
Sourcing Human Resources for Leadership of Research

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ABSTRACT

This paper developed a publication based scheme for explicit quantification of the leadership index of published researchers. A review on leadership and publication metrics was presented. Inadequacies of present empirical methods used in leadership studies; and scarcity of useful publication based metric for this purpose were established. A brief exposition was made and used in conceptualizing the important attributes useful for quantifying the research leadership index. The paper identified that the total number of citations received, the year when the researcher's publication was cited, the year when the researcher's cited article was published, the total number of publications by a researcher, and the number of authors that are listed in a publication is important and useful in the quantification of research leadership index.

Keywords: Research metrics, Research performance, Research evaluation, Citation analytics

INTRODUCTION

One of the ways to achieve sustainable business success in the present-day highly competitive business environment is to maintain a competitive advantage. Competitive advantages are conditions that allow a company to produce goods or services of equal value at a lower price or in a more desirable way. The role of research is very important in this endeavor. Researches are carried out by the organization to develop innovative ways of doing business by producing better products at lower production costs. It is therefore important to source and recruits the best leading professionals who will continue to help the company maintain its competitive advantage. For the sustainability of business success, the importance of leadership has been identified from the earliest civilizations.

The leadership concept has been widely used to imply the process of influencing groups of individuals to achieve coordination and collective action [1-5]. With this background, many works have been published on this subject. The published articles are of a broad variety of international leadership research and theory inquiries such as Transformational/Authentic, Servant, democratic, Paternalistic, Transactional, etc leaderships. Ceri-Booms,[6] carried out an empirical study with Turkish employees to study the role of trust in how transactional and authentic leaders create organizational identification. Datta, [2] worked on how to evaluate the effectiveness of authentic leadership. Groves and LaRocca, [7] worked on ethical values as applicable in leadership. Transformational and transactional leadership and follower attitudes towards corporate social responsibility were studied empirically. Öner, [8] presented a study on servant leadership and paternalistic leadership styles. This study was carried out in the context of Turkish business. The Center for Public Leadership at the Harvard Kennedy School, Harvard University, has also developed the National Leadership Index [9]. There are numerous other empirical and review reports on other aspects/styles of leadership. The key observation with all these studies is that the approach methodologies for the empirical methods are based on data obtained from questionnaire-based surveys such as Multifactor Leadership Questionnaire (MLQ), which was developed by Bass [10]; Authentic Leadership Questionnaire (ALQ) produced by Avolio et al., [11], and is available at www.mindgarden.com. The National Leadership Index study used a survey where respondents rate their confidence in the leaders of their countries.

Most of these surveys attempt to capture the attributes of these leaders as perceived by their subordinates. It is also assumed that the respondents have a grasp of all these attributes and can fairly rate these qualities in their leaders.

In this present study, the focus is to develop a scheme for evaluating the research leadership index of a researcher through the evaluation of publications of the researcher. citation counts. The aim is to provide a quantitative procedure for the determination of research leadership ability of the researcher. Generally, approaches that employ qualitative, quantitative, or mixed methodologies to study leadership are being sought and needed all over the world [12, 13]. In this study, an attempt is made to achieve this purpose; and herein the rationale for the study is identified.

METHODOLOGY

A systematic approach methodology was used in the quantification of the research leadership index. A brief exposition on the meaning of leadership was made and used to engender a better understanding of the subject. of leadership. This follows with conceptualization which identified important attributes in citation analytics, useful in forming a mathematical relationship for quantification of research leadership index. Finally, a mathematical relationship was developed as the product of these attributes, and detailed discussions on these attributes were used to provide better understanding and insight on these specific parameters

Research Leadership Conceptualization

As earlier indicated, the world perception on leadership is that it is the process of influencing a group of individuals to achieve shared objectives [4,5]. Although, this view to the meaning of leadership is acceptable, however, there are other opinions to the meaning of leadership. The dictionary meaning of it gives the impression that leadership is a word originated from lead. It should connote the act/process/position of leading. This way, other issues become important in consideration of the meaning of leadership. Leading implies providing direction, implementing plans, and influencing. Another important part of the meaning of leadership is that it also means an instance or position of being in front or ahead of others. From the foregoing, some important attributes can be inferred and found useful in the process to quantify leadership attributes from the evaluation of publication.

