How to Cite

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UNIT 5   OPEN ACCESS RESEARCH IMPACTS

Structure

5.0   INTRODUCTION

In an open access (OA) world, much importance has been given to using open source tools, open access resources and open solutions to engage authors and researchers in collaborative research, peer-to-peer sharing of scholarly information and collaborative evaluation of scholars' works.

On the other hand, exponential growth of scientific literature also has led to rapid disappearance of nascent literature before it actually gets noticed by the scientific communities. No single database can capture this over-growing scientific literature. Several data mining tools are probably required to keep abreast with quantum of emerging literature.

In this Unit, various tools and techniques have been discussed in details to help the library and information professionals in strengthening their efforts in enhancing scientific productivity, visibility, reputation, and impact of research works of their affiliated scientific researchers. This Unit briefly discusses various conventional citation-based indicators available for assessing scientific productivity of authors, journals and institutions. This Unit also identifies emerging indicators such as h-index, i10-index, Eigenfactor score, article influence score and source normalized impact per paper.

The social webs, available to the researchers' communities in addition to any other groups of citizens, help the researchers in disseminating their produced or contributed knowledge to global communities. Much you are active in social media, more you have chances to get noticed by fellow researchers and possible research collaborators. Many personalized web-based services are now increasingly made available targeting global researchers' communities, helping them to enhance their social media presence and visibility. These factors influence the development of new metrics called article level metrics or altmetrics. Finally, this Unit also briefly discusses the emergence of the open citation databases for text mining and data mining of open access literature.

5.1 LEARNING OUTCOMES

After going through the unit, you are expected to be able to:

- Describe the process of evaluation of research in national and international contexts;
- Identify the tools used for evaluation of research;
- Explain the advantages and disadvantages of different evaluation metrics; and
- Use emerging evaluation metrics to explain OA research impact.

5.2 METRICS

The scientific communication systematically enhances existing knowledge base and records new developments in ones field of research. New knowledge is created and communicated through primary literature such as journal articles, conference papers, monographs, theses, dissertations, book chapters and research reports. While communicating results of a research work, scientists often acknowledge existing research works in the form of citations as given in the list of references. Here comes the role of bibliographic databases and also citation databases in aiding researchers to identify literature through the extensive process of literature search. Bibliographic databases are usually subject-specific, and sometimes country specific, to help their users in identifying most relevant research literature – based on search term a user used. On the other hand, citation databases help in identifying most cited papers, authors and journals in addition to helping literature search similar to bibliographic databases. Thus, citation databases help in measuring effectiveness, scientific productivity and impact of research literature. There are certain bibliometric indicators often derived from the citation databases. Because bibliometric indicators are based on evidence of usability of published literature – while cited literature are better used by the fellow researchers or successors, uncited literature is often unnoticed by the researchers. Thus, bibliometric indicators help in ranking scholarly journals, or identifying core journals, and making other similar productivity measurements.

Research evaluation metrics of an individual researcher or a research institution or a research group looks into detailed analysis of many aspects of this entity. Figure 5.1 depicts four important dimensions of research evaluation. These aspects are extremely interrelated and interdependent. Weakness in one aspect will lead to lowering value to other aspect. Research evaluation should be carried out to determine strengths and weaknesses in productivity, visibility, reputation, and impact of scientific researchers or institutions.
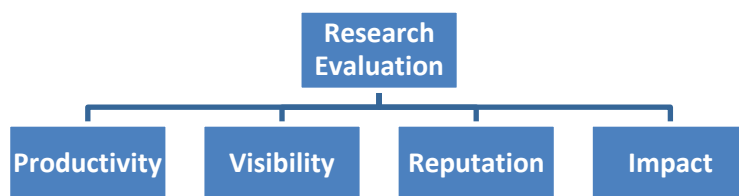
Figure 5.1: Dimensions of Research Evaluation

5.2.1 Concepts of Bibliometrics, Scientometrics and Webometrics

A number of terms are commonly used in defining different approaches of research evaluation and measurement of scientific productivity. Many of the terms are correlated as each one addresses a typical aspect of scholarly communications. Table 5.1 shows an illustrative list of terms frequently used as research evaluation metrics. Each term defines a set of methods for a particular type of resources or applications. Some of the terms are used interchangeably to broadening or narrowing scope of research evaluation.

Table 5.1: Commonly Used Terms for Assessing Research Impacts

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 worldwide web, its hyperlinks and internet resources.
Cybermetrics	Cybermetrics is an alternative term for Webometrics to measure the World Wide Web, cyber media, web resources and hyperlinks.
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 a 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.

5.2.2 Applications of Scientometrics and Bibliometrics in Research Assessment

In the last sixty years, evaluation of public funded research has been carried out globally on a regular basis for performance measurement of different actors of scientific research. Most of the citation databases and citation analysis tools available in today's world have functionalities to instantly generate reports and scientometric profile of a scientist, an institution, a collaborative research group, a country, or a journal. Some of the popular applications of scientometrics and bibliometrics listed below can use report generator tools available with citation-based products and services.

- **For Institution/ Collaborative Research Group**: mapping of collaborations, top collaborating institutions, top collaborating countries, collaborating with public vs. private institutions, highly cited papers, highly cited authors, top contributing scientists, top publishing journals, scientists with top h-index, top subject categories or research domains, percentage of cited vs. uncited papers, percentage of self-citations, publishing in OA vs. subscription-based journals, comparative study of two or more institutions in a region/ country.

- **For a scientist**: mapping of collaborations, collaborating institutions, collaborating countries, mapping of 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**: top contributing institutions, top contributing cities, top contributing states, top funding agencies supporting research, top affiliating apex bodies, mapping of collaborations, top collaborating countries, top collaborating institutions, top contributing scientists, top publishing journals, top subject categories or research domains, percentage of cited vs. uncited papers, percentage of self-citations, highly cited papers, highly cited authors, top scientists with h-index, publishing by public vs. private institutions, publishing in OA vs. subscription-based journals, comparative study of two or more countries in a region or globally.

- **For a journal**: highly cited papers, highly cited authors, percentage of cited vs. uncited papers, percentage of self-citations, top research domains, cited half-life vs. citing half-life, top contributing institutions, top contributing cities, top contributing countries, most downloaded papers, most shared papers, and highly ranked journals based on citation-based indicators.

