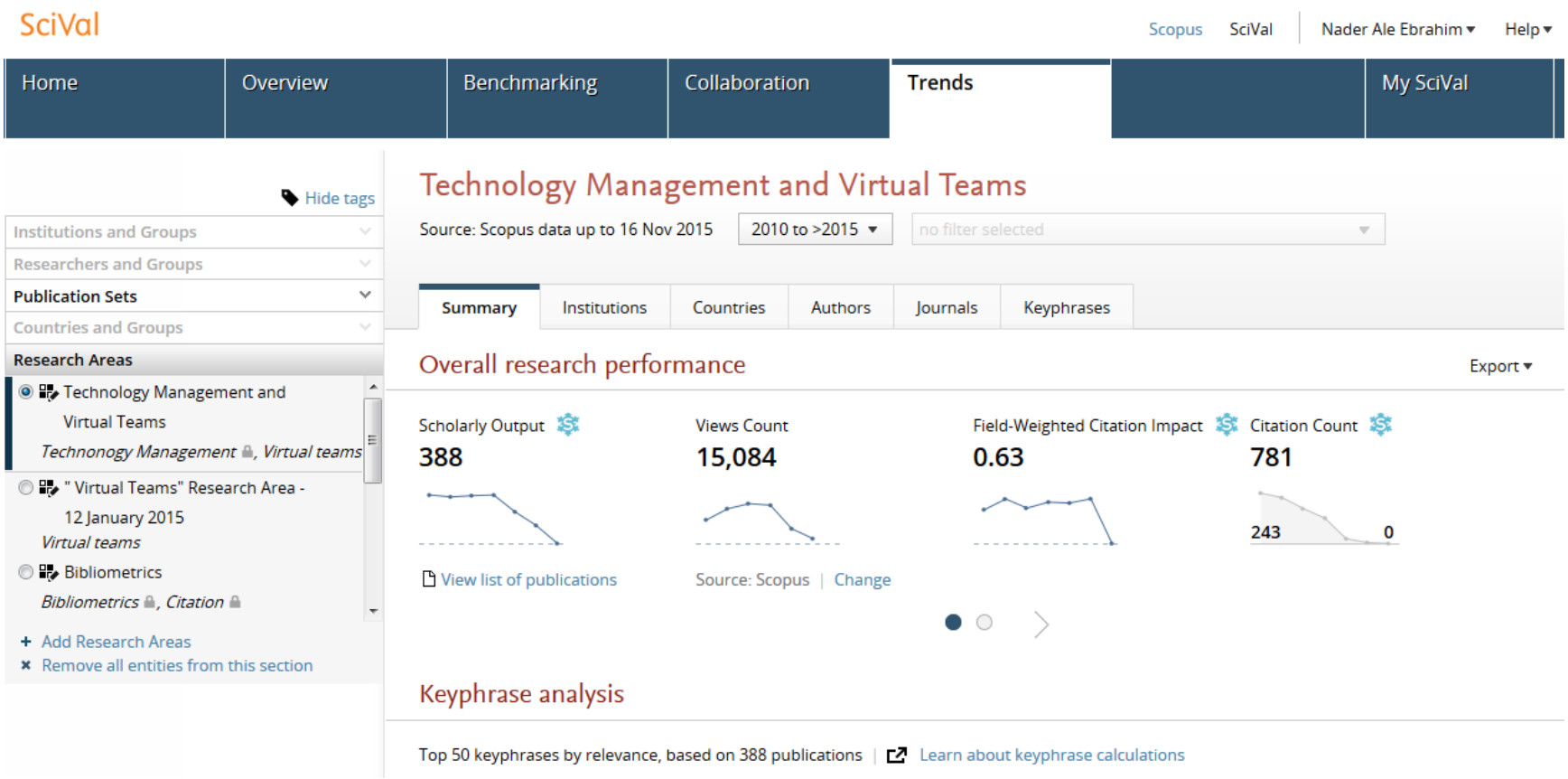
# Technology Management and Virtual Teams

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# Virtual Teams

Top 50 keyphrases by relevance, based on 3,178 publications | Learn about keyphrase calculations

→ Analyze in more detail

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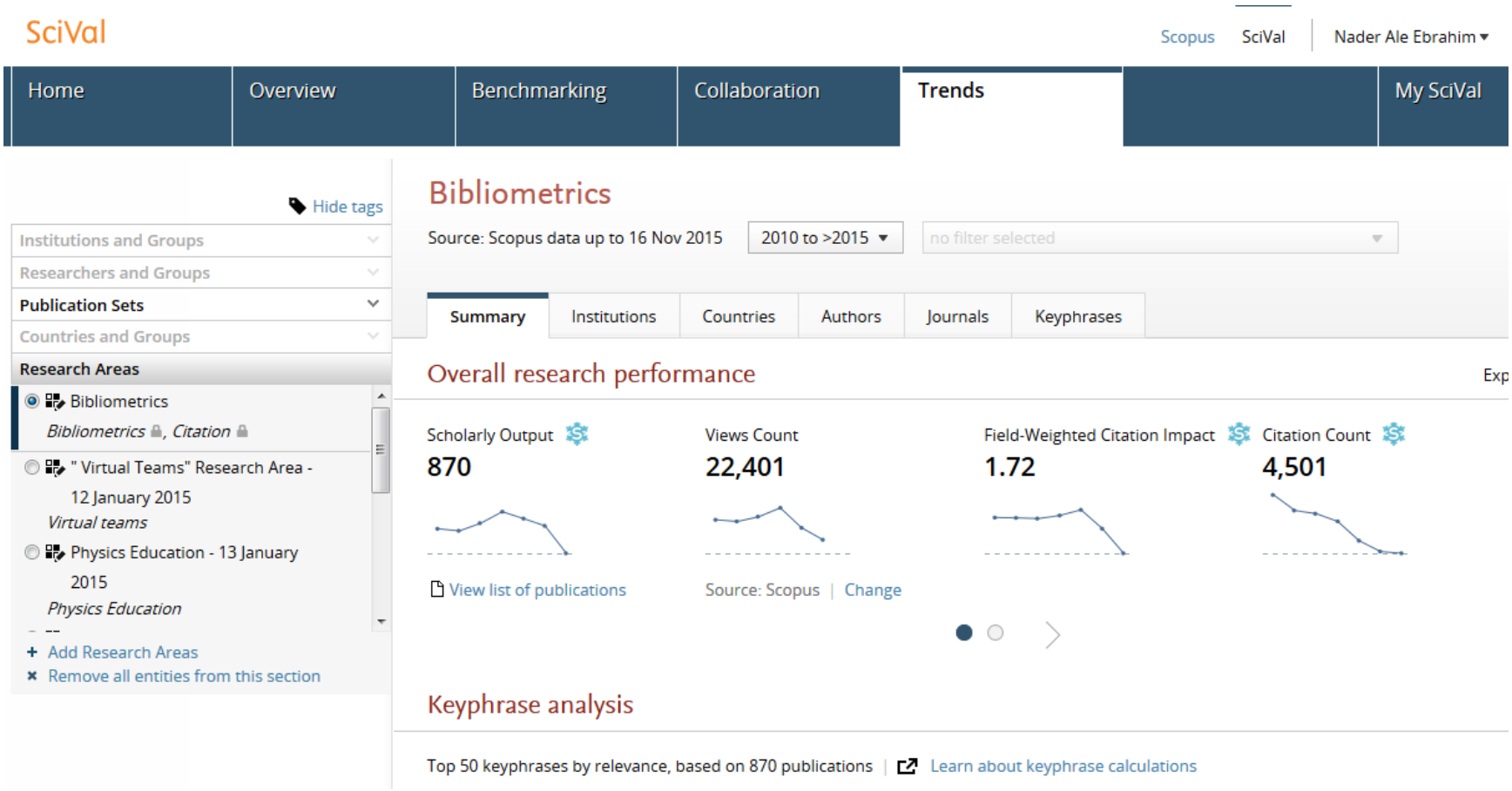
# Bibliometrics

