



ELSEVIER

# SciVal – PM Rehearsal Series

## Session 2: SciVal Key Metrics

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19 April 2023



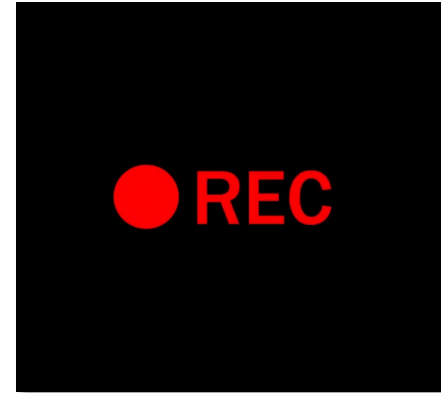
# Before we get started



Everyone has been muted



Add your questions to the  
Q&A section



Recording & resources will  
be shared

# Upcoming Sessions

## SciVal PM REHEARSALS !

### TOPIC

#### Find out whether you know your [SciVal] metrics!

On 19th April at 15:00 - 16:00 (Johannesburg Time)

**Description:** Get the hang of what the different metrics mean and how to interpret them. We'll focus on popular indicators such as FWCI, H-index, Top Citation Percentiles, and Journal Quartiles.

### TOPIC

#### How can I create top-notch reports for researchers and research teams in SciVal?

On 26th April at 15:00 - 16:00 (Johannesburg Time)

**Description:** This session covers the basics of how to create researchers' reports as well as ways that you can take your reports to the next level.

**3 May** - What can I learn from Research Areas and Topics in SciVal? Topics of Prominence and Research Areas provide a granular view of a researcher's or an institution's focus areas relative to what the rest of the world is focusing on.

**10 May** - What's the fuss about research collaboration? Building strong research partnerships is key to improving research performance. In this session we dive deep into what you can learn from the Collaboration Module.

**17 May** - How well is my institution contributing towards the SDGs? This session explores how SDG contributions are calculated and where to find them in SciVal. We'll also cover how to analyze and benchmark research related to SDGs.

**24 May** - What insights emerge from comparing institutions in SciVal? Benchmarking is the most flexible module in SciVal. Learn how to make the most of this module when doing comparative analyses of institutions.

# Agenda

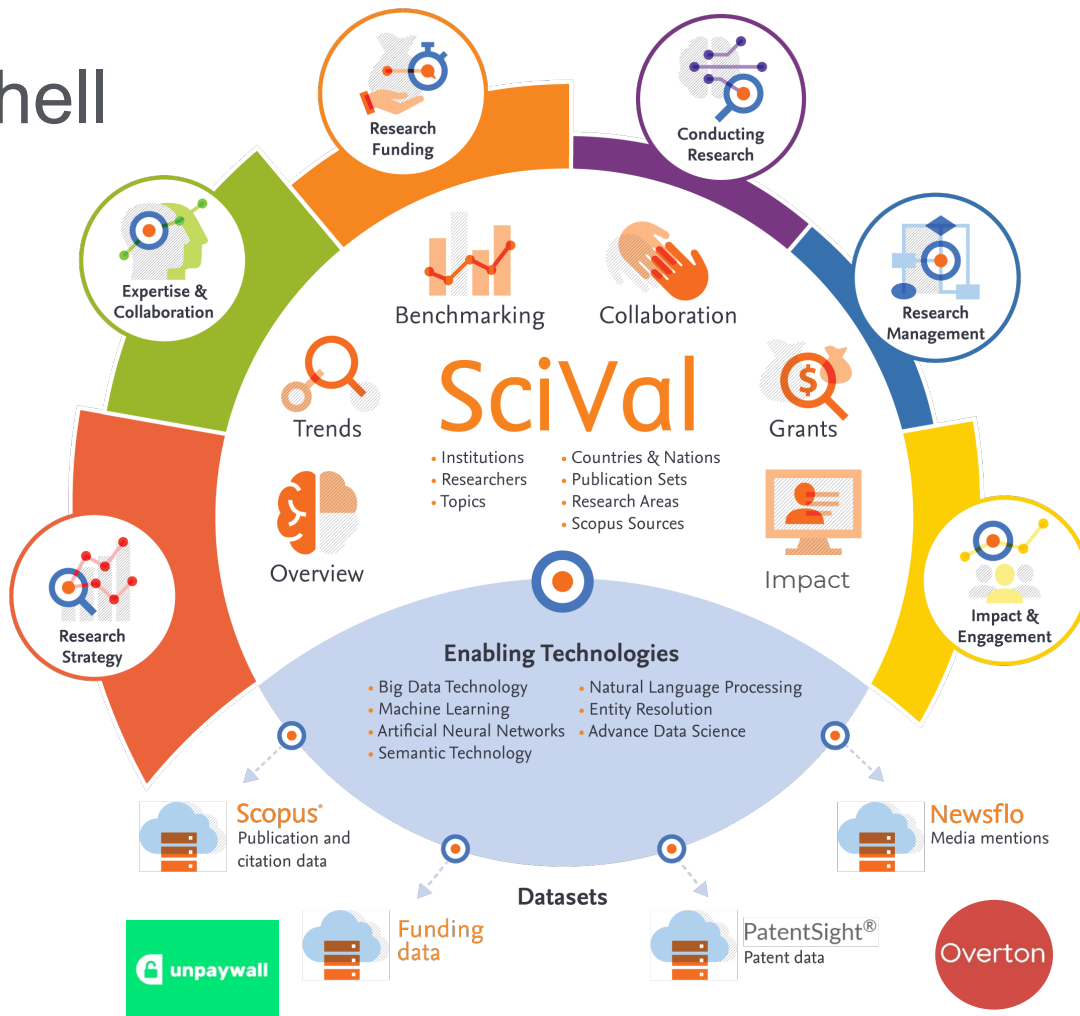
- Array of metrics
- Field-weighted Citation Impact
- H-index and variants
- CiteScore (percentiles and quartiles)
- Outputs in Top Citation Percentiles
- Outputs in Top Journal Percentiles
- Where to find help
- Q&A



