

Editorial

Bibliometrics is a research method used in library and information science to quantitatively assess and analyze publication data. It can be used for example to evaluate the contribution of a single author to a given field or the relationship between two or more authors or works. There are three so-called laws (quite different from engineers or scientists accustomed to more fundamental doctrines to be called laws!) that seem to be most commonly used in bibliometric studies and literature. They are: Lotka's Law of Scientific productivity, Bradford's Law of Scatter and Zipf's Law of word occurrence. Of course, there are more statistical "laws" that appear in the information science literature e.g. Benford's Law, Fitts Law, Hicks Law, Metcalf's Law and the Pereto Principle (20% of authors make 80% of the contribution etc). We will visit some of these interesting laws in subsequent editorials but for this editorial, I will focus on the most relevant of these laws viz. Lotka's Law.

Back in 1926 Alfred J. Lotka published paper in the Journal of Washington Academy of Sciences (vol. 16, no.12, pp 317-323) entitled *The Frequency Distribution of Scientific Productivity*. This law describes the frequency of publication by authors in a given field. Clearly it does not consider the quality or impact of such publications. The law postulates that "the number (of authors) making n contributions in a given field, is inversely proportional to the square of the number making one i.e. $1/n^2$. The proportion of all contributors that make a single contribution is about 60 percent. Stated differently, in a given field 60 percent of the authors will make one contribution, 15 percent will make two contributions, 7 per cent will make 3 contributions and so on. Only six percent of authors in a given field will produce more than 10 articles. This law has been shown to apply reasonably well to patents as well although there are recent publications that show that the power 2 is not always valid for all fields and further it may even be time-dependent.

So, what is the significance of Lotka's Law to modern science and technology? Basically it states that only a small fraction of the population of scientists or engineers or artists make a really impactful contribution to their respective fields. The more populous nations in terms of scientists, engineers, technologists, artists etc will have an edge in global competition once they are able to produce the requisite numbers of trained personnel. The recent essay in Science (vol.307, March 4, 2005, pp 1415-1418) by my personal friend Dr. R.A. Mashelkar makes this point very eloquently. The world will soon benefit from the developing intellectual capital in China and India, who within the next decade or two, can become engines of knowledge generation. What is needed is good management and sustainable development without exhausting the earth of its limited resources.

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