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# SCOPUS - Analyze author output

Combined data for multiple authors

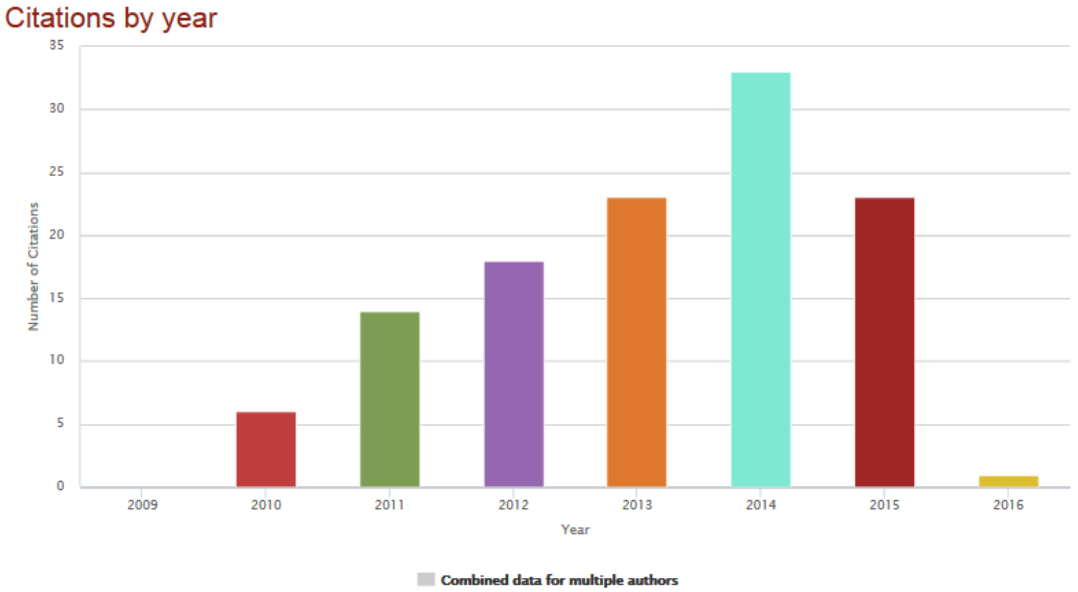
Ebrahim, Nader Ale; Ale Ebrahim, Nader

Back to citation overview

Documents (18) | *h*-index (6) | **Citations (118)** | Co-authors (33)

Analyze documents published between: 2009 to 2015 Update Graph

| Year | Citations |
|---|---|
| 2016 | 1 |
| 2015 | 23 |
| 2014 | 33 |
| 2013 | 23 |
| 2012 | 18 |
| 2011 | 14 |
| 2010 | 6 |
| 2009 | 0 |

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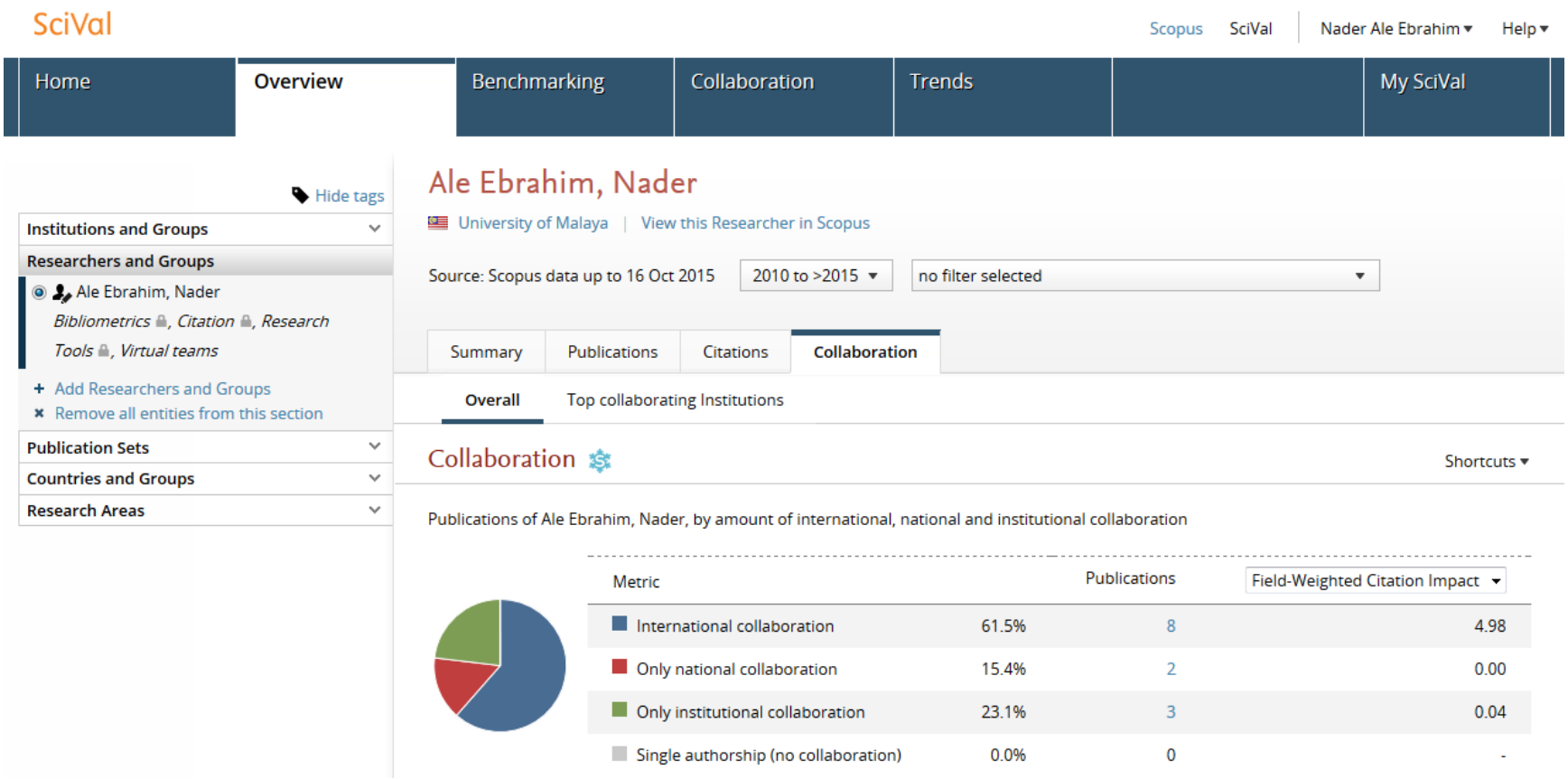
# SciVal - Elsevier Research Intelligence

