redin

UNIVERSIDAD DE ANTIOQUIA
1803

revista facultad de ingeniería

Universidad de Antioquia

June, 2017

No. 83

ISSN 0120-6230
e-ISSN 2422-2844

No. 83
June, 2017
ISSN 0120-6230
e-ISSN 2422-2844

Book Cover
Image "Simulation of magnetic field flux lines and uniform area in the TSH coils:
Pair 2-By." by Andrés Fernando Restrepo-Álvarez, Edinson Franco-Mejía, Héctor Cadavid-Ramírez and Carlos Rafael Pinedo-Jaramillo.

Layout and printing
L. Vieco S.A.S.
comercial@lvieco.com

Post
Reduced postal fare N° 842

E-mail
revistaingenieria@udea.edu.co

Web site
redin.udea.edu.co

The contents or any other legal restriction related to the articles is responsibility of the authors.
This issue was supported by Indexed Journals Fund of the Vice-President for Research, University of Antioquia Press

Objective of Revista Facultad de Ingeniería
"The principal objective of the Revista Facultad de Ingeniería is to promote the publication of original and unpublished articles derived from experimental research, engineering simulations or review papers, developed by researchers and experts from national or international, public or private institutions."

Table of contents

redin Revista Facultad de Ingeniería, Universidad de Antioquia, No 83, pp. 7-8, 2017

EDITORIAL

Bibliometry is the science that studies the nature and evolution of a scientific discipline, enabling publications, by means of computation and analysis of different data. Similarly, scientometry is the application of quantitative methods for research on the development of science considered as an informative process [1].

The bibliometric analysis is a documentary method that has achieved an important development during the last three decades. Its objectives are, on the one hand, the study of the size, growth and distribution of scientific manuscripts and, on the other hand, the investigation of the structure and dynamics of the groups that produce and consume these manuscripts and the information they contain [2, 3].

Sometimes bibliometric indicators are poorly used, which is especially evident in the use and abuse of the well-known impact factor of a scientific journal [4]. Some of the earliest works in bibliometrics at the beginning of the century were the result of man's own curiosity to understand scientific development. But it was not until the 1960s that Price (5) coined the concept of "Science of Science" when scientific resources and methods were first applied to the analysis of science itself. At that time, bibliometric studies were boomed by the combination of two important phenomena: the computerization of the database and a greater demand by the authorities responsible for scientific planning to evaluate the effectiveness of their policies. It was from the works by Lotka, Bradford, Zipf, Brookes, Kendall, Simon, Bookstein, among others, when it was shown that scientific literature exhibits a regular statistical behavior. An important step towards the institutionalization of scientometrics was the founding of Scientometrics journal in 1978. The bibliometric indicators reveal, among others, the following aspects [1]:

- The growth of any field of science, according to the chronological variation of the number of works published within it.
- The aging of scientific fields, according to the "half-life" of the references of their publications.
- The chronological evolution of scientific production, according to the year of publication of the manuscripts.
- The productivity of authors or institutions, measured by the number of their works.
- Collaboration between scientists and institutions, as measured by the number of authors per work or collaborative research centers.
- The impact or visibility of publications within the international scientific community, measured by the number of citations received by subsequent publications.
- The analysis and evolution of the diffusion sources of the works, by means of impact indicators of the sources.
- The dissemination of scientific publications among the various sources, etc.

Although it is not possible to know absolutely the quality of scientific publications, there are quantitative bibliometric indicators in the evaluation of scientific journals that allow a relative evaluation of their impact on the scientific community. Some of these are explained below:

1) Impact factor: Created in 1955 by Eugene Garfield in an article published in the Science journal, proposing a method to compare the journals and evaluate their relative importance [6]. It is a measure of the frequency with which the average article in a journal has been cited in a given period of time. It is calculated on an annual basis for journals indexed in the Journal Citation Reports (JCR) by Thomson Reuters [7]. It is calculated as follows:

A = B / C
A = Impact Factor of the journal X in the year 2013.
B = Number of citations received by the journal X in 2013 of articles published in the years 2011 and 2012.
C = Number of articles published in the journal X in the years 2011 and 2012.

2) Index of immediacy: This index measures the average number of times an article, published in a particular journal during a specific year, is cited and allows leading journals in investigation to be identified in. It is also calculated by Thomson Reuters. It is calculated as follows:

A = B / C
A = Immediacy index of the journal X in 2013.
B = Number of citations received in 2013 from articles published in the journal X in 2013.
C = Number of articles published in the journal X in 2013.

3) H-Index: It was originally described by Jorge Hirsch, of the University of California, in the year 2005. It allows simultaneously to measure the quality (according to the number of citations received) and the quantity of the scientific production. It is very important to identify the most outstanding journals within an area of knowledge. It is calculated by ordering the publications of a journal by the number of citations received in descending order and then numbering and identifying the point at which the order number matches the number of citations received. The H-index for journals is calculated by SCImago Journal & Country Rank (SJR) [8]. Example:

H-index = 9 (there are 9 publications that have received at least 9 citations each).

