



Software tools

for impact measurement

Why?

- Research impact information can assist individuals in activities such as quantifying return on research investment, making a case for promotion and tenure, and managing their scholarly reputation.
- At the institutional level, this data can help with recruitment efforts as well as developing an overall sense of the strengths and expertise within the organization.

Complexity of the subject

- Methods:
 - Quantitative (like citation counts, h-index, journal impact factors)
 - Qualitative
- The impact presents a composite view of all of the elements, both traditional (citations) and non-traditional (social media mentions) that comprise a snapshot of a researcher's impact within his/her field across time
- There is no perfect method or tool that captures all of these elements so it is important to consult a wide array of resource
- Each discipline may view impact differently, and it is important to situate qualitative and quantitative information within this broader context

Citation databases & tools exploring them

Citation databases

- Web of Science
- [Scopus CiteScore](#)
- [Google Scholar Citations](#)

Tools

- [Publish or Perish](#)
- [CitedIn](#)
- [Scholarometer](#)
- [CiteSeerX](#)

To do: follow the links

Simple examples of individual “indexes”

	h-index	g-index	i10-index
Attempts to measure	Quality and quantity of author's work	Quality and quantity of author's work, with more weight on quality	Quality of author's work
Calculation	An author's h-index is the number of papers (h) that have received (h) or more citations. An author with an h-index of 8 has 8 papers cited at least 8 times.	To calculate the g-index an author's articles are ranked in decreasing order of the number of the citations each received. The unique largest number such that the top g articles received, together, at least g^2 citations is the g-index.	Counts the number of publications with at least 10 citations.
Limitations	Inaccurate measure of early career researcher impact. Only measures published works.	Only measures published works	Only used in Google Scholar Only measures published works

[Individual] researcher metrics (1 / 2)

Metric	Definition	Tools
h-index	The h-index is an author metric that attempts to measure both the productivity and citation impact of the publications of an author. A researcher with an index of h has published h papers, each of which has been cited in other papers at least h times.	<ul style="list-style-type: none">•SciVal•Scopus•Web of Science•Google Scholar•Publish or Perish
MyCitations	Create a profile in Google Scholar to ensure correct attribution of your publications and citations. Profiles can be private or public. All citations should be checked for accuracy.	
Researcher ID	The author identifier used in Clarivate's databases. Can be accessed via Researcher ID.com, Web of Science, InCites or EndNote Online.	
...		
Author identifiers	Author identifiers are unique identifiers that distinguish individual authors from other researchers and unambiguously associate an author with their work. For example, the identifier from the Scopus database is Scopus Author ID.	
Citations per publication	The number of citations received by an entity, divided by the number of publications produced by the entity.	<ul style="list-style-type: none">•InCites•SciVal

[Individual] researcher metrics (2/2)

Metric	Definition	Tools
CNCI (Category Normalised Citation Impact)	<p>CNCI benchmarks the impact of an article or the impact of a researcher in a particular subject area.</p> <p>The CNCI of a document is calculated by dividing the number of citations by the expected citation rate for documents of the same type, year of publication and subject area. The CNCI for a set of documents, such as the work of an author or a group of authors, uses the average of all the CNCI values for documents in the set. CNCI can also apply across several subject areas although it is a more meaningful metric if it is only for a single subject area. A CNCI of 1 would be on par with the average citations for the subject area; more than 1 would be above average; and anything below 1 would be less than average.</p>	•InCites
FWCI (Field-Weighted Citation Impact)	<p>FWCI is an author metric which compares the total citations actually received by a researcher's publications to the average number of citations received by all other similar publications from the same research field.</p> <p>The global mean of the FWCI is 1.0, so an FWCI of 1.50 means 50% more cited than the world average; whereas, an FWCI of .75 means 25% less cited than the world average.</p>	•SciVal

Other measures of researcher's esteem

- Recipient of a nationally competitive research fellowship
- Membership of a statutory committee
- Recipient of an grant or fellowship
- Invitations to speak, particularly as the keynote speaker
- Involvement in committees, organisations or societies
- Editor or reviewer on a major journal or of a prestigious work or reference
- Awards or rankings in prestigious lists
- Fellowship of a learned academy

Journal quality and metrics

Metric	Definition	Tools
Article Influence Score	Calculated by dividing the Eigenfactor score of the journal by the number of articles published. It tells the average impact of an article published in a journal from a five year period after the publication of the article.	<ul style="list-style-type: none"> •InCites •Journal Citation Reports
Citations per publication	The number of citations received by an entity, divided by the number of publications produced by the entity.	<ul style="list-style-type: none"> •InCites •SciVal
Cite Score	Based on Scopus, this is a set of metrics that measure a scholarly journal's impact by looking at the average number of citations per item it receives over the preceding three-year period. It is included in Scopus Journal Metrics.	<ul style="list-style-type: none"> •Scopus
Eigenfactor	The Eigenfactor Score uses citation data to assess the relative influence of journals. Journals with many citations from influential journals are rated as influential themselves.	<ul style="list-style-type: none"> •InCites •Journal Citation Reports
Journal Impact Factor	Number of citations within one year to items published in the last two years. This metric is also available excluding journal self-cites and as a five-year impact factor	<ul style="list-style-type: none"> •Journal Citation Reports
SJR (SCImago Journal Rank)	Based on Scopus, this provides a prestige metric based on the subject, quality and reputation of citing journals. It is included in Scopus Journal Metrics.	<ul style="list-style-type: none"> •SCImago •Scopus
SNIP (Source Normalised Impact per Paper)	A free source using Scopus data and weighs citations based on the total number of citations in a subject field thereby allowing for comparisons across different subject fields. It is included in Scopus Journal Metrics.	<ul style="list-style-type: none"> •Scopus

Discipline-based journal rankings

- [CORE Rankings Portal](#) Computer Research and Education Association of Australia.
- [ERIH Plus](#) European quality journal list for the Humanities and Social Sciences.
- [Harzing Journal Quality List](#) Provides a range of rankings data for Economics, Finance, Accounting, Management, and Marketing journals.
- [Law Journals](#) US-based ranking for over 1500 law journals.