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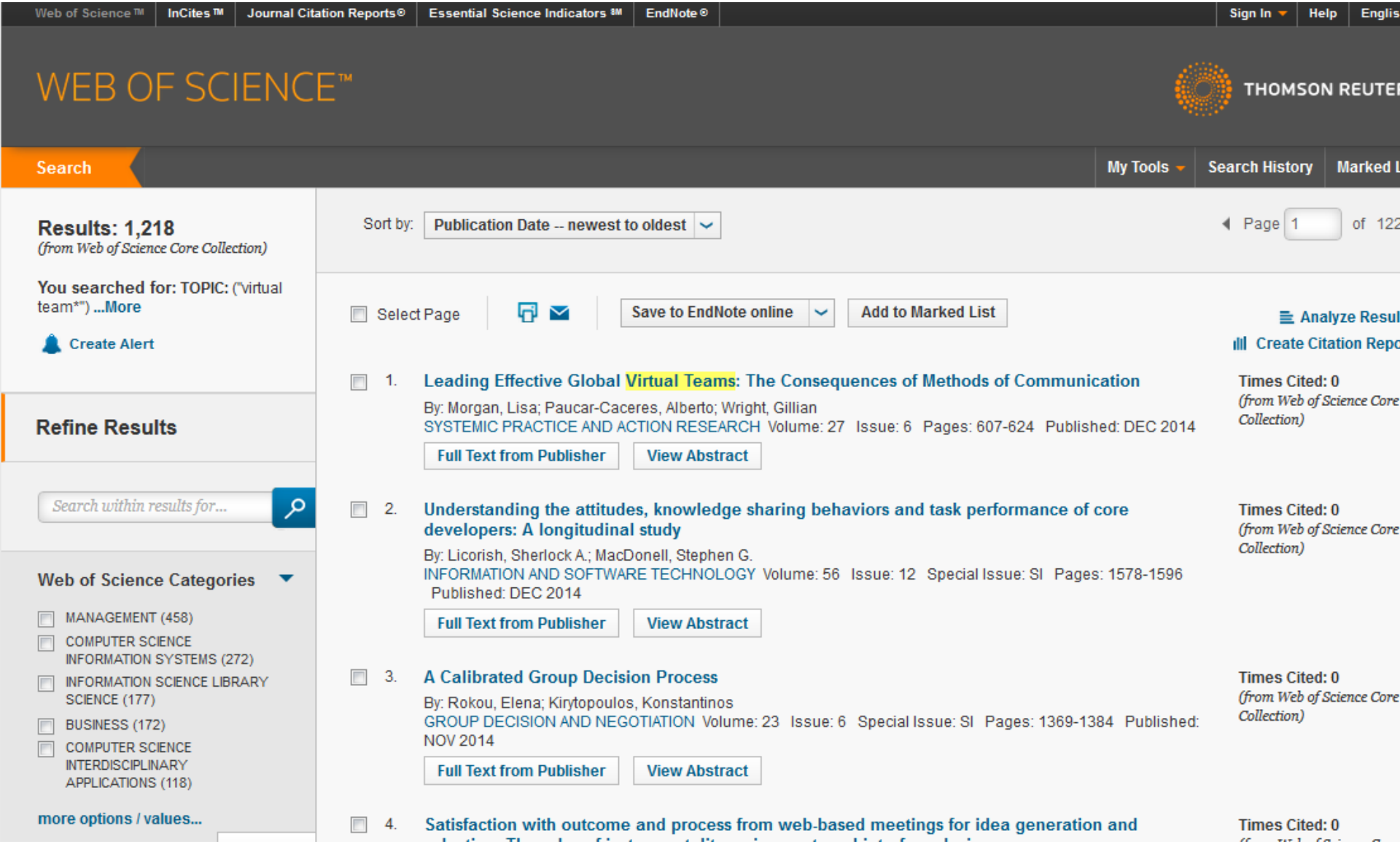


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## Citation Report: 1218

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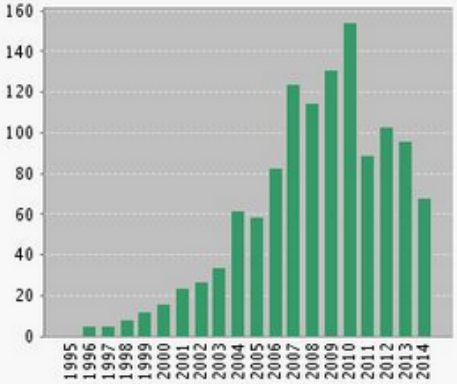
### Published Items in Each Year

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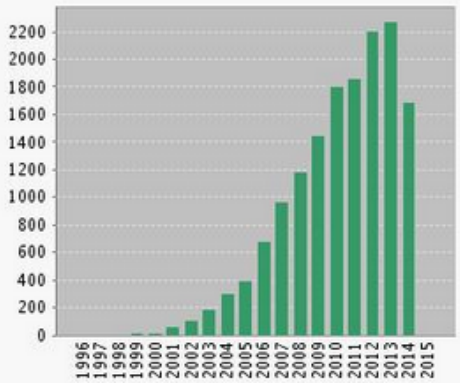
View a graph with all years.

