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Journal Impact Factor

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I

Journal Impact Factor

Scott Church

In a recent issue of *Human Communication Research,* Thomas Hugh Feeley notes, "journal impact rankings provide objective data for tenure, promotion, and, possibly, grant review committees on the quality of scholars' work."[1] Though the metric is widely regarded as the conventional measure to assess the influence of a journal in both the social and physical sciences,[2] many doubts regarding its effectiveness have been raised.[3] This essay assesses the effectiveness of the Journal Impact Factor (JIF) as a scholarly metric. After first considering the metric's history and developing a working definition of JIF (part one), next I delineate its strengths and weaknesses as a measurement tool of assessing journal prominence (part two). Then in part three, I argue that the amount of credence placed upon the metric by tenure and promotion committees needs to be critically examined, because these decisions are often based on the flawed and biased data provided by the JIF. The closing section addresses the appropriateness of the JIF for evaluating scholarship in the field of Communication.

1 Thomas Hugh Feeley, "A Bibliometric Analysis of Communication Journals from 2002 to 2005," *Human Communication Research* 34 (2008): 506.

2 Feeley, "Bibliometric Analysis," 511.

3 See Brian D. Cameron, "Trends in the Usage of ISI Bibliometric Data: Uses, Abuses, and Implications," *Libraries and the Academy* 5, no. 1 (2005): 105-125. This article, though quite incendiary in tone, provides a systematic approach to the limitations of the metric.

History and Definition

The Journal Impact Factor is a number calculated every year that purportedly is a measure of a journal's scholarly impact on its respective field. It was created in the early 1960s by Eugene Garfield and Irving Sher.[4] In subsequent decades, Garfield has gained prominence by writing frequently on the JIF, as well as founding the Institute for Scientific Information (ISI), a bibliometric database within which the journals the JIF scores are located.[5] Since 1975, the JIF has been provided by Journal Citation Reports (JCR), which is composed of several citation indexes in which roughly 9,000 international journals are included.[6] However, the ISI database's inclusivity has been the subject of criticism, due to the fact that it allegedly covers only 2.5 percent of the world's scientific journals.[7] Regardless, the JIF has become the gauge whereupon a researcher's performance may be measured. In fact, many researchers are asked not only to provide lists of their publications to tenure and promotion boards, but also the JIF score for those journals.[8]

The JIF score is essentially calculated by counting the number of times an article in a journal is cited by other scholars.[9] Its impact is gleaned from its "measure of the frequency with which recent articles in [a] journal have been cited,"[10] with recent being the crucial term; the score is calculated using citation data from a window of only the previous two years before that journal issue was published.[11] The impact score assigned a journal is heeded much attention by scholars because of the influence it wields in academia; it is generally accepted that the journals with the highest impact factors are the ones that are the most influential, thereby bolstering a scholar's marketability by publishing in that journal.[12] Be-

4 Nicola De Bellis, *Bibliometrics and Citation Analysis: From the Science Citation Index to Cybermetrics* (Lanham, MD: Rowman & Littlefield, 2009), 185.

5 De Bellis, *Bibliometrics and Citation Analysis,* 185.

6 De Bellis, *Bibliometrics and Citation Analysis,* 185.

7 Cameron, "Trends in the Usage of ISI Bibliometric Data," 110.

8 Balandin and Stancliffe. "Impact Factors and the H-Index," 1. Incidentally, the metric is not only used in traditional assessment of a researcher's performance, but also to influence digital algorithms: Journals with high impact factors will percolate to the top of search results of academic search engines. Michael Felczak, Richard Smith, and Rowland Lorimer, "Online Publishing, Technical Representation, and the Politics of Code: The Case of *CJC Online*," *Canadian Journal of Communication* 33 (2008), 280.

9 Tom Grimes, "From the Editor," *Southwestern Mass Communication Journal* (Fall 2009): ii.

10 Susan Balandin and Roger J. Stancliffe, "Impact Factors and the H-Index: What Researchers and Readers Need to Know," *Augmentative and Alternative Communication* 25, no. 1 (2009): 1.