# SciVal in a Nutshell

SciVal is an analytical tool designed to support research performance measurement relative to other entities

Over 300 trillion metric values  
Data *updated bi-weekly*



# An array of >30 metrics at your disposal

F. Qualitative input

| Metric theme       | Metric sub-theme                     | Metrics in SciVal  |
|--------------------|--------------------------------------|--|
| A. Funding         | Awards                               | <ul style="list-style-type: none"> <li>Awards Volume</li> </ul>  |
| B. Outputs         | Productivity of research outputs     | <ul style="list-style-type: none"> <li>Scholarly Output                             <ul style="list-style-type: none"> <li>Number, Type and Growth</li> <li>Subject Area Count</li> </ul> </li> </ul>  |
|                    | Visibility of communication channels | <ul style="list-style-type: none"> <li>Publications in Top Journal Percentiles</li> </ul>  |
| C. Research Impact | Research influence / impact          | <ul style="list-style-type: none"> <li>Citations Count</li> <li>Field-Weighted Citation Impact</li> <li>Outputs in Top Citations Percentiles</li> <li>Citations per publication</li> <li>Cited publications</li> <li><i>h</i>-indices</li> </ul> |
|                    | Knowledge transfer                   | <ul style="list-style-type: none"> <li>Academic-Corporate Collaboration</li> <li>Citing-Patents Count</li> <li>Patent-Cited Count</li> </ul>   |
| D. Engagement      | Academic network                     | <ul style="list-style-type: none"> <li>Collaboration</li> <li>Collaboration Impact</li> </ul>  |
|                    | Non-academic network                 | <ul style="list-style-type: none"> <li>Academic-Corporate Collaboration</li> <li>Academic-Corporate Collaboration Impact</li> </ul>  |
|                    | Expertise transfer                   | <ul style="list-style-type: none"> <li>Academic-Corporate Collaboration</li> <li>Citing-Patents Count</li> <li>Patent-Cited Count</li> </ul>   |
| E. Societal Impact | Societal Impact                      | <ul style="list-style-type: none"> <li>Academic-Corporate Collaboration</li> <li>Citing-Patents Count</li> <li>Patent-Cited Scholarly Output</li> </ul>  |
|                    |                                      | <ul style="list-style-type: none"> <li>Patent-Citations Count</li> <li>Mass Media</li> <li>Media Exposure</li> <li>Field-Weighted Mass Media</li> </ul>  |



# Factors that influence metrics

# Factors which influence publication activity

Publication activity is influenced by several factors. At the micro level, we can distinguish the following four factors:

1. the subject matter
2. the author's "publication age"
3. the observation period

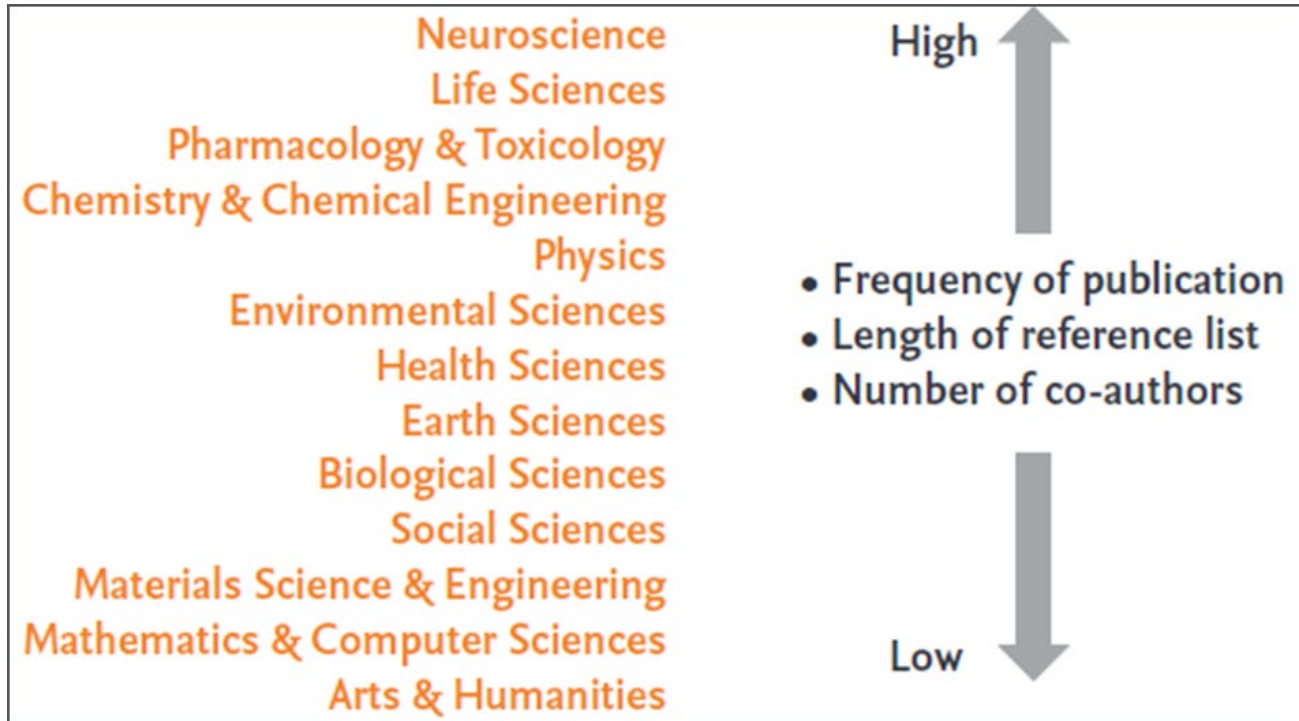
The publication activity in theoretical fields (e.g., mathematics) and in engineering is lower than in experimental fields or in the life sciences.