### Citations in Each Year




The latest 20 years are displayed.
View a graph with all years.

| | |
|---|---|
| Results found: | 1218 |
| Sum of the Times Cited [?]: | 15217 |
| Sum of Times Cited without self-citations [?]: | 10399 |
| Citing Articles [?]: | 8040 |
| Citing Articles without self-citations [?]: | 7210 |
| Average Citations per Item [?]: | 12.49 |
| h-index [?]: | 58 |

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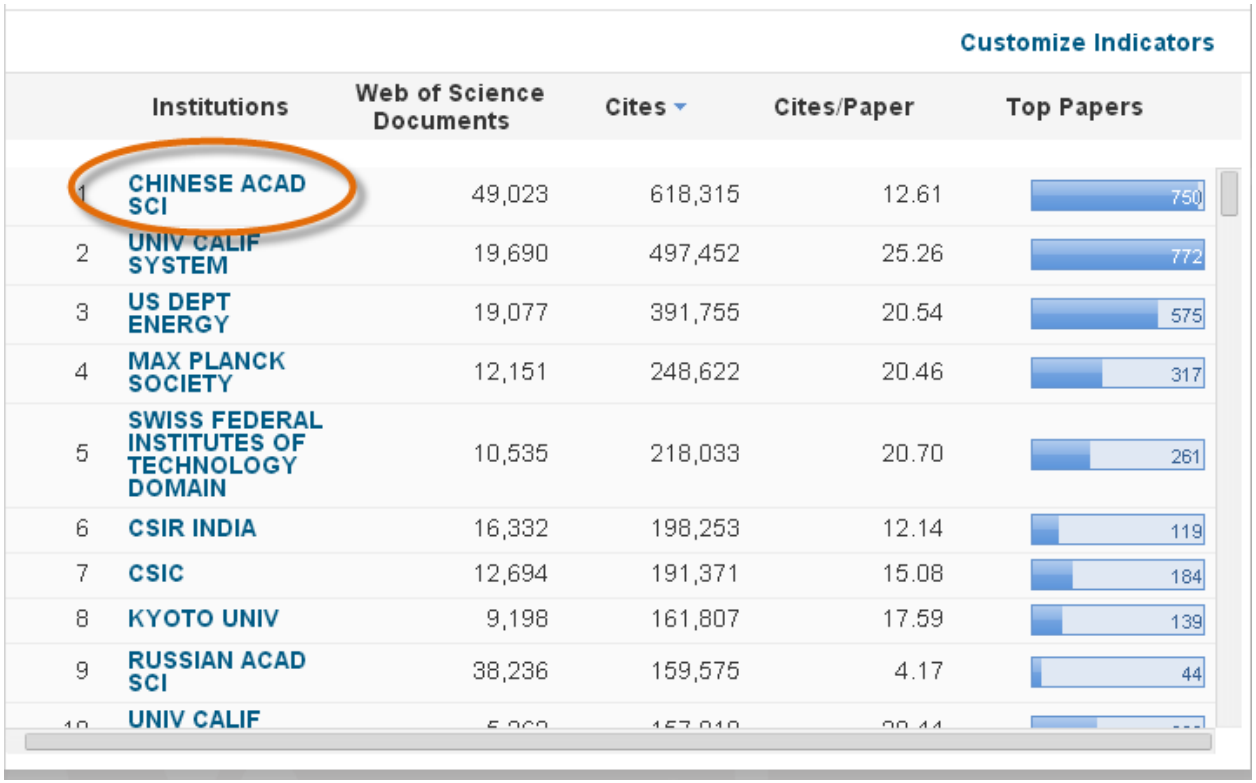
# DATA DRILL DOWN: CITATION TRENDS

Users can view citation trends for any entity in the rankings list. For example, if the user clicks on the name CHINESE ACAD SCI:



Customize Indicators

| | Institutions | Web of Science Documents | Cites | Cites/Paper | Top Papers |
|---|---|---|---|---|---|
| 1 | CHINESE ACAD SCI | 49,023 | 618,315 | 12.61 | 750 |
| 2 | UNIV CALIF SYSTEM | 19,690 | 497,452 | 25.26 | 772 |
| 3 | US DEPT ENERGY | 19,077 | 391,755 | 20.54 | 575 |
| 4 | MAX PLANCK SOCIETY | 12,151 | 248,622 | 20.46 | 317 |
| 5 | SWISS FEDERAL INSTITUTES OF TECHNOLOGY DOMAIN | 10,535 | 218,033 | 20.70 | 261 |
| 6 | CSIR INDIA | 16,332 | 198,253 | 12.14 | 119 |
| 7 | CSIC | 12,694 | 191,371 | 15.08 | 184 |
| 8 | KYOTO UNIV | 9,198 | 161,807 | 17.59 | 139 |
| 9 | RUSSIAN ACAD SCI | 38,236 | 159,575 | 4.17 | 44 |
| 10 | UNIV CALIF | | | | |

Source: MASSIMILIANO CARLONI (2014) THE NEW JCR, Journal Citation Reports on INCITES, Strategic Business Manager, Thomson Reuters

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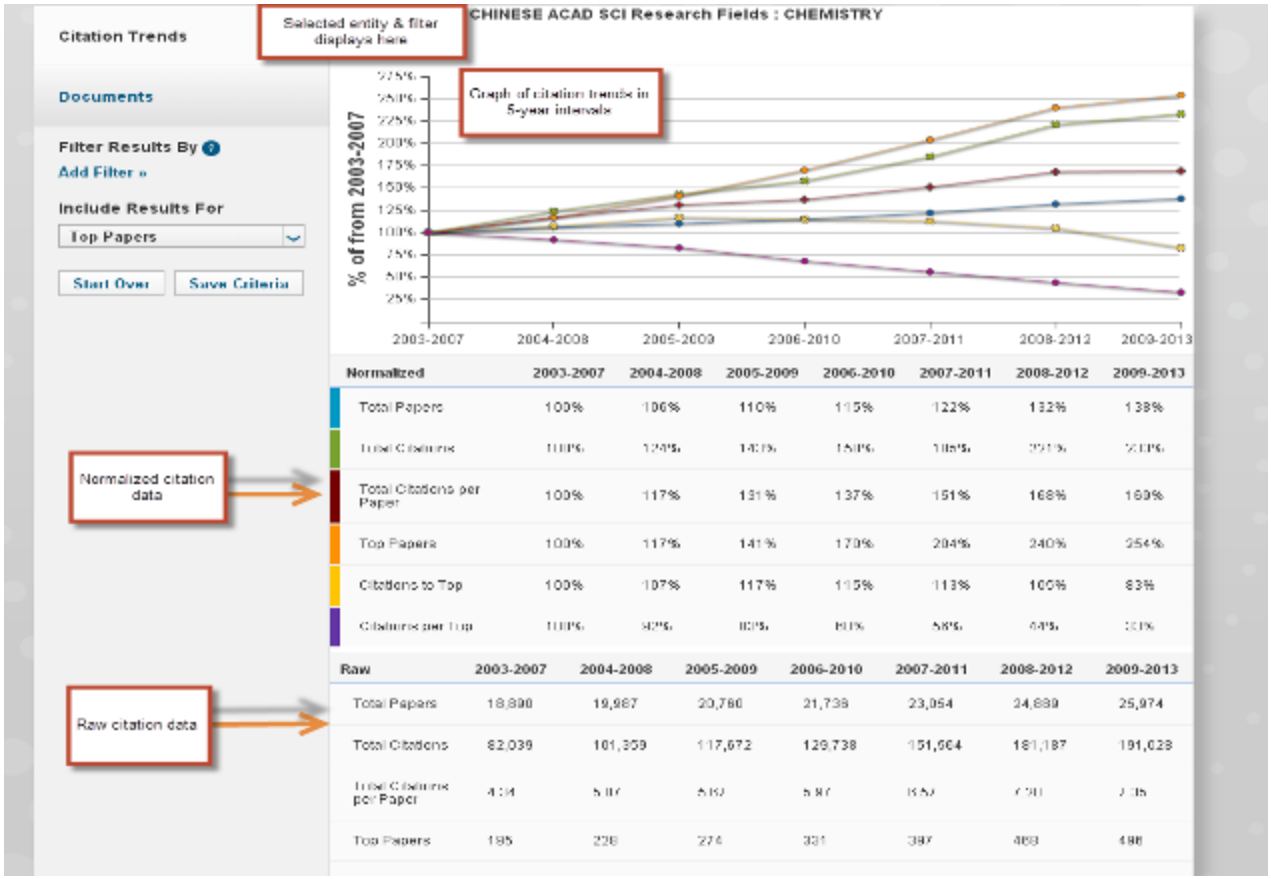
# DATA DRILL DOWN: CITATION TRENDS

