DOI: 10.36347/sjebm.2016.v03i01.001

Scholars Journal of Economics, Business and Management e-ISSN 2348-5302
Adedayo AV.; Sch J Econ Bus Manag, 2016; 3(1):1-2 p-ISSN 2348-8875

(An International Publisher for Academic and Scientific Resources)

Another Perspective to Citation Count

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Abstract: This paper examined a core problem in citation analytics. The pertinence of citations made in introduction sections of scientific articles was studied. A brief exposition was made to provide insight on the methodology to compute pertinence. With the understanding from the exposition, mathematical expressions were derived and used to quantify pertinence. Pertinence of seventy randomly selected scientific articles was studied. Result showed that significant amount of citations made in introduction section of the studied articles are impertinent to the study.
Keywords: Content analysis; Content pertinence; Performance evaluation; Impact factor; Citation analysis

INTRODUCTION

In one of the online publications of Nature Publishing Group, Philip Ball [1] discussed issues relating to negative citation of science publications. He identified from the work of Alexander Oettl, an economist at the Georgia Institute of Technology in Atlanta that the rate at which negative citations appear in the literature is low but not negligible. In the work of Alexander Oettl, the study team checked through citations in articles published in the *Journal of Immunology*. Immunologists helped the team to manually classifying 'negative' citations. Overall, it was found that only about 2.4% of the citations were "negative". Although the paper concluded that the rate of negative citation was low but not negligible, however, one may be tempted to conclude that the problem with citations analytics is a minor one. Unfortunately, this may not be the real situation, because the significant amount of critiques on citation analytics indicates that the problem is not minor. While it has been argued severally that negative citations can adulterate citation analytics, it is also believed that the success of citation analysis methodologies relies on the integrity of the citing authors. The citation impact metrics would work better, only if every citing author meticulously cited only the earlier works pertinent to theme of the new manuscript [2]. Therefore, pertinence of the cited reference to the new study being reported becomes crucial as an important consideration during performance evaluation. Actually studies have been reported on analogy between citation and votes. In the studies, it was opined that by citing articles from a given journal in their own manuscripts, authors of academic writings are in essence casting votes for the primary literature. A count of these citations serves as a tally of those votes. However, it should be pointed out that votes are not always generally valid. Sometimes, votes can be invalid [3]. One of the attributes that can determine validity of a citation is pertinence. Citation of an impertinent reference can not count as valid. Particularly, some citations made in the introduction/literature review sections may not qualify as pertinent [4, 5], and can be referred to as invalid votes. In this study, a report on the pertinence of citations made in introduction sections of randomly selected scientific articles was made. The idea presented in the report is very fresh, original and thus forms the rationale for the study.

METHODOLOGY

To determine pertinence of citations in scientific articles, not all citations count equally [4, 5]. A classification of all citations within the article was made. For article reporting empirical research, classification can be made into two (2), viz: (i) Real Citations and (ii) Imaginary Citations [5]. Citations made in the Methodology/Results/Discussion of Results/Conclusions are classified as Real Citations, because these truly show that the cited source support the new research being reported, and thus is pertinent to the reported study. Citations made in the Introduction/Literature Review sections are classified as Imaginary Citations. This because, any citation made in the Introduction/Literature Review that cannot be cited in the Methodology/Results/Discussion of Results/Conclusions can only be stated to have imagined pertinence to the study. The pertinence is only a figment in the Imagination of the citing author. Citations in the introduction sections of seventy (70) randomly selected scientific articles were analyzed. The

total number of authors cited in the Introduction sections were counted and recorded as N_c. Also, a counting of common citations made both in the Introduction and any other section of the research article was made, and recorded as n_c. Pertinence (p) of each research article was determined by finding the ratio n_c: N_c expressed as a percentage i.e.

$$p = 100\left(\frac{n_c}{N_c}\right) \qquad (1)$$

RESULT AND DISCUSSION

The overview of the variation of pertinence of the research articles analyzed (Figure 1) for the study showed that the entire articles studied have pertinences below 44%. This means the article with the highest pertinence have about 56% citations that are not pertinent to the study! By all standards, this amount is significant. This trend is in line with the predictions made by Adedayo [3] that significant proportion of citations made in the introduction sections may not be applicable in the computation of effective impact of publications.

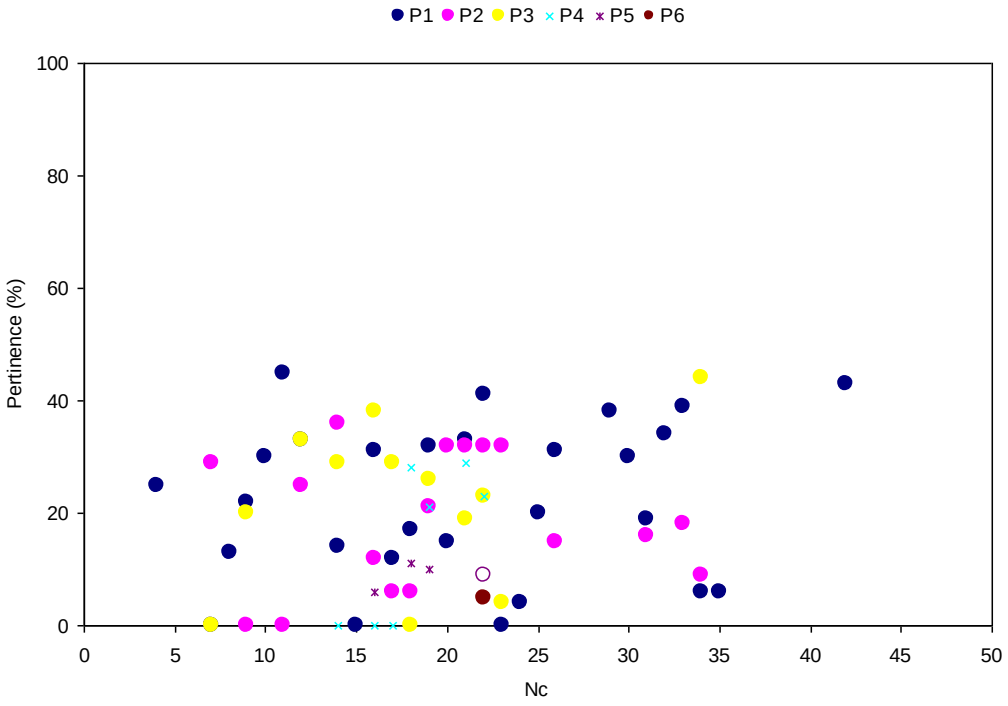

Fig. 1: Overview of the Variation of Pertinence in Research Articles

CONCLUSION

The study has shown that significant proportion of citations made in the introduction sections of scientific articles represent figment of imagination of the citing author. Overall, about 56% of citations made in the Introduction sections cannot be cited in the Methodology/ Results/ Discussion of Results/ Conclusions. Also, *pertinence;* a new parameter useful in the evaluation of scientific publications has been introduced.

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