*Cross-field comparison* – without appropriate normalisation – would not be valid. This applies above all to comparative analyses at the meso level (universities and departments).

Source: An introduction to bibliometrics, Prof Johann Mouton, Centre for Research on Evaluation, Science and Technology, Stellenbosch University 2012



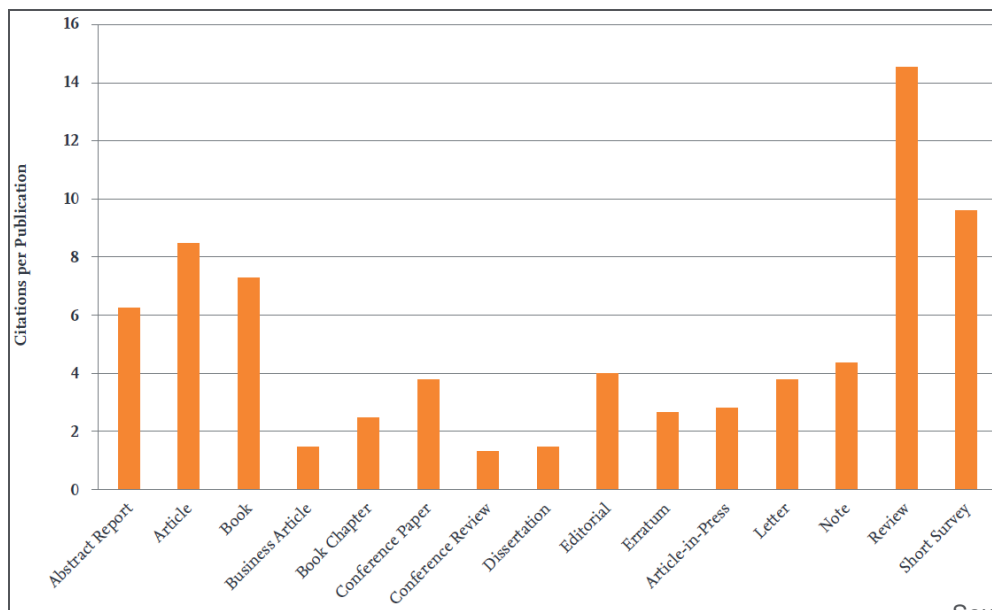
# Discipline characteristics that influence metrics



The characteristic behavior of academics differs between disciplines

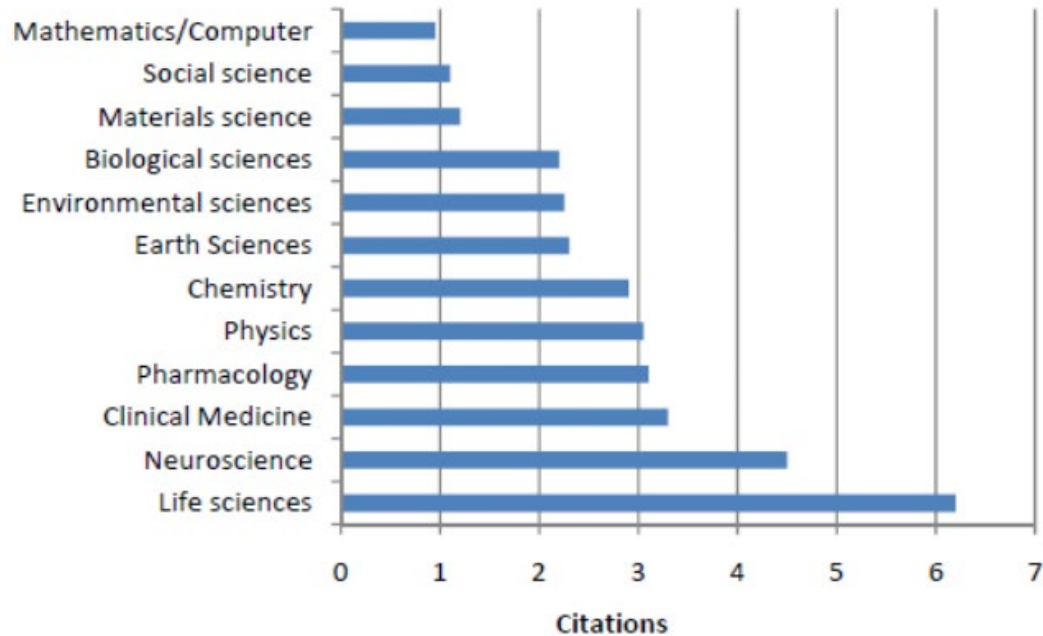
# More factors that influence metrics

- Variety in the **size** of entities within the data set
- Multiple **publication types** within the data set
- **Coverage** of data source, by geography and/or discipline



Citation rates for different publication-types as classified in Scopus. This chart displays citations received up to August 2013 per item published during the period 2008-2012.