These are:

1. The total number of citations received by a particular article of a researcher in a particular publication relative to other researchers cited in the same publication (F_R).
2. The year when the researcher's publication was cited, or rather simply the citation age (A_C)
3. The year when the researcher's cited article was published, or rather simply the publication age (A_P)
4. The total number of publications (N_p) related to the research discipline for which the leadership ability of the researcher is being evaluated.
5. The total number of authors listed on the cited paper and the position of the researchers in the listing of the authors on the paper are also important for consideration in deciding the leadership index. This is expressed as n_A .

DISCUSSIONS

Relative Total Number of Citation

The total number of pertinent citations that the work of a researcher has received in other publications relative to other researchers cited is considered a factor useful in quantifying the leadership ability of the researcher. Generally, cited references are believed to be systematic and objective means to measure research influence [14,15].

To determine the relative pertinent citation of a researcher in a particular publication, a simple ratio of the frequency of pertinent citation of the researcher to the summation of the frequencies of all authors similarly cited is calculated. Adedayo,[16-18] provided a scheme that identified pertinent citations as those citations made in sections consisting of methodology, results, and discussion of results. This ratio is expressed as below:

$$F_R = \frac{f_{Ri}}{\sum_{i=1}^{n_R} f_{Ri}} \quad (2)$$

Where f_{Ri} is the frequency with which author i has been cited in the sections which consist of methodology, results, and discussion of results. $\sum_{i=1}^{n_R} f_{Ri}$ is the summation of the frequencies of citations of n_R authors cited in the sections which consist of methodology, results, and discussion of results. n_R is the total number of authors cited in these sections. The leadership ability of a researcher increases with this ratio. The relative citation is a relevant, useful and acceptable concept, which was similarly used by Adedayo,[16] and Moed, [19] in citation analytics.

Hypothetical Case Study 1: Indication of relative citation

In a situation where two researchers are being considered for research leadership, let's say researcher A has been cited ten times in the REAL sections of publications where twenty other peers were also cited. This means researcher A has a relative citation of 10/20. Also, if researcher B has been cited twelve times in REAL sections of publications where thirty other peers were also cited. The relative citation of researcher B is 12/30. Despite that researcher B has more citations; however, researcher A has more relative citations. Where other parameters are the same, the case implies that researcher A exhibits more research leadership abilities compared to researcher B.

Year of Citation of the Researcher

The year when the researcher's article was cited is also a crucial pertinent factor useful in quantifying the researcher's leadership ability. This factor becomes significant because apart from being a process of influence, leadership also connotes leading. It means instances or position of being in front or ahead of others. When a researcher gets cited earlier than other peers, it shows that the influence of the researcher is earlier than his/her peers. This way, s/he is ahead in influencing by timing. The citation age is calculated by simply subtracting the year the researcher was cited from a year plus the year when the leadership ability is being evaluated. i.e.

$$A_C = Y_{current} + 1 - Y_{citation} \quad (3)$$

Where A_c is the citation age, $Y_{current}$ is the current year when the leadership ability is being evaluated, and $Y_{citation}$ is the year when the researcher was cited. Leadership ability increases with early citation.

Hypothetical Case Study 2: Indication of the year of citation

Considering a case of two researchers C and D, where both researchers have been cited equally. Say they both have been cited ten (10) times. However, researcher C was cited ten times in 2014, and researcher D was cited ten times in 2010. If other parameters are considered constant, because researcher D was cited earlier on than researcher C, then researcher D is considered to exhibit more leadership ability as compared to researcher C

Publication Age

The time when a researcher published relative to the current time when the leadership ability of the researcher is being evaluated is also an important factor for consideration when quantifying researchers' leadership ability. It is indicative of initiative; insight or vision, when a researcher publishes early compared to other peers. These attributes: initiative, insight or visions are leadership attributes particularly for authentic leadership. Publication age is calculated by simply subtracting the publication year from one year plus the current year. i.e.

$$A_p = Y_{current} + 1 - Y_{publication} \quad (4)$$

Where A_p is the publication age, $Y_{current}$ is the current year when the leadership ability is being evaluated, and $Y_{publication}$ is the year when the researcher was published. Leadership ability increases with early publication year.