Measures of collaboration and benchmarking metrics (1/2)

- Provide information on research partnerships of academic entities from institutions, research groups or individual researchers.
- Can be used to:
 - demonstrate capacity to build collaborative research partnerships
 - provide evidence of interdisciplinary collaboration
 - demonstrate research capacity and productive research engagements and collaborations - internal & external
 - benchmark globally against other researchers and other institutions
 - provide evidence of engagement with industry, government or community

Measures of collaboration and benchmarking metrics (2/2)

- The **academic collaboration** metric enables benchmarking by comparing citation data of researchers in similar fields at three levels of geographic criteria: same institution, national and international.
- The **academic-corporate collaboration** metric uses citation data to record scholarly activity between a researcher and other sectors such as private industry, government and NGOs.
- Examples of research collaboration are being a joint author on a publication, networking at a conference, following and connecting with a researcher via social media or participating on a research project.

Tools for measuring collaboration

- **SciVal (Elsevier)**

Is an integrated suite of objective tools that include benchmarking, collaboration and trend visualization and analysis tools that helps users track team and individual research performance.

- **Incites Benchmarking (Clarivate Analytics)**

Is a customized, web-based research evaluation tool that can help you develop your research strategy. It allows to analyze institutional productivity, monitor collaboration activity, identify influential researchers, showcase strengths, and discover areas of opportunity.

- **Essential Science Indicators**

Is an analytical tool that helps to identify top-performing research in Web of Science Core Collection. ESI surveys more than 11,000 journals from around the world to rank authors, institutions, countries, and journals in 22 broad fields based on publication and citation performance.

University rankings

- [Academic Ranking of World Universities](#) An annual publication first published in June 2003 by the Center for World-Class Universities and the Institute of Higher Education of Shanghai Jiao Tong University, China.
- [Times Higher Education World University Rankings](#) Ranks global universities across teaching, research, knowledge transfer and international outlook. The top universities rankings employ 13 carefully calibrated performance indicators to provide the most comprehensive and balanced comparisons available, which are trusted by students, academics, university leaders, industry and governments.
- [QS World University Rankings](#) Compare the world's top universities with the latest edition of the QS World University Rankings, and explore leading institutions by region and subject. Register for free site membership to access direct university comparisons and additional information, and visit the QS Intelligence Unit for in-depth analysis.

Altmetrics: alternative metrics

- provide insights into **what is being said about research** in non-scholarly forums and **how research is being used** to create public policy and solve real-world problems
- Altmetrics measure where research surfaces in a variety of non-academic environments:
 - **Online activity** e.g. mentions in blog posts, comments, reviews; social media likes, shares or tweets; and usage such as downloads, views or saves
 - **Attributions in non-academic or grey literature** e.g. government or non-government reports, discussion papers or policy documents; news or other media reports
 - **Research outputs which are not published academic papers** e.g. datasets, code or software, conference posters, guidelines, websites

Why to use altmetrics?

1. Demonstrate valuable non-academic engagement and societal value
2. Provide evidence in applications for promotion
3. Understand and join the public conversation
4. See where there is research interest and where there are gaps
5. Discover non-traditional research outputs

Altmetrics contrast with **traditional research metrics** which are **quantitative** rankings based on citation analysis of a researcher, research team or institution's scholarly publications, providing a purely numerical score indicating the number of citations this scholarship has received within academic journals.

Altmetrics vs. bibliometrics

Altmetrics

Altmetric scores can **begin to accrue immediately** as you publicise your research projects.

Altmetrics provides **data on many types of output** such as datasets, software or code, conference presentations, book chapters and reports.

Altmetrics **can surface non-academic discussion** of your work and track the public conversation as it happens.

Altmetrics provides **detail on who is engaging** with research outputs and **what they are saying and where they are saying it**.

Altmetrics allows to **explore mentions about individuals, research areas or organisations**.

Altmetrics provides **good coverage of the humanities, arts and social sciences**.

Bibliometrics

It **can take years** for bibliometrics to accrue as research is slowly noticed and cited in scholarly publications.

Bibliometrics mainly **applies mainly to scholarly journal articles** although it may also measure citations of books, book chapters and conference proceedings.

Bibliometrics **tracks only scholarly engagement**.

Bibliometrics are purely numerical counts of citations. They **don't provide context because they don't show what people are saying**. For example papers may be highly cited as examples of poor research.

Bibliometrics collates **data about citation of individual journal articles and authors**.

Bibliometrics from the major citation databases Scopus, Web of Science have **limited coverage of the humanities, arts and social sciences**.

Altmetrics aggregators

Altmetric

- tracks where published research is mentioned online by following lists of sources, including social media, news sources, government and non-government reports, blogs, Wikipedia, policy documents etc., and text-mines them for links to research

PlumX

- provides both altmetrics and traditional metrics from a variety of sources such as articles, book chapters and conference papers. These metrics shown together provide the user with an overall impact profile in the one location - a link from the database record.

To do: follow the links

Other tools for altmetrics

figshare

- a resource for storing and publishing all manner of research outputs, and can provide a DOI to make outputs findable and so improve the altmetric scores

Dimensions

- useful for exploring linked non-traditional research outputs to fully understand what is gaining attention in the public sphere

To do: follow the links