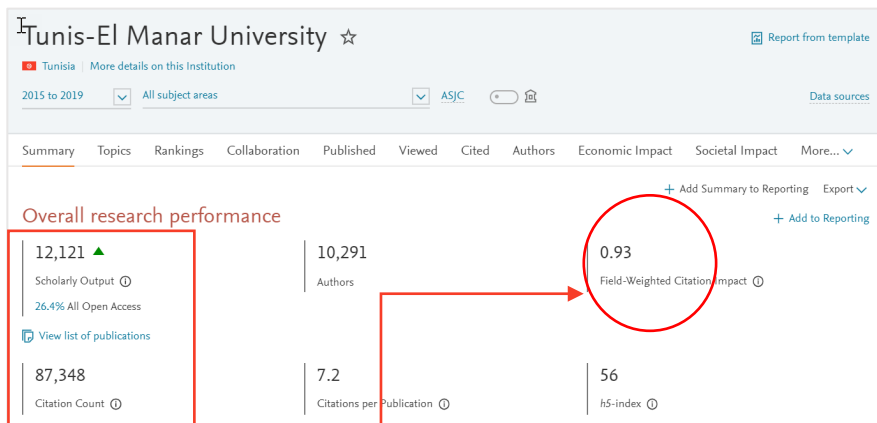
## Average citations per article





# Field-weighted Citation Impact

# FWCI – institutional level



Normalise for publication type, date of publication and subject

Field-Weighted Citation Impact is the ratio of citations received relative to the expected world average for the subject field, publication type and publication year. The world average FWCI is 1.00.

I.e., The global average of citations to articles if normalised for subject, date and type of publication is 1.0

So, if an institution has a FWCI of 0.93 it means on average publications are cited 7% below the global average.

Note: for entities with a small scholarly output, please beware of highly cited publications which may skew the FWCI

# FWCI – article level

*European Journal of Social Psychology* • Volume 49, Issue 7, Pages 1401 - 1420 • 1 December 2019

## What is threatening about refugees? Identifying different types of threat and their association with emotional responses and attitudes towards refugee migration

[Landmann, Helen<sup>a</sup>](#)  ; [Gaschler, Robert<sup>b</sup>](#); [Rohmann, Anette<sup>a</sup>](#)


 [Save all to author list](#)

<sup>a</sup> Department of Psychology, Community Psychology, FernUniversität in Hagen, Hagen, Germany

<sup>b</sup> Department of Psychology, Experimental Psychology—Learning, Motivation, Emotion, FernUniversität in Hagen, Hagen, Germany

25 95th percentile  
Citations in Scopus

3.81  
FWCI 

50  
Views count  ↗

[View all metrics >](#)

### FWCI

Field-Weighted Citation Impact shows how well cited this document is when compared to similar documents. A value greater than 1.00 means the document is more cited than expected according to the average. It takes into account:

- The year of publication
- Document type, and
- Disciplines associated with its source.

The FWCI is the ratio of the document's citations to the average number of citations received by all similar documents over a three-year window. Each discipline makes an equal contribution to the metric, which eliminates differences in researcher citation behavior.



Metrics displaying this icon are compiled according to [Snowball Metrics](#) ↗, a collaboration between industry and academia. Learn more about Article metrics in Scopus.



20.04.2023

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# Musk, Elon R. ☆

🇺🇸 Space Exploration Technologies Corporation ... Show all affiliations | View in Scopus » | Is this you?

2019 to 2021



All subject areas



ASJC



Summary Topics Collaboration Published Viewed Cited Patent Impact

## Overall research performance

6  
Scholarly Output ⓘ  
66.7% All Open Access  
[View list of publications](#)

5.27  
Field-Weighted Citation Impact ⓘ  
Yearly breakdown

393  
Citation Count ⓘ

65.5  
Citations per Publication ⓘ

8  
h-index ⓘ

4  
h5-index ⓘ

| Title                       | Citations | Year | Publication | Subject                   | FWCI        |
|-----------------------------|-----------|------|-------------|---------------------------|-------------|
| An integrated brain-machin  | 302       | 2019 | Article     | Health Informatics        | 19,43       |
| Discrete SARS-CoV-2 antibo  | 52        | 2021 | Article     | General Biochemistry, Ge  | 6,52        |
| Early cross-coronavirus rea | 31        | 2021 | Article     | Immunology  Immunolo      | 4,29        |
| Epidemiological and immun   | 6         | 2021 | Article     | Virology  Infectious Dise | 0,92        |
| Adapting Disease Preventio  | 2         | 2021 | Article     | Medicine (miscellaneous   | 0,43        |
| Aufbruch in Lateinamerika.  | 0         | 2021 | Review      | Philosophy  General Soc   | 0           |
|                             |           |      |             |                           | <b>5,27</b> |



20.04.2023

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# FWCI calculation

- Example of 3 publications
- Five steps
  1. Number of citations in each year
  2. Expected nr. of citations for each year & average
  3. Combined average if more than one subject category
  4. Ratio of actual citations to expected citations
  5. Arithmetic mean of step 4

**Scenario:** The user would like to calculate the Field-Weighted Citation Impact of an entity that consists of 3 publications. They have not selected any viewing or calculation options.