5.2.3 Classical Bibliometric Laws

Three classical bibliometric laws are widely accepted by the bibliometricians and information scientists in establishing theoretical framework and understanding growth of universe of knowledge or formation of emerging subject areas, as recorded in citation databases. Figure 5.2 visually depicts these three classical bibliometric laws. These laws are discussed in details with suitable examples in literature listed in Further Readings at the end of this Unit.
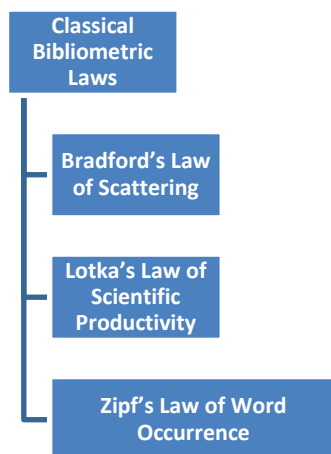
Figure 5.2: Classical Bibliometric Laws

Bradford's Law of Scattering: Samuel C. Bradford in 1934 found that a few core journals provide $1/3^{rd}$ of the articles on a given subject, a moderate number of less-than-core journals provide a further $1/3^{rd}$ of the articles on the subject, and a large number peripheral journals provide the remaining $1/3^{rd}$ of the articles. He proposed the formula 1:n:n² to describe the phenomenon share of the significant research results on a given subject. However, this distribution is not statistically accurate and it may vary subject-to-subject. But it is still commonly used as a general rule of thumb.

Lotka's Law of Scientific Productivity: Alfred J. Lotka in 1926 in his paper "the Frequency Distribution of Scientific Productivity" found that " … the number (of authors) making n contributions is about $1/n^2$ of those making one; and the proportion of all contributors, that make a single contribution, is about 60 percent". This means that out of all the authors in a given field, 60 percent will produce just one publication, and 15 percent will produce two publications, 7 percent of authors will produce three publications, and so on. According to Lotka's Law of scientific productivity, only six percent of the authors in a field will produce more than 10 articles. However, this distribution is not statistically accurate and it may vary subject-to-subject. But it is still commonly used as a general rule of thumb.

Zipf's Law of Word Occurrence: Harvard linguist George Kingsley Zipf suggested an equation popularly known as Zipf's Law that is often used to predict the frequency of words within a relatively lengthy text. Zipf found that the rank of the word multiplied by the frequency of the word equals a constant. Zipf's Law, again, is not statistically accurate, but it is very useful for indexers and indexing databases even during the internet era.

Applications of these bibliometric laws are very often found in the early period of scientometric literature and bibliometric studies. However, their applications in web 2.0 or social media-enabled scholarly communications have not been tested adequately, as scientometric research has now moved into different domains and in different directions.

5.2.4 Common Bibliometric Indicators

There are a number of bibliometric indicators used for research evaluation and performance measurement of journals, institutions, countries and collaborative research groups, but rarely individual authors. These bibliometric indicators are mostly citation-based indicators, traditionally drawn from the citation databases such as Science Citation Index (SCI), Social Science Citation Index (SSCI) and Journal Citation Reports (JCR). Later, from the beginning of the twenty first century, web-based citation databases such as Scopus and Web of Science, and citation search engines such as Google Scholar, Microsoft Academic Search and CiteSeer[X] are frequently used for deriving citation-based indicators. Figure 5.3 depicts various citation-based indicators, mostly derived from the Journal Citation Reports, citation databases and citation search engines. Some of the indicators help in analysing collaborative authorship, collaborative institutions and collaborative countries commonly found from affiliation search in any citation database.

```
Citation-based Indicators
    ├── Citations Count
    ├── Journal Impact Factor
    ├── Journal Immediacy Index
    ├── H-Index
    ├── Cited Half-Life
    ├── Citing Half-Life
    ├── Self-Citation
    ├── Cited vs. Uncited Papers Ratio
    ├── Article Influence® score
    ├── Eigenfactor® score
    ├── Cites per document
    ├── SJR Rank
    └── International Collaboration
```
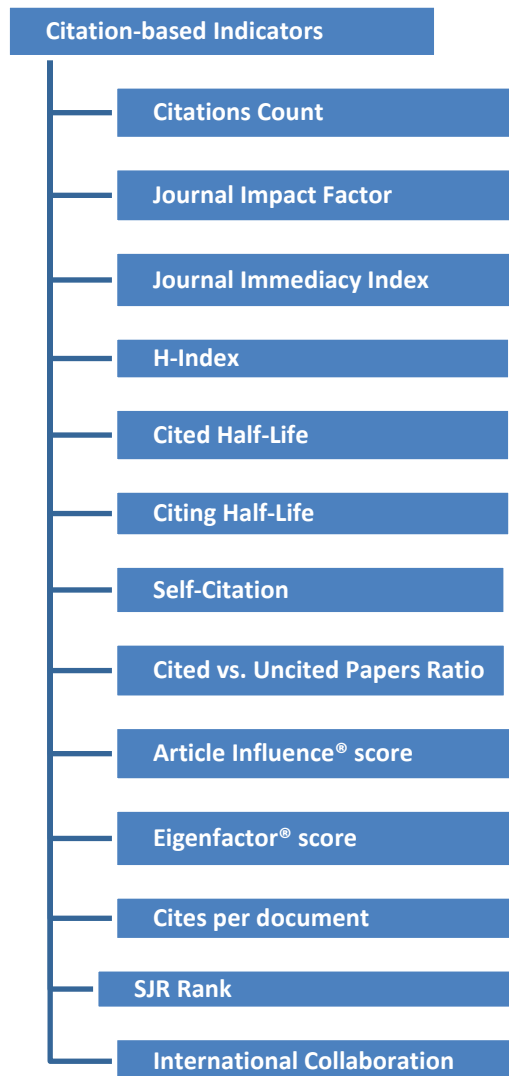
**Figure 5.3: Most Useful Citation-based Indicators, derived
from Citation Databases**

5.2.5 Webometric Ranking of Institutional Repositories

The "Ranking Web of World Repositories"[49] is a global ranking initiative by the CSIC Cybermetrics Lab in Spain for OA institutional or disciplinary repositories available across the world. This web ranking effort helps in promoting the OA initiatives, which are distributing the research outputs of the universities and research centers by depositing scientific papers and related materials at OA repositories. Its website provides world ranking of repositories. It further provides region-wise rankings, such as for the North America, Latin America, Europe, Asia, Africa, Arab World, and Oceania. It also derives ranked list of top institutional repositories and top portals of disciplinary repositories. Text Box 5.1 shows ranking methodology that includes four ranking parameters, viz., size, visibility, number of rich files and number of scholars. Figure 5.4 shows a ranked list of OA repositories from the group of emerging economies, popularly known as BRICS countries, covering 124 repositories from Brazil, Russia, India, China and South Africa.