11 Cameron, "Trends in the Usage of ISI Bibliometric Data," 109.

12 Grimes, "From the Editor," ii.

cause of its longevity, tradition, and influence, JCR (and the JIF metric) remains the "the only usable tool to rank thousands of scholarly and professional journals within their discipline or subdiscipline."[13]

Strengths and Weaknesses

The metric's popularity appears to be its biggest strength. As far as scholarly metrics go, it is used widely and referenced frequently. Some critics, however, have argued that the metric's limitations largely outnumber its strengths, placing it squarely in the category of being an ineffective measure.[14] Some of what have been perceived to be limitations of the JIF were created, in part, to curb the skewing effect of heavily cited (and outdated) research.[15] As Garfield, the co-creator argued, articles are typically cited the most within two years after their publication.[16] It has also incorporated additional metrics, like the immediacy index and the cited half-life to try to account for inconsistent scores between disciplines, thus attempting to correct issues that have been criticized in the past.[17] Finally, another important strength is its accuracy with generally predicting which journals will produce heavily-cited articles, though the opposite has been argued as well; often regional journals and journals in some disciplines will be cited more than those indexed by the JCR.[18]

As mentioned, the limitations of the JIF have been well-documented in the extant literature. A limitation of its utility as a tool of measurement may be how it is frequently used. The counterpoint of a tenure committee depending heavily on the metric can lead to a misdirected focus on a researcher's acumen; these committees may (carelessly) put too much stock in the metric of the journal in which the scholar published, associating the impact of the journal with the indi-

13 Peter Jacso, quoted on Thomson Reuters' web site. Accessed from http://thomsonreuters.com/products_services/ science/science_products/a-z/journal_citation_reports (June 2010).

14 Cameron, "Trends in the Usage of ISI Bibliometric Data," 108-109.

15 Lokman I. Meho, "The Rise and Rise of Citation Analysis" *Physics World* (January 2007): 35; De Bellis, *Bibliometrics and Citation Analysis,* 186.

16 De Bellis, *Bibliometrics and Citation Analysis,* 186.

17 De Bellis, *Bibliometrics and Citation Analysis,* 186.

18 De Bellis, *Bibliometrics and Citation Analysis:* "It can be argued that highly cited articles are also published in journals with a low or no impact factor, and that impact is about paradigm shifts in the field rather than numbers" (191). Balandin and Stancliffe, "Impact Factors and the H-Index," 2; Feeley, "Bibliometric Analysis," 516.

vidual merit of the author.[19]

There are some structural limitations of the JIF as well, namely the ambiguity of how citable items are classified, the types of cited references, and the journal format and article type.[20] First, there are ambiguities in which items may be counted as citable and which may not. It has been held that citable items do not include letters, editorials, and conference abstracts; however, sometimes noncitable materials still get cited, thereby inflating the impact factor for that journal.[21] There may also be measurement inaccuracies that the citation analysis in general fails to distinguish, such as homographs (the failure to separate the citations of unrelated researchers with the same name), cronyism (the act of persistently citing one's friend or colleague), ceremonial citations (citing seminal articles though they may not be directly relevant), and negative citations (citing other works in order to refute them).[22] Self-citations may also inflate the impact factor.[23] Second, the journal format and article type are also illustrative of the structural limitations of the JIF. If the scope of an article or journal is more time-sensitive or more general than other journals or articles, for example, it will be rewarded with a higher score.[24] Journals that publish a high quantity of review articles will also be favored by the JIF, with as many as 60 percent of the top 25 journals being review journals.[25]

An important limitation of the metric is that it is not uniform when being measured across disciplines.[26] For example, the JIF appears to disadvantage journals with long lags between publication, failing to take into account that some disciplines have ideas and concepts that take longer to develop than others.[27] Faster publication, then, will result in a higher impact factor; this fact discriminates against certain fields like taxonomy, which may take a year before its articles are

19 Cameron, "Trends in the Usage of ISI Bibliometric Data," 112; De Bellis, *Bibliometrics and Citation Analysis,* 187.

20 De Bellis, *Bibliometrics and Citation Analysis,* 191-193.

21 De Bellis, *Bibliometrics and Citation Analysis,* 191.

22 Meho, "The Rise of Citation Analysis," 32.

23 Meho, "The Rise of Citation Analysis," 32; Feeley, "A Bibliometric Analysis," 518; De Bellis, *Bibliometrics and Citation Analysis,* 192.