|  |   | Entity with 3 Publications  |                     |  |              |
|--|---|---|---------------------|--|--------------|
| Publication Identity   |   | Publication 1   | Publication 2       | Publication 3                                  |              |
| Publication Year (pub year)  |   | 2009  | 2010                |  | 2013         |
| Publication Type   |   | Article   | Review              |  | Erratum      |
| Journal category(ies)  |   | Immunology  | Immunology          | Parasitology                                   | Parasitology |
| Step 1   | - Compute number of citations received by publications in the entity.   | 2   | 12                  | 0  |              |
|  | - Actual citations received in pub year   | 3   | 23                  | N/A (example prepared in 2013)                 |              |
|  | - Actual citations received in 1st year after pub year  | 13  | 28                  | N/A (example prepared in 2013)                 |              |
|  | - Actual citations received in 2nd year after pub year  | 23  | 45                  | N/A (example prepared in 2013)                 |              |
|  | - Actual citations received in 3rd year after pub year  | 2+3+13+23   | 12+23+28+45         |  |              |
| - Actual citations received by the individual publication in pub year plus following 3 years |   | 41  | 108                 | 0  |              |
| Step 2   | - Compute expected number of citations received by similar publications.  | 7829.6  | 1,349.8             | 161.9  | 8.3          |
|  | - Number of publications in database published in same year, of same type, and within same discipline as Publication 1, 2, or 3   | 141,665.2   | 35,770.8            | 2,161.5  | 0.0          |
|  | - Total citations received in pub year plus 3 years by all publications in database published in same year, of same type, and within same journal category(ies) as Publication 1, 2, or 3 | 141,665.2 / 7,829.6   | 35,770.8 / 1,349.8  | 2,161.5 / 161.9                                | 0.0 / 8.3    |
|  | - Average citations per publication for all publications in database published in same year, of same type, and within same subject category as Publication 1, 2, or 3                     | 18.09   | 26.50               | 13.35  | 0.00         |
|  |   |   |                     |  |              |
| Step 3   | - Use harmonic mean to compute expected number of citations for publications covered in multiple categories.  |   | 2/(1/26.5 + 1/13.4) |  |              |
|  | - Combined average citations per publication for publications indexed in multiple journal categories  |   | 17.76               |  |              |
| Step 4   | Compute ratio of actual (result of step 1) to expected (result of step 2 or 3) citations for each of Publications 1, 2 and 3.   | 41/18.1<br>2.27   | 108/17.76<br>6.08   | No citations received or expected => 0<br>0.00 |              |
|  | Step 5  | Take arithmetic mean of the results of step 4 to calculate Field-Weighted Citation Impact for this entity |                     |  |              |
|  |   | Arithmetic Mean<br>$(2.27 + 6.08 + 0.00) / 3$<br>Field-Weighted Citation Impact = 2.78                    |                     |  |              |



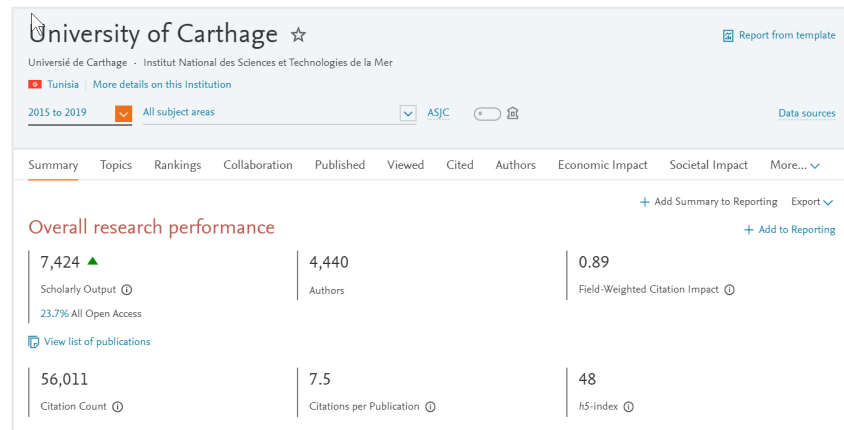
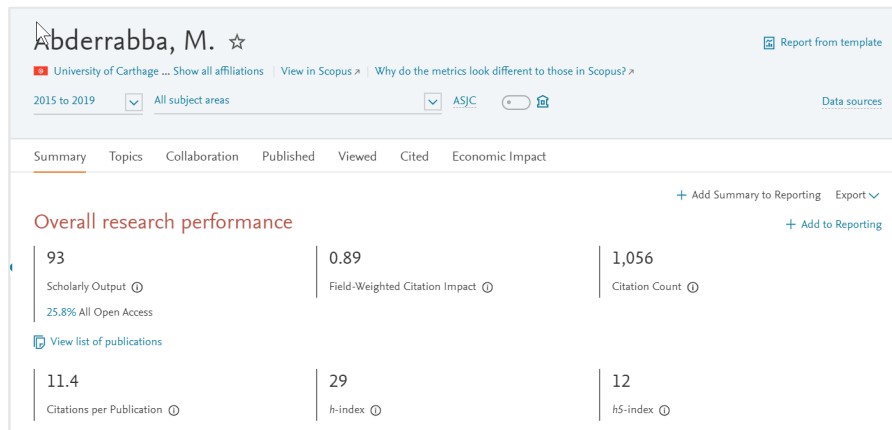


# H-index (& variants)



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# H-index & H5-index in SciVal