Text Box 5.1: Methodology[50] in the Ranking Web of Repositories

Methodology

The Ranking Web (Webometrics) provides a list of mainly research-oriented repositories arranged according a composite index derived from their web presence and the web impact (link visibility) of their contents, data obtained from the major commercial search engines. For being accepted in the Directory the following conditions are needed:

- Only repositories with an autonomous web domain or subdomain are included:
  - repository.xxx.zz (YES)
  - www.xxx.zz/repository (NO)
- The contents should be mainly scientific papers

With the aim to improve visibility of repositories and good practices in their web publication we have extracted the following quantitative web indicators from the most important search engines. The methodology is similar, but not exactly the same, to those use in our other Rankings:

- Size (S). Number of web pages extracted from Google.
- Visibility (V). The total number of external links received (backlinks) by the number of referring domains for such links obtained from MajesticSEO.com and Ahrefs.com databases.
- Rich Files (R). Files in formats like Adobe Acrobat (.pdf), MS Word (doc, docx), MS PowerPoint (ppt, pptx) and PostScript (.ps & .eps) extracted from Google.
- Scholar (Sc). Using Google Scholar database we calculate the normalised number of papers between 2007 and 2011.

The four ranks were combined according to a formula where each one has a different weight but maintain the ratio 1:1 between activity (size in the broad sense) and impact (visibility).

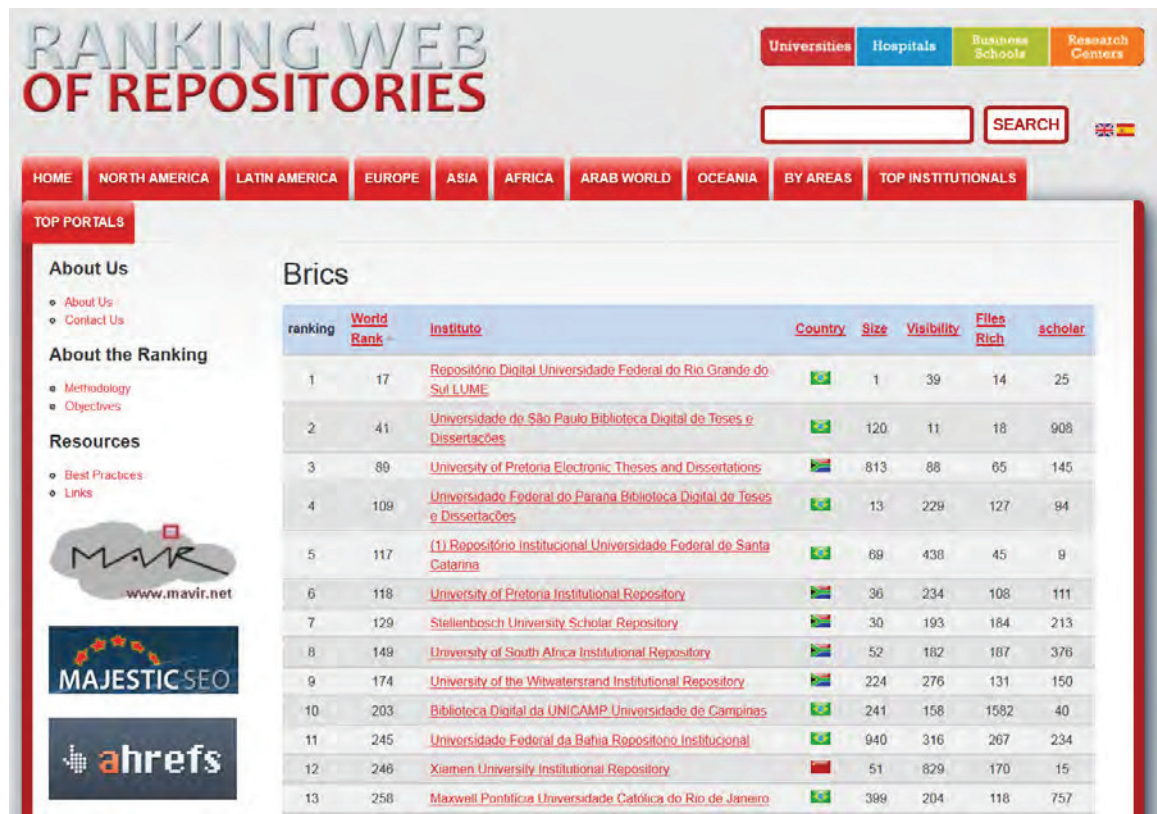[49] http://repositories.webometrics.info
[50] http://repositories.webometrics.info/en/Methodology

Figure 5.4: Ranking of OA Repositories from the BRICS Countries

5.2.6 Article Level Metrics (Altmetrics)

Outputs or impacts of scientific research are periodically measured worldwide with different parameters, where a variant number of different tools and techniques are used. The Journal Impact Factor (JIF), Hirsch's H-Index and a number of variations of these two citation-based metrics are used commonly for evaluating impacts of journals and their contributing authors and institutions. However, many funders, research administrators, scientific communities and other stakeholders felt these indicators as inadequate, inappropriate and skewed due to various reasons. The San Francisco Declaration on Research Assessment (DORA) publicly declared a statement on 16th December 2012 supporting altmetrics or alternative metrics also widely known as article level metrics), which is a clear transition from the citation-based indicators such as JIF and h-index to measuring impacts beyond citations of a particular piece of research work. DORA got considerable support from the funding bodies, publishers, research institutions, and scientific communities as altmetrics is focused on capturing the increasing variety of online references to a scholar's work. Altmetrics offers a different view of the influence of that work. In the editorial of the Bulletin of the American Society for Information Science and Technology, April-May 2013 issue in a special section on altmetrics, the Guest Editor identifies: "Altmetrics offer four potential advantages:

- A more nuanced understanding of impact, showing us which scholarly products are read, discussed, saved and recommended as well as cited.

- Often more timely data, showing evidence of impact in days instead of years.

- A window on the impact of web-native scholarly products like datasets, software, blog posts, videos and more.