24 De Bellis, *Bibliometrics and Citation Analysis,* 193.

25 Cameron, "Trends in the Usage of ISI Bibliometric Data," 111; Meho, "The Rise and Rise of Citation Analysis," 35.

26 Balandin and Stancliffe, "Impact Factors and the H-Index."

27 Cameron, "Trends in the Usage of ISI Bibliometric Data," 109.

routinely cited.[28] Moreover, the two-year window of the JIF is agnostic to long-term values of many journals.[29] The JIF disadvantages some disciplines due to the size of their field and the amount of journals they publish.[30] The same can also be said by the nature, or urgency, of the articles published in that discipline. For example, some fields of biology are cited 500 percent more than articles in pharmacy fields.[31] Importantly, some fields may have a few highly cited articles and many uncited articles, but this can skew the distribution of the citations in those fields.[32] The JIF does not take these factors into account in its metric. There has also been some evidence that there is a language bias in the JIF measurement process, favoring journals published in English over foreign language journals.[33]

The ability for the JIF to be manipulated by editors and publishers is another limitation. To receive a higher JIF score, Garfield states that an editor should invite "authors who publish innovative research, an international editorial board and a high standard of articles."[34] However, framing the same practice less honorably, critics have argued that editors may inflate scores by including "vibrant correspondence section[s]" in their journals,[35] increasing the amount of review articles or the number of articles in total, or exclusively inviting authors who have good citation histories to submit.[36] For-profit publishers may even sell advertising space in journals with higher impact factor scores to increase their profit margins.[37]

Judgment

Given the strengths and weaknesses of the JIF, a judgment regarding its effectiveness in measuring what it purports to measure—the scholarly impact of a journal—is warranted. Given the flaws in the measurement process, the metric should be used with caution by committees who intend to use it to make

28 Cameron, "Trends in the Usage of ISI Bibliometric Data," 109.

29 Meho, "The Rise of Citation Analysis," 35.

30 Feeley, "Bibliometric Analysis"; Cameron, "Trends in the Usage of ISI Bibliometric Data," 109.

31 Cameron, "Trends in the Usage of ISI Bibliometric Data," 109.

32 Feeley, "Bibliometric Analysis," 507; Meho, "The Rise of Citation Analysis," 35.

33 Cameron, "Trends in the Usage of ISI Bibliometric Data," 110.

34 Quoted in Balandin and Stancliffe, "Impact Factors and the H-Index," 2.

35 Cameron, "Trends in the Usage of ISI Bibliometric Data," 109.

36 Cameron, "Trends in the Usage of ISI Bibliometric Data," 117.

37 Cameron, "Trends in the Usage of ISI Bibliometric Data," 117.

important decisions regarding tenure and promotion. I argue that the JIF score does, indeed, measure the influence of a scholarly journal, though its findings may be misleading. As has been noted, the size or type of the discipline in which the journal is published may have a large influence on the score, thus the score can certainly not be a standardized metric across disciplines. If the limitations of the JIF are to be remedied, one or all of the following suggestions need to be addressed: Widen the two-year time window of citations; improve the metric; abandon the metric all together by focusing instead on other alternatives like the journal's acceptance rate, space allotment, quantity of submissions, or quality of submissions; or "use the data more critically and cautiously."[38] Incidentally, a possible alternative to using the JIF to assess the impact of scholarly work is the Web site SCImago, which ranks journals according to a variety of factors.[39] Critical to the site's salience to our discussion is the fact that it draws from Scopus®, a repository of journals much more comprehensive than that of the ISI. By drawing from Scopus®—the largest database of research literature containing roughly 18,000 journal titles[40]—SCImago is positioned to improve on the JIF by compensating for one of the metric's frequently-cited limitations. It also accounts for the JIF limitation of addressing self-citation—thus decreasing rank inflation—as well as providing an alternative metric, the H-Index.[41]

Another important factor yet to be addressed is academe's common consideration of JIF as the status quo of a print-based world. Though the metric has a long history, it does not account for some of the exigencies that we have already discussed, as well as other emerging issues like Open Access (OA) publishing. The JIF does not directly address the fact that open access articles on the Internet "usually receive more citations than articles accessible only by purchase or subscription."[42] With the increasing popularity of OA journals and online publishing, a new focus should be placed on downloads as a consequence of academic publishing in the age of Web 2.0. The download count is emerging as a quantifiable measurement of an article's popularity, even demonstrating a positive correlation between it and citation counts and impact factors.[43] Another possible

38 De Bellis, *Bibliometrics and Citation Analysis,* 194; Feeley, "Bibliometric Analysis," 517; Cameron, "Trends in the Usage of ISI Bibliometric Data," 112.