They will be taken to the Citation Trends Page for the Chinese Academy of Sciences, which shows a trend graph, normalized citation data, and raw citation data:

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Source: MASSIMILIANO CARLONI (2014) THE NEW JCR, Journal Citation Reports on INCITES, Strategic Business Manager, Thomson Reuters

# Practical Advice

- Find out what's Hot
  - http://info.scopus.com/topcited/
  - http://top25.sciencedirect.com/
- Find the trends of the subject area
  - Search tips (including alerts)
  - Journals, authors, publications per year (Scopus)
- Evaluate which journal is right for your article
  - Impact Factor
  - Subject Specific Impact Factor (http://tinyurl.com/scopusimpact)
  - SCImago Journal & Country Ranking (http://scimagojr.com/)
  - Journal Analyzer
  - *h*-Index
- Find out more about the journals
  - Who are the editors?
  - Guide for authors
  - Article of the future

  http://beta.cell.com/erickson/

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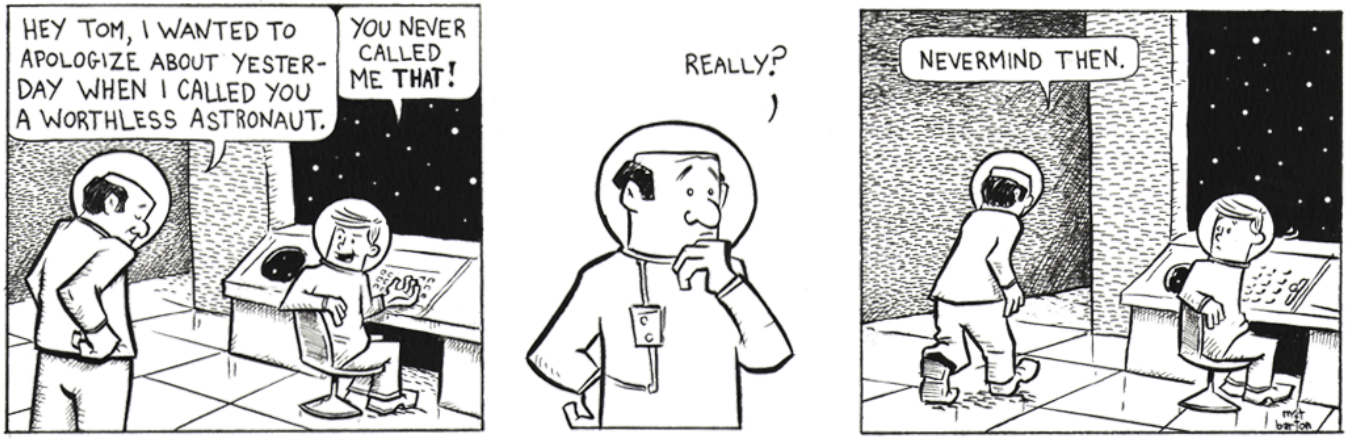
Source: How To Get Your Article Published: *From title to references, From submission to revision* Presented by: Anthony Newman, Elsevier, Amsterdam, *Birmingham, Nov. 2010*

# Your paper is worthless if no one reads, uses, or cites it




A research study is meaningful only if…

- it is clearly described, so
- someone else can use it in his/her studies
- it arouses other scientists' interest and
- allows others to reproduce the results.

By submitting a manuscript you are basically trying to sell your work to your community…

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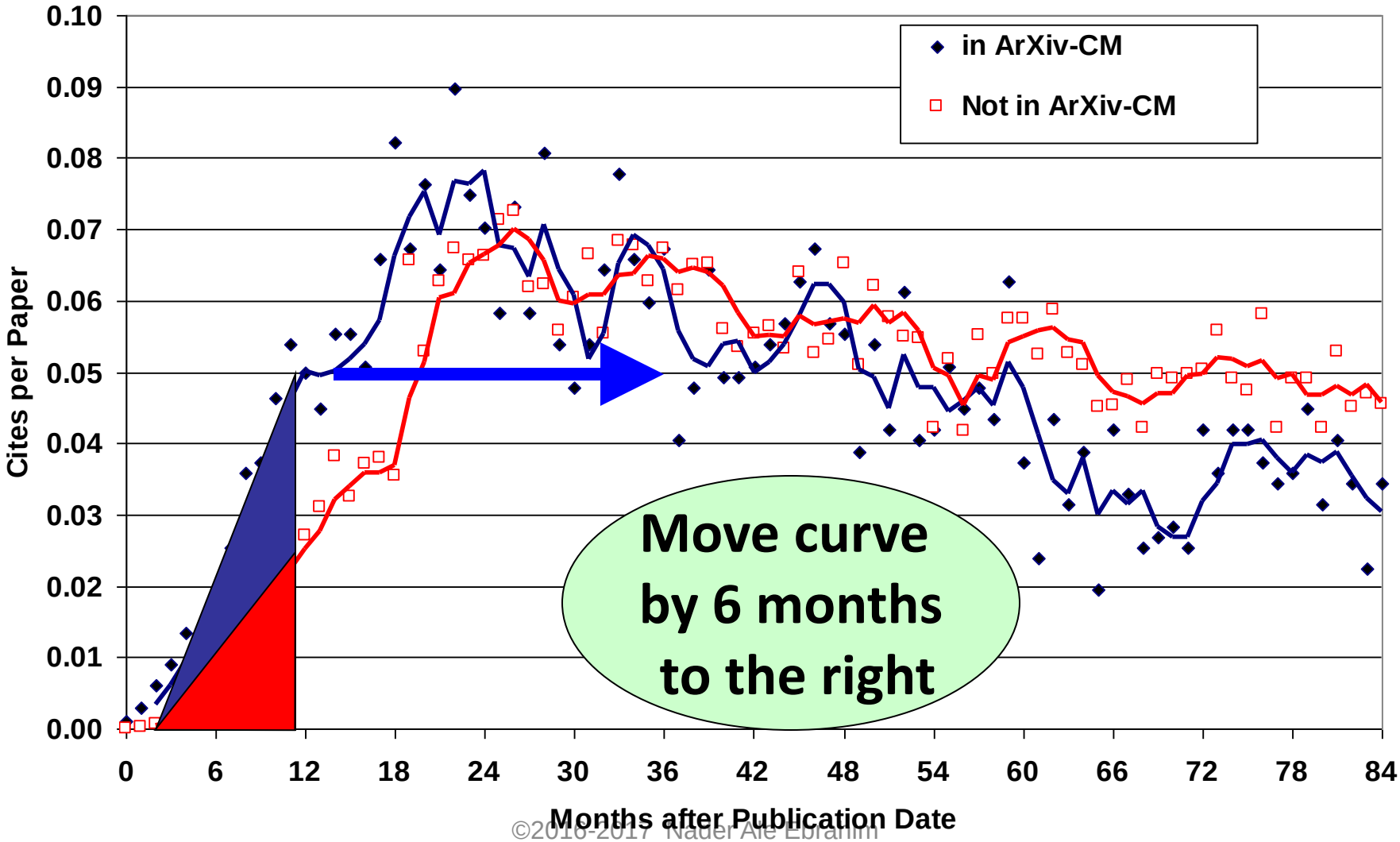
Source: How To Get Your Article Published: *From title to references, From submission to revision* Presented by: Anthony Newman, Elsevier, Amsterdam, *Birmingham, Nov. 2010*

