

Bibliometrics To Social Media Analytics: Old Wines With New Flavour In New Bottle

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Abstract- *Root of bibliometrics founded in late 19th century and further developed in early 20th century but it has been zoomed after 1960s due to development computation and communication technology, which were became instrumental in dissemination of information. Like every innovation, first it touches with science and technology and later, as technology became available for common people, it became easy to explore for academicians and researchers of every field. Furthermore, with the emergence of internet and smartphones in 2nd decade of 20th century, social media became common and inevitable for the human society and all the bibliometrics tools and techniques have been reshaped for the social media and became a useful field for the consumer behavioural research tool for the users of social media. As these techniques and tools are associated with behavioural research, it became major tools for promoters, marketers and propaganda agencies. This is also useful for policy makers and people associated with disaster management and pandemics.*

Keywords- Bibliometrics, Science Citation Index, Altmetrics, Social Media Analytics, Artificial Intelligence, Machine Learning, Behavioural Research.

I. GENESIS

When Bibliometrics came into existence, nobody has even imagined that this technique will further develop and grow and will be used widespread as consumer / viewer behavioural analytic tool. But now it is common. This development happened in last decade but it was started a century ago. In 1917 by Cole and Eales, both professors in Zoology, have conducted a study which were known as “statistical analysis of the literature” by counting and categorizing publications by country of origin and by field. (Cole, F. J., & Eales, N. B., 1917).

Bibliometrics is essentially a quantitative analysis of publications for the purpose of ascertaining specific kinds of phenomena (Herubel, Jean-Pierre, 1999). Though it is quantitative in nature, it reflects qualitative outcome by ranking of sources, authors, fields, etc. in almost any subject field. Bibliometric studies can be based on index terms, words

in the titles of documents, authors, sources, or geographical or time distribution. (Von Ungern-Sternberg, S., 1998)

As this field went ahead, presently Bibliometrics, Scientometrics, Webometrics and Informetrics in Library and Information Science have been developed and it have capacity to understand relevant ideas from different fields of knowledge. (Chellappandi, P., and C.S. Vijayakumar, 2018)

Science Citation Index and its’ Role in Bibliometrics:

Dr. Eugene Garfield, founder and now Chairman Emeritus of ISI (now Clarivate Analytics), was deeply involved in the research relating to machine generated indexes in the mid-1950’s and early 1960’s. One of his earliest points of involvement was a project sponsored by the Armed Forces Medical Library (predecessor to our current National Library of Medicine). The Welch Medical Library Indexing project, as it was called, was to investigate the role of automation in the organization and retrieval of medical literature. The hope was that the problems associated with subjective human judgement in selection of descriptors and indexing terms could be eliminated. By removing the human element, one might thereby increase the speed with which information was incorporated in to the indexes. It might also increase the cost-effectiveness of the indexes. Garfield grasped early on that review articles in the journal literature were heavily reliant on the bibliographic citations that referred the reader to the original published source for the notable idea or concept. By capturing those citations, Garfield believed, the researcher could immediately get a view of the approach taken by another scientist to support an idea or methodology based on the sources that the published writer had consulted and cited as pertinent in the bibliography. As retrieval terms, citations could function as well as keywords and descriptors that were thoughtfully assigned by a professional indexer (History of citation indexing, n.d.).

The Science Citation Index (SCI®) was first promulgated in Science in 1955, as an up-to-date tool to facilitate the dissemination and retrieval of scientific literature. Its practical realization was possible thanks to the already-existing information service, Current Contents. (Garfield, 2007)

Garfield's original motivation for the creation of an index for scholarly content in the 1950s was to study the history and development of science. However, through the latter half of the twentieth Century and the early part of the twenty-first Century, use cases for this type of data have significantly diversified (Hook et al., 2018).

Information technology: a catalyst

As the computation capabilities developed, it is being used widely in the field of academics and research. Also, in 1970s, with the emergence of Personal Computers, it became reachable to common man and this is the real leap for so many fields as well as bibliometrics. During 1980s and post era, other than paper form became handy as well as cheaper. It had ability to contain more scientific data than ever before. These leads to major change in bibliographic databases. (Falk, J. D., 1982). In those days Current Content and Citation Indexes were available in the form of Floppy disk and then on CD-ROMs.

However, what we use and see now is the resultant of modern day IT which involve cloud computing and data analytics.