- Indications of impacts on diverse audiences including scholars but also practitioners, clinicians, educators and the general public." (Piwowar, 2013)

Thus, an altmetric score of a scholar's work encompasses not only citation count but also number of times it is viewed, saved, shared, discussed, tagged, highlighted in news, and other such counts in academic social media and online networks. It also involves normalization of some counts based on subject area of an article. Figure 5.5 elaborates enumeration of an altmetric score from different sources. Figure 5.6 shows altmetric score of one of the highest rating articles, which is amongst top 1% in generating global attention of researchers, practitioners, journalists and bloggers communities. This paper ranks second in *Science* magazine, compared to all papers published therein. Figure 5.6 also shows detail counts of social media that talked about this paper. This way an almetric score can help in measuring impact of a scholarly work to researchers' communities. Figure 5.6 also shows a multicolour emblem, which is popularly known as Altmetric Badge. Journal publishers can integrate and provide a fuller picture of online impact by integrating visually-appealing Altmetric badges into their article level metrics pages.

The DORA as well as *Altmetrics Manifesto* indicate two major providers of altmetric score, namely Altmetric.com and ImpactStory.org. Many others are now under development stage, whereas some are in experimental or testing stages. Other important ones are namely PlumAnalytics.com, ScienceCard.org, PeerEvaluation.org, ResearchScorecard.com, and ReaderMeter.org. Many individual journal publishers also engaged in development of in-house article level metrics (ALM) tools, which they will integrate into their online journals in near future. A leading online journal publisher – PLOS (Public Library of Science) has widely publicized its interests in article level metrics. Article level measurement can be carried out using online tools from Altmetric.com and ImpactStory.org. ALM can also be integrated to publishers' websites for generating article level metrics for each published article, subject to having a DOI-linked webpage.
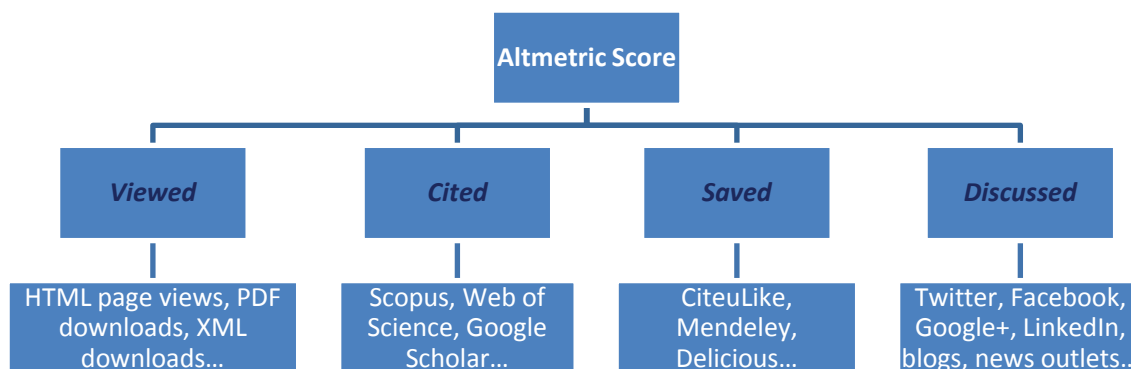
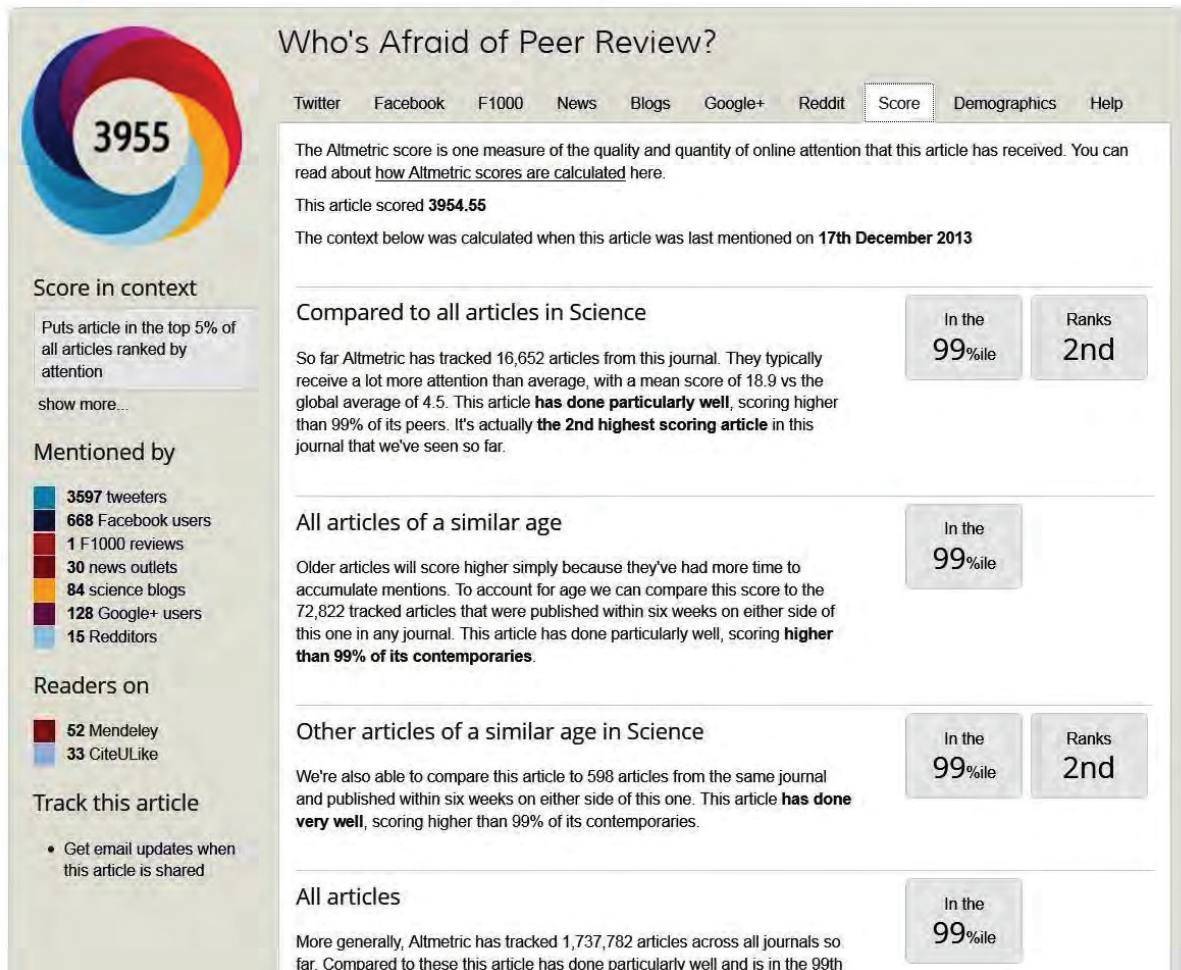**Figure 5.5: Deriving an Altmetric Score**

