

Scientometrics and key performance indicators

What is scientometrics

- “quantitative study of science, communication in science, and science policy”
(Hess, 1997)
- Is concerned with the quantitative features and characteristics of science and research
- Is the field of study which concerns measuring and analysing scientific literature
- Scientometrics is a sub-field of bibliometrics
- Focused on the analysis of publications
- The scientific and empirical study of science and its outcomes

Research issues in scientometrics

- measurement of the impact of research papers and academic journals,
- the understanding of scientific citations,
- the use of the measurements in policy and management contexts

Allow

- institutional productivity comparisons
- institutional research rankings,
- journal rankings
- establish faculty productivity and position standards,
- assess the influence of top scholarly articles,
- profiles of top authors and institutions in terms of research performance

Indexes (1): impact factor

- The IF of an academic journal is a measure reflecting the yearly average number of citations to recent articles published in that journal.
- Is frequently used as a proxy for the relative importance of a journal within its field: journals with higher impact factors are often deemed to be more important than those with lower ones.
- was devised by the founder of the Institute for Scientific Information (ISI).

Indexes (2): Science Citation Index

- Introduced in 1979 by Garfield
- The SCI is a citation index originally produced by the Institute for Scientific Information (ISI) owned by Clarivate Analytics (previously the Intellectual Property and Science business of Thomson Reuters)
- Science Citation Index Expanded covers more than 8,500 notable and significant journals, across 150 disciplines, from 1900 to the present; inclusion based on a rigorous selection process

Indexes (3): Acknowledgment index

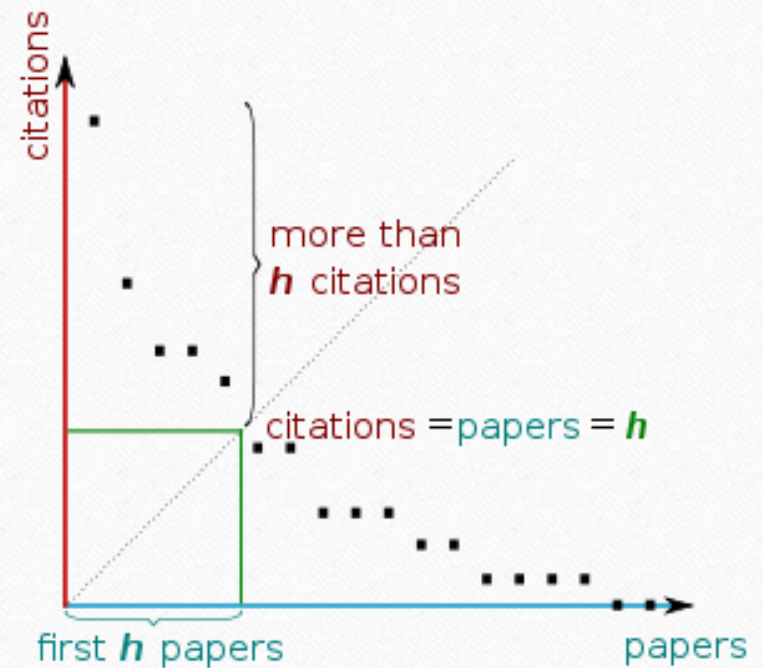
- is a method for indexing and analyzing acknowledgments in the scientific literature
- a scholarly article has a section in which the authors acknowledge entities such as funding, technical staff, colleagues, etc. that have contributed materials or knowledge or have influenced or inspired their work.
- it measures institutional and economic influences as well as informal influences of individual people, ideas, and artifacts
- the total number of acknowledgements to an acknowledged entity can be measured and so can the number of citations to the papers in which the acknowledgement appears.
- the ratio of this total number of citations to the total number of papers in which the acknowledge entity appears can be construed as the impact of that acknowledged entity

Evaluation and ranking after 2000

- Institutions: Academic Ranking of World Universities (ARWU) of the Shanghai Jiao Tong University in 2004
- Impact metric for individual authors: h-index (Hirsh, 2005) capturing both the productivity and impact of an individual author
- Software support at the level of individuals/journals/institutions: Publish and Perish for number of publications, citations, h-index, g-index (Egghe, 2006) that increases the sensitivity of h-index values to highly cited papers, etc.

h-index

the maximum value of h such that the given author/journal has published h papers that have each been cited at least h time



After SCI

- From 2004, alternatives to SCI:
 - Google Scholar
 - Scopus
- From 2011
 - use percentiles classes top-1%, top-5%, top-10%, top-25%, top-50%, and 9 bottom-50%
 - Eg. use top-10% as an excellence indicator for Top universities in SCImago Institutions Rankings/Leiden Ranking

Use indicators

- Citation analysis and rankings have become increasingly paradigmatic in research management and science policies
- Example 1: To evaluate faculty members
- Example 2: Picking the winners in competitions for funding
- Example 3: Funding university activities

Now visit sites:

- Web of Science
- Google Academic
- Scimago
- Scopus
- Publons
- ARWU
- Publish and Perish