Research Metrics

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Learning Outcomes

After completion of this lecture the learner will be able to;

- Understand the significance of Research Metrics

- Categorize research metrics

- Calculate various research metrics

- Select appropriate journal with high research metrics for publication

Types of Research Metrics

- Journal Metrics
- Article Metrics
- Author Metrics

Basic Journal Metrics

- **Usage**
  - the number of times articles are viewed/downloaded.

- **Speed**
  - Speed from submission to first decision
  - Speed from submission to first post-review decision
  - Speed from acceptance to online publication

- **Acceptance rate**
  - the number of submissions it receives for every article that's eventually published.

Scopus Journal Metrics

- **CiteScore**

- CiteScore measures average citations received per document published in the serial.

- CiteScore 2021 counts the citations received in 2018-2021 to articles, reviews, conference papers, book chapters and data papers published in 2018-2021, and divides this by the number of publications published in 2018-2021

Cite Score year 2021

= 28,743 Citations 2018 -through 2021
  204 Documents 2018 -through 2021

=140.9

Cont..

- **SCImago Journal Rank**

- SCImago Journal Rank measures weighted citations received by the serial. Citation weighting depends on subject field and prestige (SJR) of the citing serial.

- **CiteScoreTracker**

- continue to update on a monthly basis until the next annual CiteScore calculation.

CiteScoreTracker

$$= \frac{\text{Citations to date}}{\text{Documents to date}}$$

Updated monthly

Cont..

- **Source Normalized Impact per Paper**

- Source Normalized Impact per Paper measures actual citations received relative to citations expected for the serial's subject field.

- **IPP (Impact per Publication)**

- The impact per publication, calculated as the **number of citations given in the present year to publications in the past three years** divided by **the total number of publications in the past three years**.

- CiteScore includes all sources and document types, while IPP excludes certain sources and document types.

WOS Journal Metrics

- **The Journal Impact Factor**

- The impact factor (IF) of a scientific journal is a measure reflecting the average number of citations to papers published in that journal.

- Thomson Reuters calculates the impact factor of journals every year

- calculated by dividing the number of current year citations to the source items published in that journal during the previous two years

Differences with journal impact factor

- The main differences between the indicators provided by CWTS Journal Indicators, in particular the IPP and SNIP indicators, and the journal impact factor (JIF) can be summarized as follows:

- Based on Scopus (IPP and SNIP) vs. based on Web of Science (JIF).

- Correction for field differences (SNIP) vs. no correction for field differences (IPP and JIF).

- Three years of cited publications (IPP and SNIP) vs. two years of cited publications (JIF).

- Citations from selected sources and selected document types only (IPP and SNIP) vs. citations from all sources and document types (JIF).

- Citations to selected document types only (IPP and SNIP) vs. citations to all document types (JIF).

Article Metrics

- **Altmetric Score**

- The Altmetric Attention Score tracks a wide range of online sources to capture the conversations happening around academic research.

- Altmetric monitors each online mention of a piece of research and weights the mentions based on volume, sources, and authors. A mention in an international newspaper contributes to a higher score than a tweet about the research,

- Altmetric.com, Plum Analytics (Scopus), ImpactStory

794

- News (96)
- Blogs (3)
- Twitter (32)
- Facebook (1)
- Google+ (1)

- Mendeley (2)
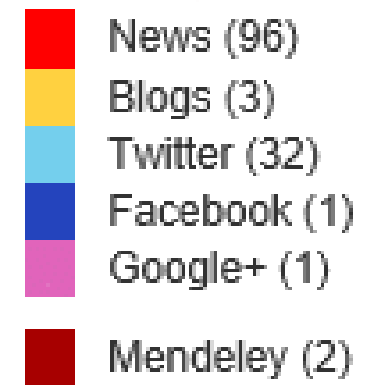
Altmetric Score

Advantages

• Receive instant, traceable feedback

• Get a holistic view of attention, impact and influence

Disadvantages

• Biases in the data which Altmetric collects

• Limited to tracking online attention

Other Metrics

- Article Views

- Citations

- Cited In

- Average Rating

- Readers Comment

- Bookmarked In

- Number of times Downloaded

- Blog Coverage

Author Metrics

Basic Metrics

- **Citations per paper** = total citations/total papers

- **Citations per year** = total citations/years since first paper

- **Citations per author** = divide citations for each publication by the number of authors and sum the resulting citations; this is the single-authored equivalent number of citations for the author in question.

- **Papers per author** = divide each publication by the number of authors and sum the fractional author counts; this is the single-authored equivalent number of papers for the author in question.

- **Authors per paper** = add up the total number of authors involved in the publications for the author in question and divide this by the number of papers.

h-index

- The h-index was proposed by J.E. **H**irsch in his paper "An index to quantify an individual's scientific research output", arXiv:physics/0508025 v5 29 Sep 2005.

- It is defined as follows:

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

- Ex: A h-index of 20 means that an academic has published at least 20 papers that have received at least 20 citations each.

Advantages

- **Results aren't skewed**

- The main advantage of the h-index is that it isn't skewed upwards by a small number of highly-cited papers. It also isn't skewed downwards by a long tail of poorly-cited work.

- The h-index rewards researchers whose work is consistently well cited. That said, a handful of well-placed citations can have a major effect.

Disadvantages

- Results can be inconsistent
- Results can be skewed by self-citations
- Results aren't comparable across disciplines
- Results can't be compared between researchers

g-index

- The g-index is calculated based on the distribution of citations received by a given researcher's publications, such that:

- Given a set of articles ranked in decreasing order of the number of citations that they received, the g-index is the unique largest number such that the **top g articles received together at least g^2 citations.**

Contemporary h-index

- It adds an age-related weighting to each cited article, giving less weight to older articles.

- The weighting is **parameterized**; the Publish or Perish implementation uses gamma=4 and delta=1 for Current Year, (**γ** / δ) and δ= 2,3,4 and so on based on the number of previous years.

- This means that for an article published during the current year, its citations count four times.

- For an article published 4 years ago, its citations count only once (4/4). For an article published 6 years ago, its citations count 4/6 times, and so on.

Individual h-index (3 variations)

- It divides the standard h-index by the average number of authors in the articles that contribute to the h-index, in order to reduce the effects of co-authorship; the resulting index is called h_I.

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i10-index & i20 index

- **The i10-index** is the newest in the line of journal metrics and was introduced by Google Scholar in 2011.

- It is a simple and straightforward indexing measure found by tallying a journal's/ Auhtor's **total number of published papers with at least 10 citations.**

- **The i20-index**, proposed in this editorial note, is obtained by tallying a journal's/ Auhtor's **total number of published papers with at least 20 citations**