**Figure 5.6: Altmetric Score of one of the Highest Rating Articles
(amongst top 1%)**

5.3   EMERGING INDICATORS (H-INDEX AND DERIVATIVES)

The Journal Citation Reports (JCR) derived from the Web of Science, combining the Science Citation Index Expanded (SCI-E) and Social Science Citation Index (SSCI), can only provide evaluation metrics based on overall journals' performance, but JCR failed to measure performance of individual papers and individual authors. There has been emergent necessity of measuring scholarly impact of individual researchers. At this juncture, physicist Jorge E. Hirsch proposed a new indicator named H-Index. H-Index measures scholarly impact of individual researchers, and is the largest number h such that h publications have at least h citations. For example an H-Index value 6 denotes 6 publications have at least 6 citations each. In addition to an author, H-Index can also be obtained for a journal, an affiliating institution, a research group.

Other derivatives of h-index are:

- i10-index (number of publications with at least 10 citations),

- h5-index (the h-index for articles published in the last 5 complete years),

- h5-median (the median number of citations for the articles that make up its h5-index),

- g-index (an index to quantify an individual's scientific research output, proposed by Leo Egghe).

Google Scholar Citations[51] (GSC) helps in creating an author's profile that auto-generates several indicators based on an author's research impact and citations history. GSC is a personalized source of information for authors to keep track of citations to their published articles. As an author, you can check who is citing your publications, graph citations over time, and compute several citation metrics. You can also make your profile public, so that it will appear in Google Scholar results when people search for your name, e.g., Richard Feynman.

In a public profile, information displayed include: name of the scholar, current affiliation, broad areas of research interests, bibliographic details of all papers, number of citations received by each paper, names of co-authors, number of followers of this profile, etc. This profile also includes a few performance indicators and citation metrics, such as overall total citations, h-index, i-10 index; and total citations, h-index, i-10 index for last five years, as shown in Figure 5.7. When you register with GSC as an author, these citation metrics are computed and updated automatically as Google Scholar finds new citations to your work on the web. You can choose to have your list of articles updated automatically or review the updates yourself, or to manually update your articles at any time.
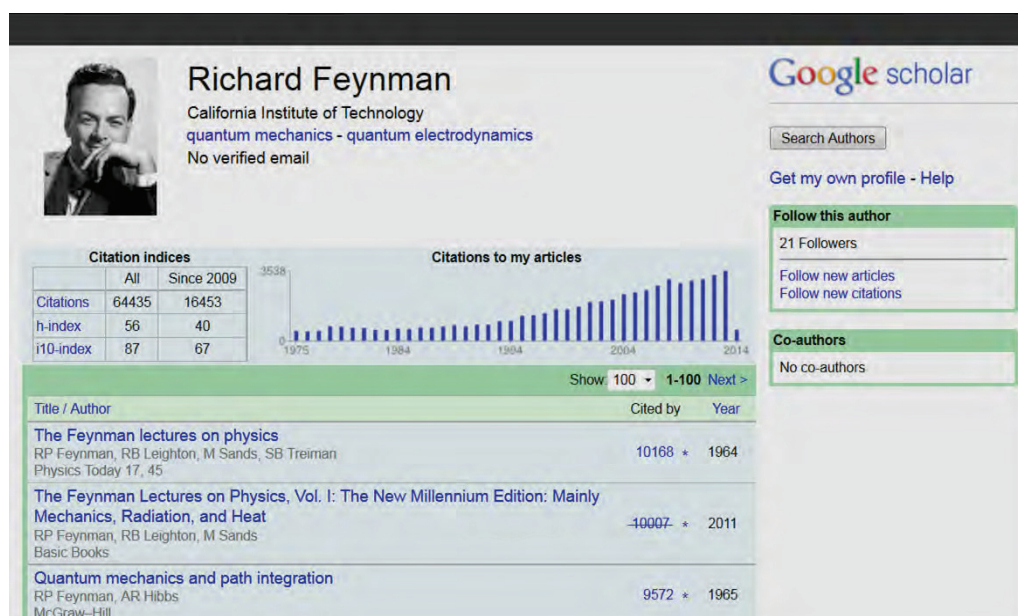

Figure 5.7: Display of Public Profile of Prof. Richard Feynman in Google Scholar Citations

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[51] http://scholar.google.com/citations

The Publish or Perish[52] (POP) software, developed by Australian Professor Anne-Wil Harzing in 2006, is a freely downloadable software for personal non-profit use. This software can be used for author impact analysis. The software fetches bibliographic information of papers written by specified author from the Google Scholar search engine and presents different author citations metrics such as h-index, g-index, cites per paper, hc-index (the contemporary h-index), citations count for each paper, cumulative citations count, publishing years (i.e., productive years of a scientist), etc. Similarly, this software can also be used for journal impact analysis with similar citation metrics.

Several other freely available online portals are available that derive different indicators for comparative impact analysis of authors, journals, institutions, and countries. Some examples are:

- eigenFACTOR.org – for article influence score, eigenfactor score and cost effectiveness score of journals.
- JournalMetrics.com – for SNIP (Source Normalized Impact per Paper), SJR (SCImago Journal Rank) values.
- JournalPrices.com – for cost effectiveness of journals.
- ScimagoIR.com – SCImago institutions rankings.
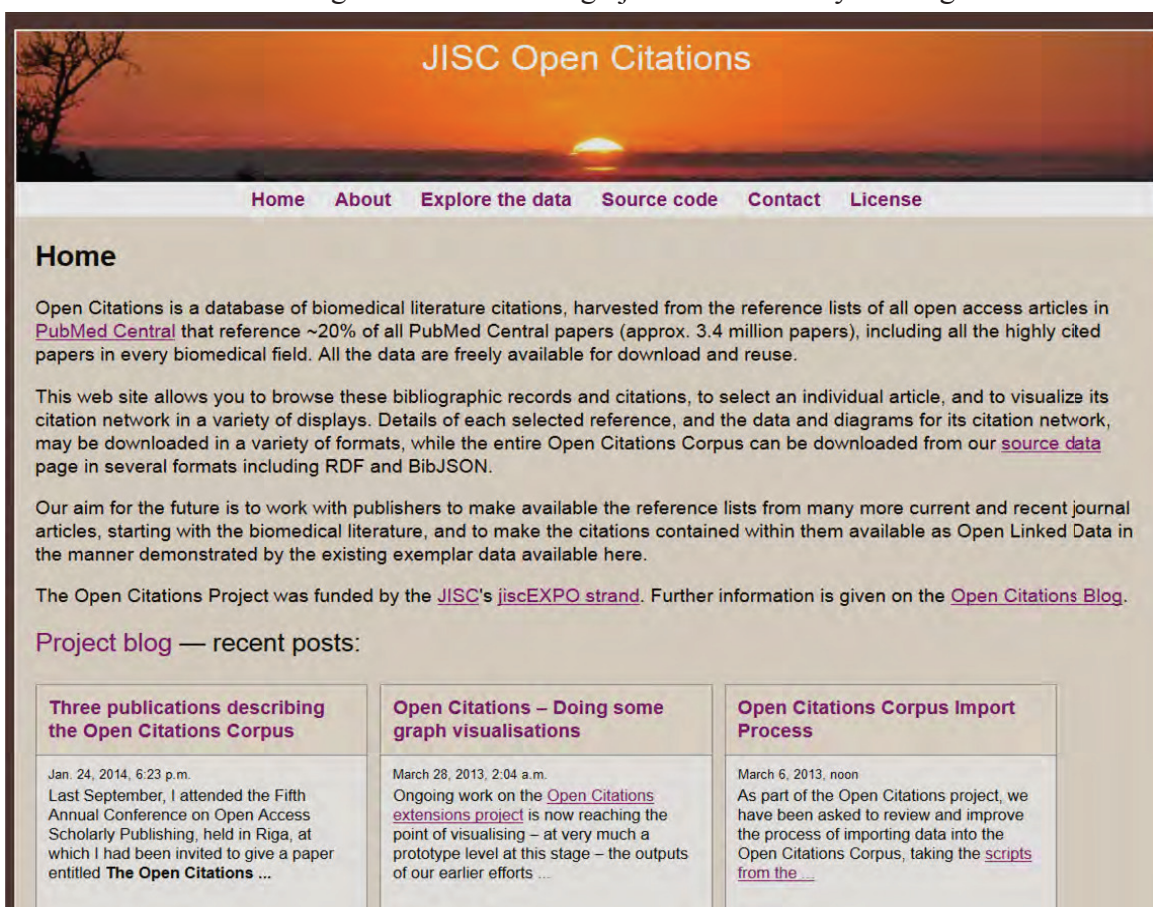- ScimagoJR.com – SCImago journal & country ranking.

Figure 5.8: Homepage of JISC Open Citations Project[53]

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[52] http://www.harzing.com/pop.htm
[53] http://opencitations.net

5.4   OPEN CITATION DATABASES

OA literature gets cited by successive research publications, that makes a sustainable life cycle of open science endeavours. Open citations projects, being planned and implemented in different scales, help in assessing impact and reach of OA resources. Global OA movement and particularly the concept of Green OA proliferate number of Open Archives Initiative (OAI)-compliant OA digital archives, institutional repositories and disciplinary repositories across the world. OAI-compliant repositories or archives can be harvested using metadata harvesting software such as Open Harvester Systems (OHS) developed by the Public Knowledge Project (PKP).

The Open Citations project (OpCit), initially funded by the Joint NSF-JISC International Digital Libraries Research Programme, is a conceptual framework for publishing bibliographic and data citations as linked open data within Open Citations Corpus (OCC). OpCit gathers citation data from OAI-compliant open archives such as arXiv.org and PubMed Central for "reference linking and citation analysis for open archives". Its citation-based linked open data are gathered in a central database called 'Citebase' for citation analysis and data mining.

5.5   LET US SUM UP

In this Unit, you have learnt about different methods and techniques used in evaluating research, particularly the measurement of science, scientific communities and scientific communications. Some of them are commonly described as research evaluation metrics. Historically, main tools used for research evaluation are citation analysis and citation indexes. Emergence of interactive social network and social media marks arrival of personalized web-based indicators for measuring social impact and outreach of every piece of scholarly work, and its producers – authors and institutions.

When an author shares his 'just published' research paper in social media, personalized researcher's profile and online forums, it comes with much higher possibilities of getting read or noticed or cited by co-researchers working in the same or allied research areas. Thus, author-level metrics and article-level metrics are built upon counting social 'share', 'saved', 'discussed' and 'cited' data sources available through different social webs.

 Unlike toll-access research literature, OA literatures have higher chance of getting cited as well as shared, saved and discussed due to their worldwide availability and visibility. Thus, OA literatures have possibility of considerably higher research impact. Altmetrics and other new indicators will help in judging or determining the productivity, visibility, reputation and impact of OA literature to scientific communities.

5.6   CHECK YOUR PROGRESS

a) Identify five key citation-based indicators for journals.

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b) Identify five key author-level indicators for evaluating author's
    productivity.

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c) Identify names of three common bibliometric laws.

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    …………………………………………………………………………...

d) Where can you find H-Index of an author?

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    …………………………………………………………………………...

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e) Where can you find G-Index of an author?

    …………………………………………………………………………...

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f) Which Citation Index was introduced first?

    i)   Science Citation Index
    ii)   Social Science Citation Index
    iii) Arts & Humanities Citation Index
    iv)   Data Citation Index

g) Which altmetrics tool generates an altmetric badge?

    i)   ImpactStory.org
    ii)   Altmetric.com
    iii) SSRN
    iv)   Scopus

h) Which company did introduce Science Citation Index?

    i)   Thomson Reuters
    ii)   Institute for Scientific Information
    iii) Elsevier
    iv) Springer

i) Which journal publishers did first introduce article level metrics?

    i)   JoVE
    ii)   eLIFE
    iii) PLOS
    iv) Biomed Central

j) Where can you find i10-Index of an author?

    i)   Google Scholar
    ii)   ResearchGate
    iii) Scopus
    iv) Google Scholar Citations

ONLINE VIDEOS FOR SELF-LEARNING

There are a number of video tutorials available on topics discussed in this Unit. Some of the tutorials were developed by the organizations responsible for the respective products or services, while some others were developed by reputed scientists and libraries. Now, you learn more about how these products can be used for measurement of articles and contributors.