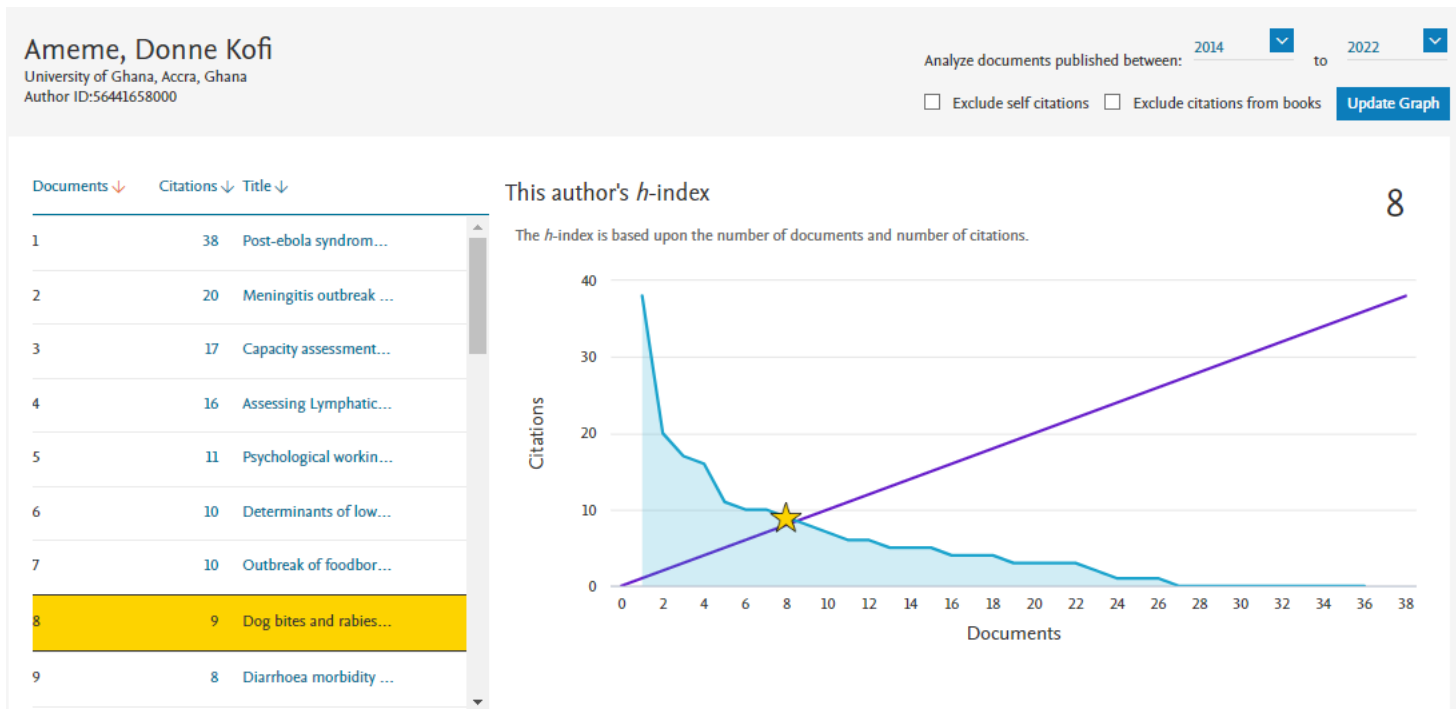


*h*-index is a measure of both the productivity and citation impact of a Researcher, based on the number of publications as well as the number of citations they have received. It's based upon data from 1996 to current date and can be filtered by subject areas

The h5-index uses a 5-year publication and citation window on the standard h-index calculation (Advantage: equal year range)



# How is h-index calculated?



# Advantages of h-index

- Combines quantity (publications) and impact (citations).
- Objective measure of performance
- Insensitive to low cited papers
- Better than other single-number criteria:
  - Impact factor, total number of documents, total number of citations, citation per paper rate and number of highly cited papers
- Easy to obtain
- Easy to understand

# Limitations of h-index

- Publication and citation patterns vary between disciplines
- Not time sensitive
- Highly cited papers are not reflected in the h-index
- Easy to obtain, risk of indiscriminate use and over-reliance
- May change behaviour of scientists (self-citations)
- There are also technical limitations:
  - Difficulty to obtain the complete output of scientists
  - Deciding whether self-citations should be removed or not

# Variants of h-index (in SciVal)

Collaboration

Published

Viewed

Cited

- Citation Count
- Field-Weighted Citation Impact
- Outputs in Top Citation Percentiles
  - Publications in Journal Quartiles
- Publications in Top Journal Percentiles
- Citations per Publication
- Cited Publications
- h-indices**
  - Number of Citing Countries
  - Collaboration Impact
  - Academic-Corporate Collaboration Impact
  - Citing-Patents Count
  - Patent-Cited Scholarly Output
  - Patent-Citations Count
  - Patent-Citations per Scholarly Output

**h-indices**

A measure of both the productivity and citation impact of an entity, based on the number of publications as well as the number of citations they have received. h5-index is h-index for the past 5 years. g-index emphasizes the most highly cited publications. m-index is h-index per year.

[Learn more about this metric](#)

Select metric:

h-index  h5-index  g-index

m-index

Include self-citations

Include:

All publication types

Articles only

Articles and conference papers


[Choose metric](#)

g-index is a variant of the h-index that emphasizes the most highly cited papers in a data set. The h-index does not give extra weighting to the most-cited publications of a data set that are likely the ones that are responsible for an entity's prestige; g-index can be used if this feature of the h-index is seen as a weakness. The g-index is always the same as or higher than the h-index

The *m*-index is defined as ***h* divided by *n***, where *n* is the number of years since the first published paper of the scientist



# Example

| Entity <span>↑</span>   | h-index <span>▼</span> | h5-index <span>▼</span> | g-index <span>▼</span> | m-index <span>▼</span> |
|---|------------------------|-------------------------|------------------------|------------------------|
|  Ameme, Donne Kofi | 8                      | 5                       | 12                     | 1.0                    |

Year range 1996-2022

Recent 5 years

Reflects highly cited papers

Reflects publishing years



# g-index calculation



Leo Egge

Table 1. Example of calculation of h- and g-index

| Rank doc | No. citations | h-index | Rank <sup>2</sup> | Sum citations | g-index |
|----------|---------------|---------|-------------------|---------------|---------|
| 1        | 15            |         | 1                 | 15            |         |
| 2        | 10            |         | 4                 | 25            |         |
| 3        | 7             |         | 9                 | 32            |         |
| 4        | 4             | X       | 16                | 36            |         |
| 5        | 0             |         | 25                | 36            |         |
| 6        | 0             |         | 36                | 36            | X       |
| 7        | 0             |         | 49                | 36            |         |

**Method/calculation:** Rank by decreasing order the citations of all the documents of the unit. The position where the **square of the rank position is equal to the accumulated number of citations corresponds to the g-index**