39 Accessed from the SCImago Web site, http://www.scimagojr.com/ (July 2010).

40 Accessed from the SCImago Web site, http://www.scopus.com/home.url (July 2010).

41 Accessed from the SCImago Web site, http://www.scimagojr.com/ (July 2010).

42 Joran Beel, Bela Gipp, and Erik Eilde, "Academic Search Engine Optimization (ASEO)," *Journal of Scholarly Publishing* 41 (2010), 185.

43 Meho, "The Rise and Rise of Citation Analysis," 35.

direction that the metric may take is focusing exclusively on the article, rather than the journal; if this practice becomes more widespread as it has in some OA online databases, citation rates will likely rise.[44] Though I am not advocating the elimination of the JIF in favor of a new digital metric alternative, I believe that this issue will continue to grow more salient in the coming years.

Field Relevance

Finally, we will address the appropriateness of the Journal Impact Factor for evaluating scholarship in the field of Communication. Synthesizing the above limitations, we can infer that the JIF favors scientists and those in the fields of the physical sciences and medical research. This claim is substantiated by evidence that those in the fields of the social sciences and humanities often write books rather than articles; books are not covered by the ISI database, and thus are not eligible to receive a JIF score.[45] Further, as argued by a scholar on the National Communication Association's listserv network, the Communication discipline functions as a microcosm of the aforementioned divide between the physical sciences and the social sciences.[46] Even within the discipline, there is a cultural divide between social scientists, media theorists, and rhetoricians; each of these subdisciplines has its own citation patterns and will often exclude the others from citation.[47] Moreover, Communication research is represented in journals from two associations—the National Communication Association and the International Communication Associations—and certain subdisciplines favor one outlet for publishing over the other. His final argument is that the quality of the article is agnostic to its impact rating because of the aforementioned limitations of the metric.[48] This argument indicates that the same issues that academia writ large is encountering with the JIF is also echoed in the field of Communication. The alternative metric mentioned earlier, SCImago, attempts to ameliorate some of these limitations by using the larger database Scopus®, which does include

44 Juliet Walker, "Richard Smith: The Beginning of the End for Impact Factors and Journals." (November 2009): n.p.

45 Rong Tang, "Citation Characteristics and Intellectual Acceptance of Scholarly Monographs," *College & Research Libraries* (July 2008): 357; Cameron, "Trends in the Usage of ISI Bibliometric Data," 110.

46 John Caughlin, "What's Wrong With Journal Citation Statistics?" On CRTNET: Announcements, Queries and Discussions #11040 (October 20, 2009).

47 Caughlin, "What's Wrong With Journal Citation Statistics?"

48 Caughlin, "What's Wrong With Journal Citation Statistics?"

book series in its database and not journals exclusively.[49] SCImago also includes in its metric a portal that rewards collaboration among authors.[50]

Ultimately, though the JIF may, indeed, provide ostensibly "objective data" for tenure and promotion committees,[51] given the complex composition and complicated needs of the many disciplines in the scholarly sphere, the JIF is too potentially misleading to accept wholesale as a legitimate scholarly metric. Though one could try to account for the limitations of the metric's bias toward one discipline over another by only using it to measure journals within one discipline, there still remain other limitations that need to be addressed. As it now stands, it appears that the best way to interpret the metric is critically, only after a careful consideration of its limitations.

49 Accessed from the Scopus® Web site: http://info.scopus.com/scopus-in-detail/facts/ (July 2010).

50 Accessed from the SCImago Web site, http://www.scimagojr.com/help.php (July 2010).

51 Feeley, "Bibliometric Analysis," 506.