- *Academic Visibility and the Webometric Future* **Video**[54]

- *Alternate Routes: Journal Metrics Revisited* **Video**[55]

- *Altmetric for Librarians* **Video**[56]

- *Article level metrics for publishers by Altmetric* **Video**[57]

- *Citation Indexing* **Video**[58]

- *eigenFACTOR* **Video**[59]

- *Eugene Garfield on H-indexes and Impact Factors* **Video**[60]

- *Eugene Garfield on Impact Factors* **Video**[61]

- *Getting Started with Harzing's Publish or Perish* **Video1**[62], **Video2**[63]

- *H-Index: A Measure of a Scientist's Impact* **Video**[64]

- *Impact Factor and other Bibliometric Indicators* **Video**[65]

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[54] http://www.youtube.com/watch?v=IRLo_VyBMIo
[55] http://www.youtube.com/watch?v=B7WRbybStps
[56] http://www.youtube.com/watch?v=RzVxoUx9tfc
[57] http://www.youtube.com/watch?v=XE8hDetxEt0
[58] http://www.youtube.com/watch?v=uYTZouNlxWo
[59] http://vimeo.com/20498839
[60] http://www.webofstories.com/play/eugene.garfield/71
[61] http://www.webofstories.com/play/eugene.garfield/38
[62] http://www.youtube.com/watch?v=pZpyo7X5YIc
[63] http://www.youtube.com/watch?v=w06iw9NPKaw
[64] http://www.youtube.com/watch?v=P47yAH8yz9U
[65] http://www.youtube.com/watch?v=Pmw9KKpuqFU

SELF-LEARNING ACTIVITIES

1. Determine various metric indicators (e.g. Journal Impact Factor, SJR, SNIP, Eigenfactor Score, Article Influence Score) of the following journal title - PLoS ONE - by visiting the following databases:

   a) SCImago at http://www.scimagojr.com/

   b) Eigenfactor.org at: http://www.eigenfactor.org/

   c) Journal Citation Reports or Scopus via your library database subscriptions.

2. Create a researcher profile for yourself or a researcher at your institution using the following:

   a) Google Scholar Citations at http://scholar.google.com/citations

   b) ORCID at http://orcid.org

   c) ResearcherID at http://www.researcherid.com

   d) ResearchGate at http://www.researchgate.net/

   e) LinkedIn at http://www.linkedin.com/

   f) Academia.edu at http://www.academia.edu/

   g) ImpactStory at http://impactstory.org/

3. Determine the altmetrics of a paper/author by using http://altmetrics.org/tools/

4. Determine different metrics of a scientific paper written by a senior researcher in your university/ institution PoP (Publish or Perish) Software.

5. Calculate h-index of five authors on any given area by using PoP Software.

ANSWERS TO CHECK YOUR PROGRESS

Unit 2

Q-(e) ii,

Q-(f) iv,

Q-(g) iii,

Q-(h) ii,

Q-(i) i.

Unit 3

Q- (f) ii,

Q- (g) iv,

Q- (h) iii,

Q- (i) i,

Q- (j) iv.

Unit 4

Q-(e) iv,

Q-(f) ii,

Q-(g) ii,

Q-(h) i,

Q-(i) ii,

Q-(j) iv.

Unit 5

Q-(f) i,

Q-(g) ii,

Q-(h) ii,

Q-(i) iii,

Q-(j) iv.

GLOSSARY OF TERMS

Advocacy   It is a political process by an individual or group which aims to influence public opinion, public-policy and resource allocation decisions within political, economic, and social systems and institutions. It can include many activities that a person or organization undertakes including media campaigns, public speaking, commissioning and publishing research.

Altmetrics   Altmetrics is a new metrics proposed as an alternative to the widely used journal impact factor and personal citation indices such as 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   The article influence determines the average influence of a

Influence® score	journal's articles over the first five years after publication. It is calculated by dividing a journal's EFS by the number of articles in the journal, normalized as a fraction of all articles in all publications.
Arts & Humanities Citation Index	It is the third commercially available citation index, launched in 1978 by the ISI. Now it is available with the WoS/ WoK platform.
Author Addendum	A legal instrument that modifies the publisher's agreement and allows you to keep key rights to your articles.
Author Rights	A bundle of rights which are part of copyright law, such as right to share, use, reuse, modify, perform and remix.
Capacity Building	It is a conceptual approach to development that focuses on understanding the obstacles that inhibit people, governments, international organizations and non-governmental organizations from realizing their developmental goals while enhancing the abilities that will allow them to achieve measurable and sustainable results. It is also referred to as capacity development.
Citation	It is a reference to a text or part of a text identifying the document in which it may be found.
Citation analysis	It is the examination of the frequency, patterns, and graphs of citations in articles and books. It uses citations in scholarly works to establish links to other works or other researchers. It is one of the most widely used methods of bibliometrics.
Citation Index	It is a bibliographic tool in print or electronic format that lists all referenced or cited source items published in a given time span.
Cited Half-Life	It is a measurement used to estimate the impact of a journal. It is the number of years, going back from the current year, that account for 50% of the total citations received by the cited journal in the current year. ISI developed this calculation to provide an indicator as to the long-term value of source items in a single journal publication.
Citing Half-Life	The number of journal publication years, going back from the current year that account for 50% of the total citations given by the citing journal in the current year. ISI developed this calculation to provide an indicator of the subtle changes in scope of a publication over the course of time.
Coalition	It is a pact or treaty among individuals or groups, during which they cooperate in joint action, each in their own self-interest, joining forces together for a common cause. This alliance may be temporary or a matter of convenience.
Copyleft	An arrangement whereby software or artistic work may be used, modified, and distributed freely on condition that anything derived from it is bound by the same conditions.

Copyright	The exclusive and assignable legal right, given to the originator or creator or author for a fixed number of years, to print, publish, perform, film, or record literary, artistic, or musical material.
Copyright Transfer Agreement	An agreement between authors and publishers, where authors transfer some exclusive rights to publishers.
Delayed OA	It offers free access after a specified period. A journal will make its articles freely available after a period of time, anywhere from 6 months to 2 years.
Digital Preservation	In library and archival science context, it is a formal endeavour to ensure that digital information of continuing value remains accessible and usable.
Eigenfactor® score	It is based on the number of times articles from the journal published in the past five years have been cited in the JCR year, but it also considers which journals have contributed these citations so that highly cited journals will influence the network more than lesser cited journals. References from one article in a journal to another article from the same journal are removed, so that Eigenfactor Scores are not influenced by journal self-citation.
Gratis OA	It removes price barriers alone. It is free of charge, but not free of copyright, or licensing restrictions.
H-Index	It refers to Hirsch's H-Index, suggested by physicist Jorge E. Hirsch. It is the largest number h such that h publications have at least h citations.
Hybrid OA	It offers free availability of certain articles written by authors who choose to pay a publication charge or APC to make their articles OA immediately on publication, while the rest of the articles requires a subscription to access.
i10 Index	It, introduced in 2011 by Google Scholar, indicates the number of academic publications an author has written that have at least ten citations from others.
Institutional Repository	It is an online archive for collecting, preserving, and disseminating digital copies of the intellectual output of an institution, particularly a research institution. Usually it is in OA.
Journal Citation Reports	It is a tool, launched in 1975 by the ISI, for ranking academic journals analysing citations count, journal impact factor and journal immediacy index. Presently it has two annual editions for science and social sciences, based on SCI-E and SSCI.
Journal Immediacy Index	It is the average number of times that an article published in a specific year within a specific journal is cited over the course of that same year.
Journal	It is the number of current citations to articles published in a