Hypothetical Case Study 3: Indication of publication age

Where researchers E and F are considered for research leadership, and both researchers have published a total number of five publications. Researcher E has five publications published in 2009 and researcher F has five publications published in 2013. When other parameters are constant, then researcher E has more research leadership ability

Total Number of Publications

The total number of publications by a researcher is also indicative of the leadership ability of the researcher. It is a measure of the impact and influence of the researcher. Although citation count has been widely used to evaluate impact and influence, however, the total number of publications is also a relevant and useful parameter to quantify these attributes. Every publication by a researcher indicates that the researcher has an influence on the publisher, the editor and possibly the reviewers. This is the reason the publisher has accepted to publish the work of the researcher. Also, the number of publications has been considered a factor in some important metrics used in the evaluation of the performance of researchers. Egghe, [20] and Hirsch,[21] developed the g-index and the h-index respectively. These indices attempt to measure both the number of publications (productivity) and citation impact. Similarly, the Nature Index Metrics are also gaining prominence, particularly for measuring collaboration scores of researchers, institutes or countries [22, 23]. The total number of publications is indicative of mind adroitness, which is an essential leadership attribute. The total number of publications is determined

by simply counting the number of researcher's relevant publications. This number connotes all relevant/related publications of the researcher related to the subject or research area for which the leadership index is being evaluated. It includes both cited and un-cited relevant publications of the researcher. It is denoted as N_p .

Hypothetical Case Study 4: Indication of number of publication

If researcher G and H are being evaluated for research leadership ability, in a situation where other parameters are constant, but researcher G has five (5) publications while researcher H has twelve publications. Then researcher H manifests more research leadership ability.

Total Number and Order of Authors Listed

The total number of authors listed on a published paper also serves as an important factor to be considered. The number of authors listed shows the minimum number of persons the researcher has worked with. The total number of listed authors may not represent the total number of persons involved in the research; however, it represents those persons who have had important contributions to the research. This number is a measure of the number of persons the researcher has influenced. In this context, the number n_A is indicative of leadership ability. It is generally believed that research collaborations produce some of the highest/leading quality science [22]. The Nature Index Metrics were developed based on this premise. The Nature Index is one of the well-poised and important evaluative indices. Data has confirmed the link between high-quality science and collaborations. The core operational principle of Nature Index Metrics is based on counting the total number of publications, and the number of authors who have contributed to every published paper [23]. The position of the researcher in the listing of the authors on the paper is equally important because this position shows the order of influence of the listed authors on the research being published. n_A is calculated simply as follows:

$$n_A = n + 1 - r \quad (5)$$

Where n is the total number of authors listed on the publication, and r is the position of the researcher on the publication.

Hypothetical Case Study 5: Number of authors listed

Consider researchers I and J, where both researchers are the first author listed on the publication. Researcher, I published a two-author paper, and researcher J published a six-author paper. The value of n_A for researcher I is 2, while that of researcher J is 6. If other parameters are constant, then researcher J has more leadership attributes.

Hypothetical Case Study 6: Order of authors listed

Where researchers K and L were both listed on a five-author paper; researcher K was listed in the second position while researcher L was listed in the fourth position. The value of n_A for researcher K is 4, while that of researcher L is 2. This shows that researcher K exhibits more research leadership attributes.

CONCLUSION

A framework useful in quantifying the leadership ability of the researcher has been developed. The role of the other four important parameters useful for this function has been established. This scheme developed is an objective methodology and more useful than existing methodologies/metrics currently employed to evaluate leadership abilities relevant in research evaluation.

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