# m-index

- The h-index depends on the duration of each scientist's career because the pool of publications and citations increases over time.
- In order to compare scientists at different stages of their career, Hirsch presented the “m parameter”, which is the result of dividing h by the scientific age of a scientist (number of years since the author's first publication)
- The *m*-index is defined as  $h/n$ , where  $n$  is the number of years since the first published paper of the scientist

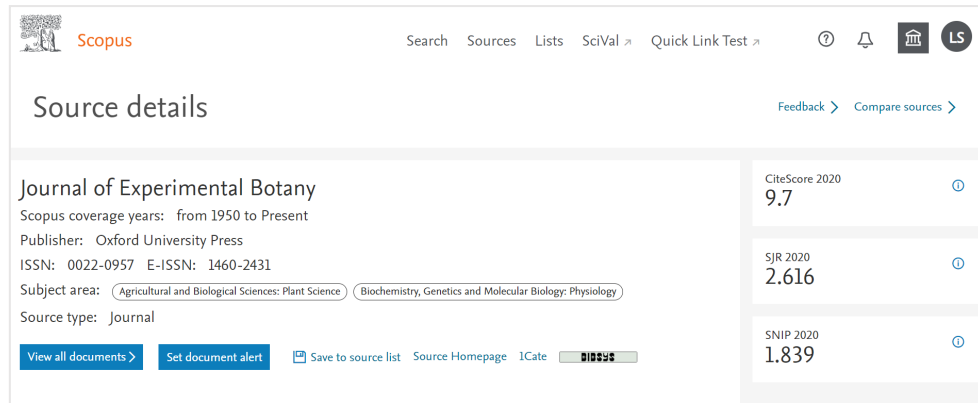


# CiteScore



# CiteScore

- **CiteScore** is the number of citations to documents (articles, reviews, conference papers, book chapters, and data papers) by a journal over four years, divided by the number of the same document types indexed in Scopus and published in those same four years.
- **CiteScore Percentile** indicates the relative standing of a serial title in its subject field based on the CiteScore metric. The Percentile and Ranking are relative to a specific Subject Area. The Source table only displays the Subject Area where the source performs the best.
- **Source normalised impact per paper (SNIP)** divides the journal's citation count per paper by the expected citation count in its subject field (Calculated by CWTS)
- **SciMago Journal Rank (SJR)** - Citations are weighted depending on the quality and the subject field of the source journal (Calculated by SciMago)



Scopus

Search Sources Lists SciVal Quick Link Test

Source details

Journal of Experimental Botany

Scopus coverage years: from 1950 to Present

Publisher: Oxford University Press

ISSN: 0022-0957 E-ISSN: 1460-2431

Subject area: Agricultural and Biological Sciences: Plant Science Biochemistry, Genetics and Molecular Biology: Physiology

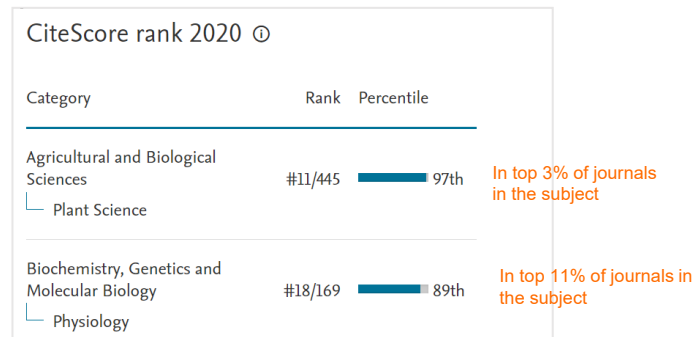
Source type: Journal

View all documents > Set document alert Save to source list Source Homepage ICate

CiteScore 2020 9.7

SJR 2020 2.616

SNIP 2020 1.839





# CiteScore in SciVal

Quartiles indicate where a journal's ranking lies within a particular subject category or overall. These quartiles rank the journals from highest to lowest based on their **CiteScore Percentiles**, SNIP or SJR.

There are four quartiles: Q1, Q2, Q3 and Q4.

Quartiles are bands of serial titles that have been grouped together because they occupy a similar position within their subject categories. The quartiles are:

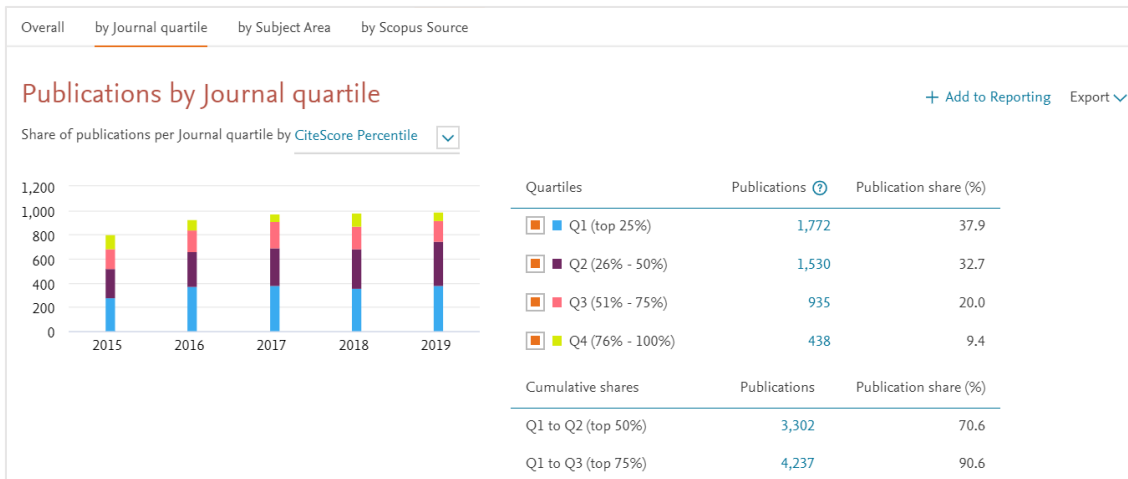
**Quartile 1:** serial titles in 99-75th percentiles