**Positive correlation between downloads and citations partly due to the effect of citations upon downloads**

Source: Henk F. Moed, (2011) "New developments in electronic publishing and bibliometrics", CWTS, Leiden University, Netherlands & Elsevier, Amsterdam, Netherlands

# Age distribution of citations to Arxiv and non-ArXiv papers

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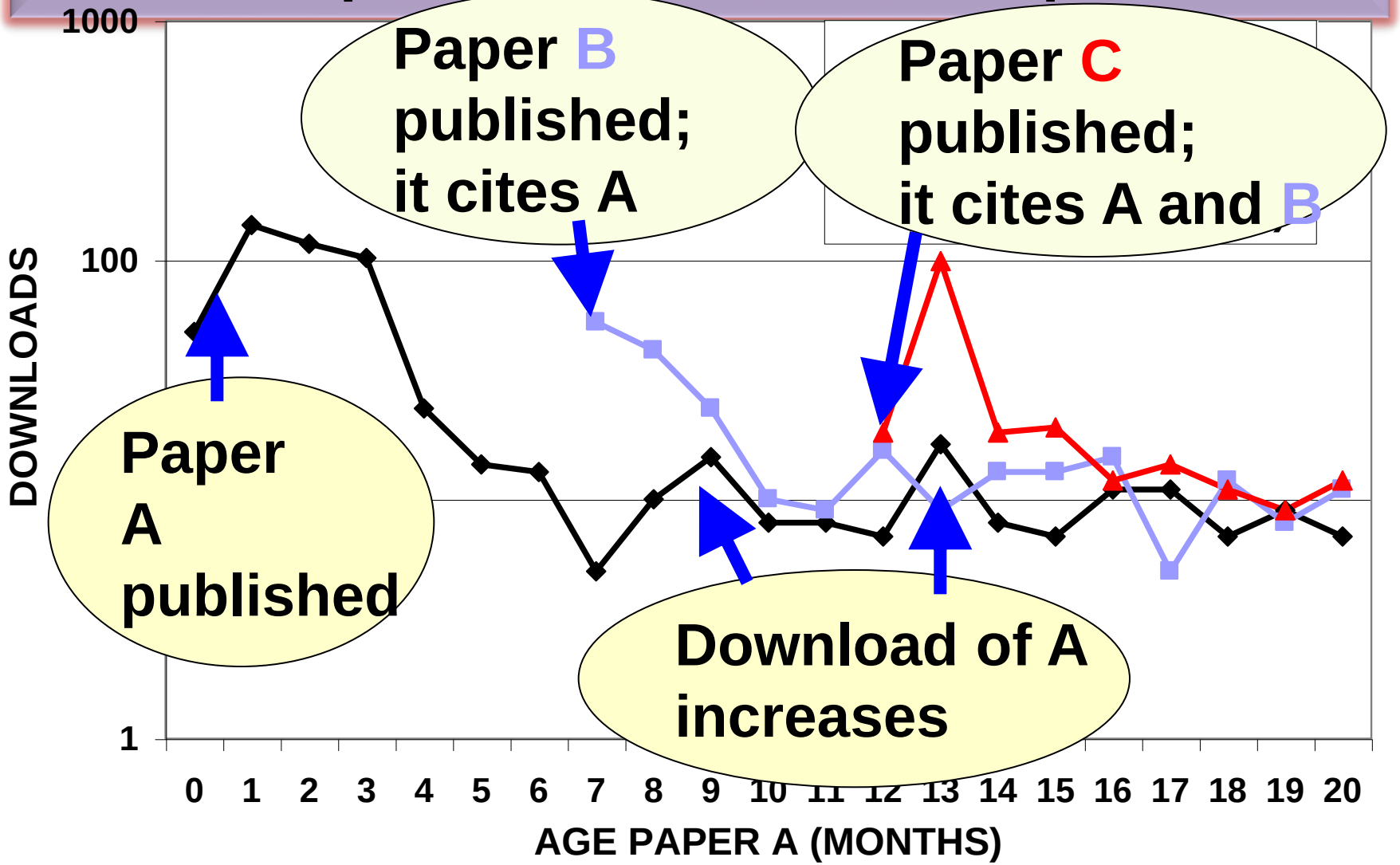
Source: Henk F. Moed, (2011) "New developments in electronic publishing and bibliometrics", CWTS, Leiden University, Netherlands & Elsevier, Amsterdam, Netherlands

# Citations lead to downloads

[Moed, J. Am Soc Inf Sci Techn, 2005]

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Source: Henk F. Moed, (2011) "New developments in electronic publishing and bibliometrics", CWTS, Leiden University, Netherlands & Elsevier, Amsterdam, Netherlands