Inception of Social Media and association with analytics

In the early days of social media, PR agencies would monitor customers' posts on a business's own website in an attempt to identify and manage disgruntled customers. With the explosion in the number of social media sites and the volume of use on them, this is not nearly enough. Consider the prevalence of social media.

- Social networking is the most popular online activity
- 91% of online adults use social media regularly
- Facebook, YouTube, and Twitter are the first, third, and tenth most-trafficked sites on the Internet (Fan & Gordon, 2014).

Analysing social media data can help organizations understand behaviour and target products and services more effectively. Key applications include profiling voters and complementing traditional polling, targeting adverts at consumers, credit scoring and informing policing decisions. There is a debate about how to analyse social media data, including which methods to use and how to control for biases users' consent as long as they are anonymized (Jelvehgaran Esfahani et al., 2019).

Here, as a curious reader you may be thinking that why Science Citation Index and Social Media Analytics have been mentioned here? It is mentioned here as it is providing behavioural data of viewer who view content either from website and journals and use for their research work or decision making. So, it is become necessary to put overview or glimpses of one's work on social media platform after publishing research work.

Web 2.0 and Social Media analytics

The second generation of Social Media Analytics or Social media metrics bring to the foreground a family of new indicators to gauge the dissemination and reception of research outside the traditional academic circles by providing recent data on various events including shares, users, readers, downloads, comments, or recommendations in social media sites such as Twitter, Facebook, News media, Mendeley, and blogs (Díaz-Faes et al., 2019).

The advent of social media using Web 2.0 technologies has opened up unprecedented new possibilities of engaging the public in government work and has changed the public's expectations about how government work should be done. Indeed, social media applications provide channels not just for mass dissemination but also for mass production and collaboration, and have become acceptable information and communication channels in governments, playing an important role in implementing open government and in rendering online public services (Díaz-Faes et al., 2019).

Internet and social networks transform the dynamics of social mobilization. The paper of the social environment is the consequence of a technological democracy. Passive reception has given way to an active, participatory connection. Users of social media publish a large amount of content on blogs and social networks, which helps to solve customer questions and make consumption decisions thanks to comments (Fondevila-Gascón et al., 2020).

The above studies drawing attention that with the emergence of processing speed, more storage capacities and high-speed data transfer facilities with new data analytics field and development of packages like R and Python, both bibliometrics and altmetrics have gained with respect to quality and wide spread use. Altmetrics are non-traditional metrics that cover not just citation counts but also downloads, social media shares and other measures of impact of research outputs. (Fan & Gordon, 2014).

Social media analytics can be conducted in different fields of study, Social media analytics can be used in various

fields to get insight from social media platforms; it can be used in business, agriculture, politics, disaster management and other fields (Madila et al., 2021).

The cloud based databases and various social media platform along with analytics tools (softwares) are capable to produce quantitative and qualitative outcomes 24x7 and need to be interpreted for decision making and innovations.

AI, ML and Bigdata analytics with respect to Altmetrics

Artificial Intelligence is playing key role both in Social Media analytics as well as modern bibliometric analysis. Technology and Artificial Intelligence has major effect on marketing. The presence of Social Media and technology had already changed the statistics of marketing; with the integration of Artificial Intelligence it has taken the game a notch higher. The advent of Artificial Intelligence has opened ample of new opportunities and fields for further discoveries. The intervention of Artificial Intelligence in marketing has given rise to the scope of new researches (“Role of Artificial Intelligence in Social Media Marketing,” 2019).

Likewise, modern bibliographic databases like WoS, Scopus and Dimension have enhanced its strength with the use of machine learning (ML) and artificial intelligence (AI) (Hook et al., 2018). In similar manner, social media too using ML and AI and feed the content to users as per behavioural outcomes of the analytics.

Social media is already a critical part of the information ecosystem and as social media platforms and applications gain widespread adoption with unprecedented reach to users, consumers, voters, businesses, governments, and non-profit organizations alike, interest in social media from all walks of life has been skyrocketing from both application and research perspectives. (Zeng, H. Chen, R. Lusch and LI S., 2010).

II. CONCLUSION

Though bibliometrics is more than a half century old filed, it is highly developed now. Now, it is part of Big data science. Artificial Intelligence and Machine Learning have added flavour in bibliometrics and this field has more applicability as social media is playing a major role in every person’s social life as well as decision making. More over to this, the outcome of Altmetrics has major role on creation of strategies of marketing, brand promotion, social-religious-political opinion of individual human being as well as society and nation too. The journey of bibliometrics started with journals article and it is become an important tool for human society.

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