**Quartile 2:** serial titles in 74-50th percentiles

**Quartile 3:** serial titles in 49-25th percentiles

**Quartile 4:** serial titles in 24-0 percentiles

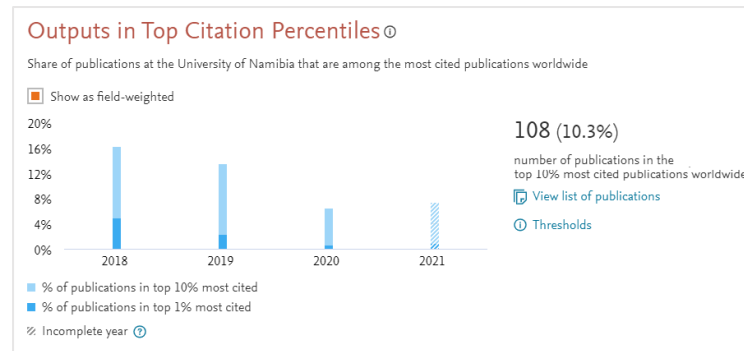
The most prestigious journals within a subject area are those occupying the first quartile, Q1.





# Outputs in Top Citation Percentiles

- **Definition:** Outputs in Top Citation Percentiles in SciVal indicates the extent to which an entity's publications are present in the most-cited percentiles of a data universe: how many publications are in the top 1%, 5%, 10% or 25% of the most-cited publications?
- **How is it calculated?** For each year, the global publications are extracted from Scopus and ordered from highest to lowest citation. The publications are then split into 100 even percentiles and the citation thresholds are noted.
- Available as **percentage** or **absolute** numbers
- **Field-weighted:** When field weighting is selected, (FWCI) is used for each publication to calculate the percentile thresholds, instead of the publication's citations.
- Available for **all entities**



Overview Module > Published

| Entity ↑              | Output in Top 1% Citation Percentiles                  | Output in Top 5% Citation Percentiles                  | Output in Top 10% Citation Percentiles                  | Output in Top 25% Citation Percentiles                  |
|-----------------------|--|--|---|---|
| University of Namibia | 36   | 99   | 166   | 395   |
| Entity ↑              | Output in Top 1% Citation Percentiles (field-weighted) | Output in Top 5% Citation Percentiles (field-weighted) | Output in Top 10% Citation Percentiles (field-weighted) | Output in Top 25% Citation Percentiles (field-weighted) |
| University of Namibia | 33   | 99   | 160   | 377   |

Benchmarking Module



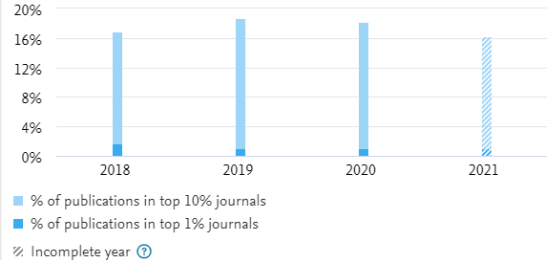
# Outputs in Top Journal Percentiles

- **Definition:** Outputs in Top Citation Percentiles in SciVal indicates the extent to which an entity's publications are present in the most-cited journals in the data universe: how many publications are in the top 1%, 5%, 10% or 25% of the most-cited journals indexed by Scopus?
- **How is it calculated?** Using the Citescore, SNIP, SJR values to split publications into 100 even percentiles
- Available as **percentage** or **absolute** numbers
- **Citescore:** For CiteScore, the percentage thresholds are taken directly from the CiteScore Percentile values that are calculated by Scopus. A journal receives a CiteScore Percentile for each ASJC in which it's categorized. SciVal always uses the highest relevant CiteScore Percentile, which is dictated by the subject area filter
- Available for **all entities**



## Publications in Top Journal Percentiles

Share of publications at the University of The Free State that are in the top journals by [CiteScore Percentile](#)



936 (17.4%)  
number of publications  
in the top 10% journals by CiteScore

Overview Module > Published

| Entity ↑                     | Publications in Top 1% Journal Percentiles by CiteScore Percentile ↓ | Publications in Top 5% Journal Percentiles by CiteScore Percentile ↓ | Publications in Top 10% Journal Percentiles by CiteScore Percentile ↓ | Publications in Top 25% Journal Percentiles by CiteScore Percentile ↓ |
|------------------------------|--|--|---|---|
| University of The Free State | 86   | 595  | 243   | 2,969   |

Benchmarking Module (select CiteScore, SJR or SNIP)



# Getting help

SciVal

Overview   Benchmarking   Collaboration   Trends   Grants   Reporting   My SciVal   Scopus >

## Welcome to SciVal

- Overview >**  
View the research performance of Researchers, Institutions, Countries and more.
- Benchmarking >**  
Compare and benchmark the research performance of anything in SciVal.
- Collaboration >**  
Explore the collaboration of Institutions, Countries and Researchers.
- Trends >**  
Dive deeper into an area of interest.
- Grants >**  
Analyze and compare funding in areas of interest.
- Reporting >**  
Create, export and share custom reports and templates.

🔍 Research Areas provided by SciVal: Quantum Computing | SDG 6: Clean Water and Sanitation (2021) | [View more](#)

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Last name:  ×   First name:  ⌂

Affiliation:

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[SciVal 快速使用指南 \(简体中文版\)](#)

[Research Metrics Guidebook](#)

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Thank you