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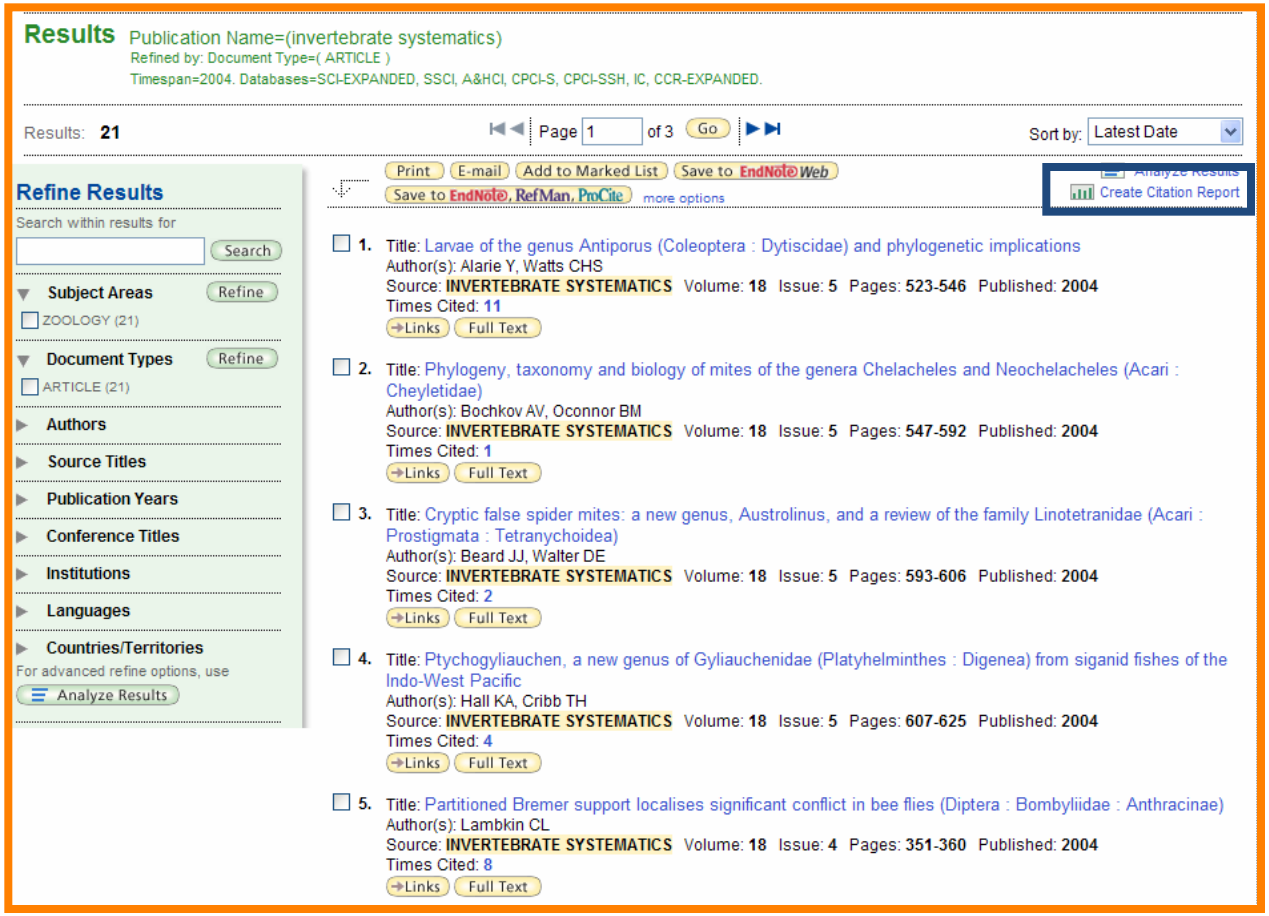


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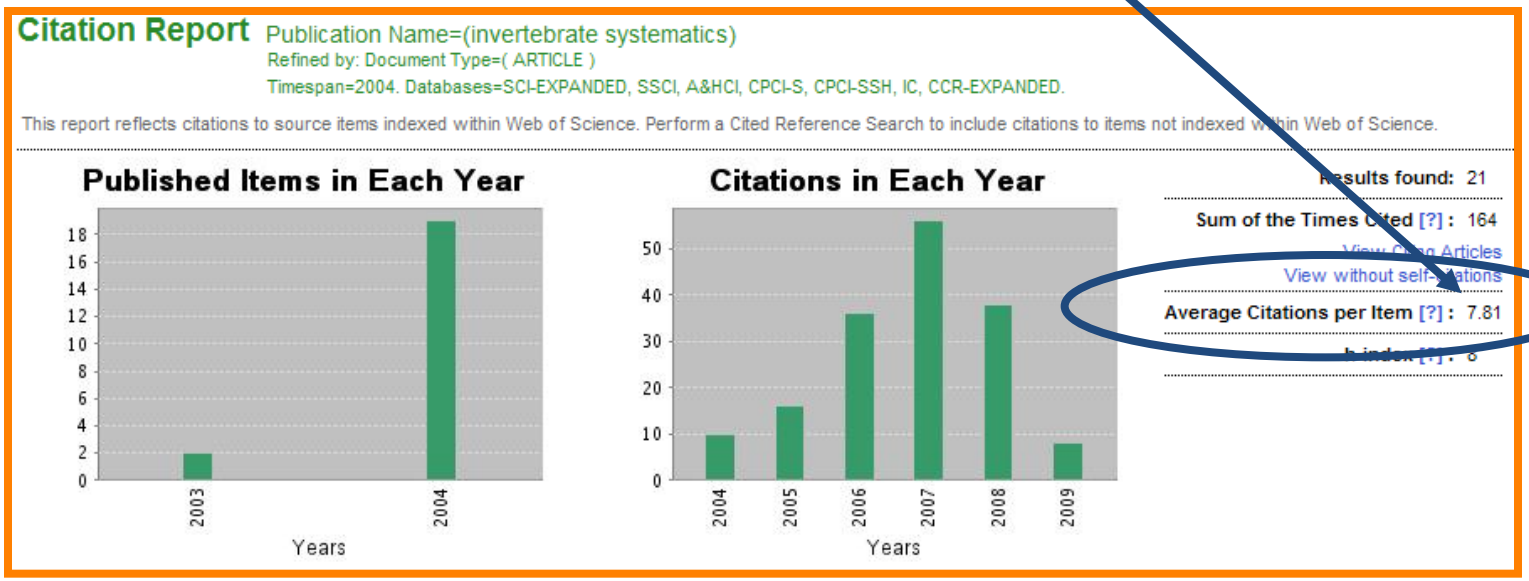
# RELATIVE IMPACT AGAINST JOURNAL AVERAGE

Citation report shows an average of 7.81 citations per paper for that journal, year and document type

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# RELATIVE IMPACT AGAINST JOURNAL AVERAGE

So our paper was cited 22/7.81 = **2.82** times the average

We call this journal actual versus expected cites

A phylogenetic analysis of dung beetles (Scarabaeinae : Scarabaeidae): unrolling an evolutionary history

Full Text | Links | Holdings | Go | Print | E-mail | Add to Marked List | Save to EndNote Web | Save to EndNote, RefMan, ProCite | more options