4) Quartile: It is an indicator or measure of the ranking of a paper within its subject. A list of journals is ordered from the highest to the lowest impact factor and then divided into 4 equal parts; each of these parts will be a quartile. The journals with the highest impact factor will be in the first quartile, the middle quartiles will be the second and the

DOI: 10.17533/udea.redin.n83a01

third quartile, the lowest quartile will be the fourth [7, 8]. Example:

100 magazines of one category / 4 quartiles = 25 magazines per quartile (Q1: 1-25, Q2: 26-50, Q3: 51-75, Q4: 76-100).

5) SCImago Journal Rank (SJR): This indicator was developed by SCImago, a research group of the *Consejo Superior de Investigaciones Científicas* (CSIC) [Higher Council for Scientific Research], and the universities of Granada, Extremadura, Carlos III (Madrid) and Alcalá de Henares. With SJR, the research, quality and reputation areas of the scientific journal have a direct impact on the value of the citation. Therefore, the citation of a journal with a high SJR is worth more than the citation in a journal with a low SJR. It was designed to evaluate the impact of a publication by combining the number of citations received with the influence of the publications citing it. It is calculated using an iterative algorithm in which, starting from an identical score for each journal, the journal set redistributes the scores each time they are cited between them. Once the prestige of each journal has been calculated, a normalization process is performed so that the indicator neutralizes the size of the journal. In this way, the pattern of citations between the different research areas is standardized [8, 9].

6) Journal Citation Reports (JCR): It is the best known and most highly valued indicator by the evaluation agencies of the research activity. It measures the impact of a journal based on citations received from articles published and collected in Web of Science (WOS). The Journal Citation Reports has two annual editions: JCR Science Edition and JCR Social Sciences Edition. The publication window is two-year retrospective, although there is an impact factor collecting information for the previous 5 years. It should be noted that there is no impact factor for Art and Humanities, except for History and Linguistics [7].

7) SCOPUS: It provides the opportunity to verify index values of journals such as SJR, Source Normalized Impact per Paper (SNIP) and H-Index. From the journal record, you can make use of the Journals Analyzer, an online application that allows comparing simultaneously and graphically a journal with up to 10 selected journals. For each of the publications, the SJR, the SNIP, the number of citations received, the number of manuscripts published, the percentage of articles not cited and the percentage of articles reviewed are shown in table and graph. Data are updated biannually [9].

8) Source Normalized Impact per Paper (SNIP): This indicator was developed by the Centre for Science & Technology Studies CWTS of the University of Leiden. This indicator represents the standard impact of source by article, it measures the average impact of the citation of the publications of a paper. Unlike the impact factor of the journals, SNIP corrects for differences in citation practices between scientific fields, thereby allowing for more accurate between-field comparisons of citation impact. It weighs citations to a journal based on the number of citations in an area of knowledge (immediacy), that is, in a field of research with a lower frequency of citations, each citation has a higher value than that of citations in fields with higher frequency. It is also considered the frequency with which authors and authors cite or the projection of an area of knowledge in reference databases [8-10].

References

1. R. Sancho, "Indicadores bibliométricos utilizados en la evaluación de la ciencia y la tecnología. Revisión bibliográfica," *Rev. Esp. Doc. Cient.*, vol. 13, no. 3-4, pp. 842-865, 1990.
2. J. M. López and M. L. Terrada, "Los indicadores bibliométricos y la evaluación de la actividad médico-científica (IV). La aplicación de los indicadores," *Med. Clín. (Barc.)*, vol. 98, pp. 384-388, 1992.
3. M. L. Terrada and R. Peris, "Bibliometría de la literatura pediátrica española (1974-1981)," *An. Esp. Pediatr.*, vol. 17, pp. 105-114, 1982.
4. J. M. López and M. L. Terrada, "Los indicadores bibliométricos y la evaluación de la actividad médico-científica (I). Usos y abusos de la bibliometría," *Med. Clín. (Barc.)*, vol. 98, pp. 64-68, 1992.
5. D. Price, "Network of scientific papers," *Science,* vol. 149, pp. 510-515, 1965.
6. B. Velasco, J. Eiros, J. Pinilla, and J. A. San Román, "La utilización de los indicadores bibliométricos para evaluar la actividad investigadora," *Aula Abierta*, vol. 40, no. 2, pp. 75-84, 2012.
7. Thomson Reuters, InCites™ Journal Citation Reports. [Online]. Available: https://jcr.incites.thomsonreuters.com. Accessed on: May 22, 2017.
8. Scimago Lab, *SJR Scimago Journal & Country Rank*. [Online]. Available: http://www.scimagojr.com. Accessed on: May 20, 2017.
9. Elsevier, *Scopus*. [Online]. Available: https://www.scopus.com. Accessed on: May 12, 2017.
10. Centre for Science and Technology Studies, Leiden University, *CWTS Journal Indicators*. [Online]. Available: http://www.journalindicators.com. Accessed on: May 16, 2017.

Maryory Astrid Gómez Botero
Editor-in-Chief
Revista Facultad de Ingeniería
Professor-Universidad de Antioquia
https://orcid.org/0000-0001-9685-3080