Impact Factor	specific journal in a two year period divided by the total number of articles published in the same journal in the corresponding two year period.
Libre OA	It removes price barriers and at least some permission barriers as well. It is free of charge and expressly permits uses beyond fair use.
Licence to Publish	An exclusive right authors grant to publishers.
License	A permission or authorization that ensures licensors get the credit for their work.
Open Source Software	It is computer software with its source code made available and licensed with a license in which the copyright holder provides the rights to study change and distribute the software to anyone and for any purpose.
Partial OA	It offers free availability of the journal's primary research articles, but access to other value-added content such as editorials and review articles requires a subscription.
Scholarly Journal	It is a peer-reviewed periodical publication in which scholarship relating to a particular academic discipline is published. Academic journals serve as forums for the introduction and presentation for scrutiny of new research, and the critique of existing research.
Science Citation Index	It is the first commercially available citation index, launched in 1964 by the ISI. Now it is available with the WoS/ WoK platform.
SCImago Journal Rank	It is a prestige metric based on the idea that 'all citations are not created equal'.
Scopus	It is the world's largest abstracting and citation database of peer-reviewed literature.
Selected OA	It offers free availability of selected articles of a journal issue, while the rest of the issue requires a subscription to access.
Self-Citation	It is a reference an author provide in a document to other documents written by himself/ herself.
Serials Crisis	A common phenomenon to describe the constant increase in subscription cost increases of many scholarly journals.
Short-term OA	It provides free access to articles for a short period after publication, after which they are only available to paid subscribers.
SNIP	It measures contextual citation impact by weighting citations based on the total number of citations in a subject field.
Social Science Citation Index	It is the second commercially available citation index, launched in 1972 by the ISI. Now it is available with the WoS/ WoK platform.

LIST OF ABBREVIATIONS

ACD	IFLA Acquisition & Collection Development
A&HCI	Arts & Humanities Citation Index
AIS	Article Influence® score
ALM	Article Level Metrics
Altmetrics	Article Level Metrics
APC	Article Processing Charge
ATA	Alliance for Taxpayer Access
BBB	Budapest, Berlin and Bethesda OA declarations
BMC	BioMed Central
BOAI	Budapest Open Access Initiative
CC	Creative Commons
CC BY	Creative Commons Attribution
CC BY-NC	Creative Commons Attribution- Non-Commercial
CC BY-NC-ND	Creative Commons Attribution- Non-Commercial- No Derivatives
CC BY-NC-SA	Creative Commons Attribution- Non-Commercial- Share Alike
CC BY-ND	Creative Commons Attribution- No Derivatives
CC BY-SA	Creative Commons Attribution- Share Alike
CLOCKSS	Controlled LOCKSS
COAPI	Coalition for Open Access Policy Institutions
COPE	Committee on Publication Ethics
CTA	Copyright Transfer Agreement
DCC	Digital Curation Centre
DOAJ	Directory of Open Access Journals
DOI	Digital Object Identifier
DOI	Digital Object Identifier
DORA	San Francisco Declaration on Research Assessment
DRM	Digital Rights Management
EFS	Eigenfactor® score
EIFL	Electronic Information for Libraries
EOS	Enabling Open Scholarship
ERA	European Research Area
ETD	Electronic Theses and Dissertations
EU	European Union
FAO	Food and Agriculture Organization
FASTR	Fair Access to Science and Technology Research

FOSTER	Facilitate Open Science Training for European Research
FP7	Seventh Framework Programme for Research and Development
FSF	Free Software Foundation
GPL	GNU General Public License
GSC	Google Scholar Citations
HC-Index	Contemporary H-Index
H-Index	Hirsch Index
HTML	Hypertext Markup Language
I2S2	Infrastructure for Integration in Structural Sciences Project, U.K.
INASP	International Network for the Availability of Scientific Publications
IPR	Intellectual Property Rights
ISI	Institute for Scientific Information, USA
JCR	Journal Citation Reports
JIF	Journal Impact Factor
JII	Journal Impact Factor
JISC	Joint Information Systems Committee, United Kingdom
LIBER	Association of European Research Libraries
LOCKSS	Lots of Copies Keep Stuff Safe
LTP	Licence to Publish
MOOC	Massive Online Courses
NDLTD	Networked Digital Library of Theses and Dissertations
OA	Open Access
OAI	Open Archives Initiative
OASPA	Open Access Scholarly Publishers Association
OCC	Open Citations Corpus
OCS	Open Conference Systems
OCW	Open Courseware
ODL	Open and Distance Learning
OER	Open Educational Resources
OHS	Open Harvester Systems
OJS	Open Journal Systems
OpenDOAR	Directory of Open Repositories
OPL	Open Content License
OSS	Open Source Software
PKP	Public Knowledge Project
PLOS	Public Library of Science
PLOS ALM	PLOS Article Level Metrics.
PMC	PubMed Central

POP	Publish or Perish software
R&D	Research and Development
RLUK	Research Libraries in the UK and Ireland
ROARMAP	Registry of Open Access Repositories Mandatory Archiving Policies
RoMEO	Rights Metadata for Open Archiving
SCI-E	Science Citation Index Expanded
SciELO	Scientific Electronic Library Online
SJR	SCImago Journal Rank
SNIP	Source Normalized Impact per Paper
SPARC	Scholarly Publishing and Academic Resources Coalition
SSCI	Social Science Citation Index
SSRN	Social Science Research Network
UKOLN	United Kingdom Office for Library and Information Networking
UNESCO	United Nations Educational, Scientific and Cultural Organization
URI	Uniform Resource Identifier
WIPO	World Intellectual Property Organization
WoK	Web of Knowledge
WoS	Web of Science
WSIS	World Summit on the Information Society

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