**Author(s):** Philips TK, Pretorius E, Scholtz CH

**Source:** INVERTEBRATE SYSTEMATICS **Volume:** 18 **Issue:** 1 **Pages:** 53-88 **Published:** 2004

**Times Cited:** 22 **References:** 73 Citation Map

**Abstract:** The phylogeny of the Scarabaeinae, the largest and most important group of dung feeding beetles, is hypothesised based on 200 morphological characters of 50 taxa, representing nearly one quarter of the known genera. We present a drastically different picture of evolution of this highly successful group of beetles than those previously proposed. It is apparent that gross morphology is correlated with either rolling or tunnelling but does not accurately reflect evolutionary history. Results indicate that there are not two separate clades of dung beetles, the rollers and tunnellers, but that rolling behaviour has evolved several times from ancestral tunnellers. The Dichotomiini, Canthonini, and Coprini are poly- or paraphyletic, whereas each of the remaining nine tribes appear as well supported monophyletic clades (the monophyly of the Gymnopleurini was not tested). The genera traditionally included in the Dichotomiini are the oldest and most basal lineages and all other clades, including those of the Canthonini, evolved from ancestral dichotomiine lineages either directly or indirectly. New interpretations of the evolution of rolling, its possible loss, nesting and feeding behaviours, and future changes in classification are discussed. Evidence supports the origin of the Scarabaeinae before the Tertiary and subsequent vicariance of many clades via the breakup of Gondwanaland.

**Document Type:** Article

**Language:** English

**KeyWords Plus:** COLEOPTERA-SCARABAEIDAE; INTEGUMENTARY GLANDS; NESTING-BEHAVIOR; SCARABAEOIDEA; HYPOTHESES; APHODIINAE; CATENATUS; DIVERSITY

**Reprint Address:** Philips, TK (reprint author), Western Kentucky Univ, Dept Biol, Bowling Green, KY 42101 USA

**Addresses:**
1. Western Kentucky Univ, Dept Biol, Bowling Green, KY 42101 USA
2. Univ Pretoria, Fac Med, Dept Anat, ZA-0001 Pretoria, South Africa
3. Univ Pretoria, Dept Zool & Entomol, ZA-0001 Pretoria, South Africa

**E-mail Addresses:** keith.philips@wku.edu

**Publisher:** C S I R O PUBLISHING, 150 OXFORD ST, PO BOX 1139, COLLINGWOOD, VICTORIA 3066, AUSTRALIA

**Subject Category:** Zoology

**IDS Number:** 800AT

**ISSN:** 1445-5226

**DOI:** 10.1071/IS03030

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Price DL Phylogeny and biogeography of the dung beetle genus Phanaeus (Coleoptera: Scarabaeidae) SYSTEMATIC ENTOMOLOGY 34 1 137-150 JAN 2009

Scholtz G Scarab beetles at the interface of wheel invention in nature and culture? CONTRIBUTIONS TO ZOOLOGY 77 3 139-148 2008

Montreuil O Revision of the genus Cambefortantus Paulian, 1986 (Insecta, Coleoptera, Scarabaeidae) ZOOSYSTEMA 30 3 641-650 2008

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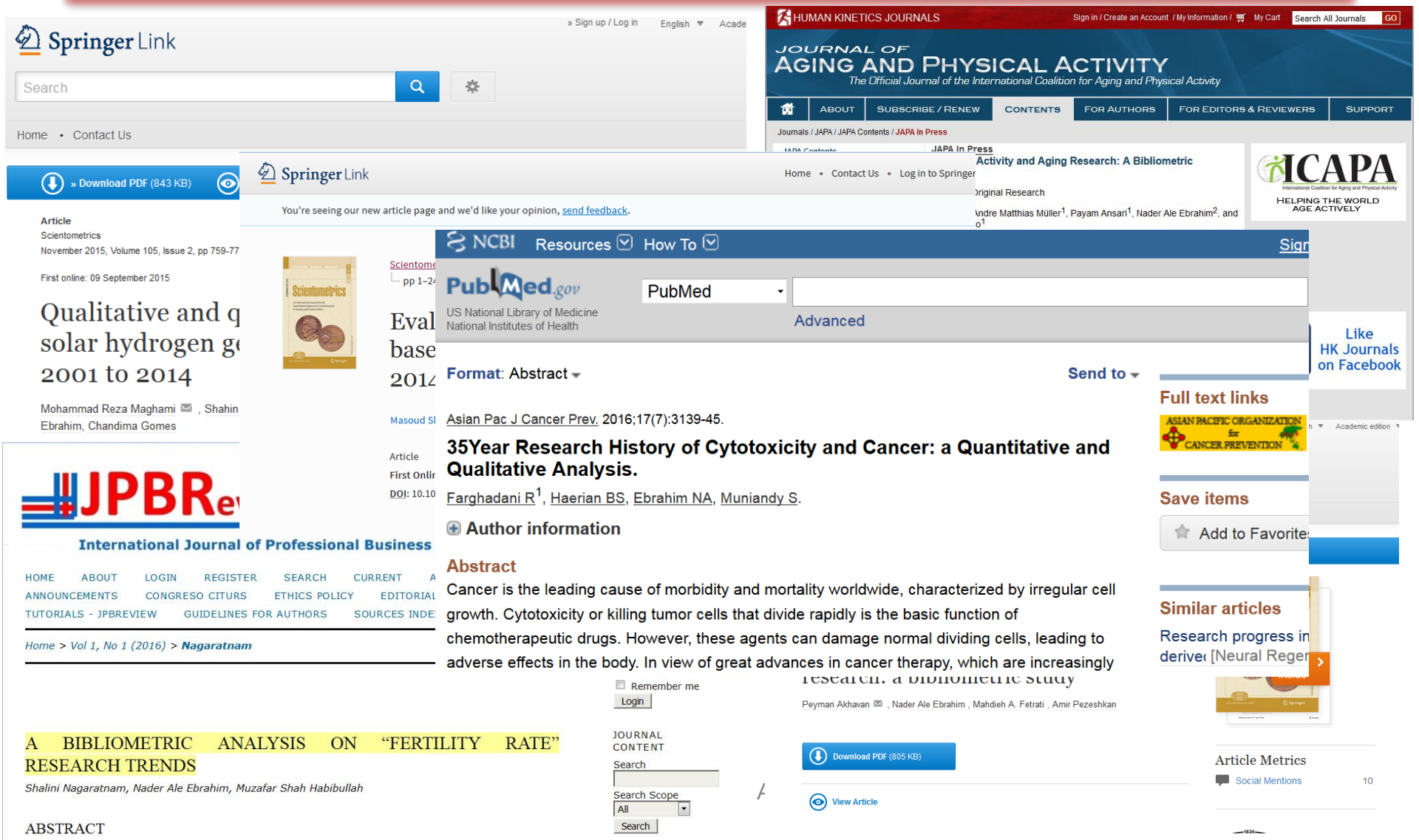

# Questions?

E-mail: aleebrahim@um.edu.my

Twitter: @aleebrahim

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**Nader Ale Ebrahim, PhD**
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Centre for Research Services
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