

## A Review of the State of the Art of Self-Citations

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### Abstract

*As important measures, citations must reflect the quality of the scientific research and the impact factor of a certain journal can be influence by some highly cited papers. Citations make the work of a scientist recognized by the colleagues, determining the property rights and the prioritization of the scientific contribution of an author. The point is that there is no penalty for the excessive number of self-citations. There has been lengthy and intense discussion among the scientific community about the role of self-citations. Thus, caution is indicated before adopting them as indicators of the scientific impact. In the present exploratory study, aspects related to citations are addressed, especially self-citations and their influence on bibliometrics. There is the need of deeper reflection to extend the discussion about the use of self-citations and their consequences on the impact factor, since the latter is an important indicator of the quality of scientific production.*

**Keywords:** bibliometrics, citation indicators, impact factor, self citation.

### Introduction

Citation is a well established social practice, based on the academic communication system, in a combination between practical and discursive knowledge. In the process of producing and disseminating their work, researchers usually refer to ideas, insights, standards and texts by other authors (cognitive resources) (Cronin, 1998).

As important measures, citations must reflect the quality of the scientific research since the financing of the latter is calculated by integrating the former (Glänzel et al., 2006). The impact factor of a certain journal can be influence by some highly cited papers (Butchel & Della Sala 2006). On average, 20% scientific articles receive 80% of all citations (Foley & Della Sala, 2010).

There has been lengthy and intense discussion among the scientific community about the role of self-citations. Some experts in the field consider appropriate the use of self-citations, whereas others judge it inadequate since they inflate the citation rates of certain investigators. Thus, caution is recommended before adopting them as indicators of the scientific impact (Aksnes, 2003; Amante, 2011).

In the present exploratory study, aspects related to citations are addressed, especially self-citations and their influence on bibliometrics.

### **Literature Review**

In 1665, scientific results were first published in two journals: *Journal des Sçavans* and *Philosophical Transactions of the Royal Society* (Kronick, 1976). In the latter, we can highlight authors like Isaac Newton, James Clerk Maxwell, Michael Faraday and Charles Darwin. Those papers were first cited in 1752 (Kronick, 1976; Kronick, 1990; Burnham, 1990).

Analysis of citations began with the publication of the Science Citation Index (SCI) in 1961. Moravcsik & Murugesan (1975), classified citations into conceptual (theoretical), organic (essential), evolutionary (idea development) and confirmatory (statement support), based on their nature and function.

According to the NBR 10520:2002 standard, elaborated by the Technical Committee 014 (Information and Documentation) of the Brazilian Technical Standards Association, citation in a text is the "Mention of information extracted from another source" such as books, periodicals, videos and websites. A citation supports a hypothesis, an idea or illustrates a thought. Its role is to provide the reader with the necessary background to prove the veracity of the given information and allow further deepening.

The cited half-life is a measure of the rate of decline of the citation curve and corresponds to the period (in years) needed for the number of current citations to decline to half of its initial value (Amin & Mabe, 2000). Citations make the work of a scientist recognized by the colleagues, determining the property rights and the prioritization of the scientific contribution of an author (Foresti, 1989; Araujo, 2006; Romancini, 2010).

Wallace et al. (2012), divide citations into three categories: a) self-citations, in which the citing and the cited papers share at least one co-author; b) co-author citations, in which at least one author of the citing paper has already collaborated with at least one author of the cited paper; and c) distant citations, others than self-citations and co-author citations.

When citations are used as indicators of the scientific impact, they can generate problems. In certain universities or groups in these institutions, for example, there are authors who cite themselves and others who do not (Mac Roberts & Mac Roberts, 1989; Seglen, 1997; Buchanan, 2012).

### **Self-citations**

In a more restricted form, only papers with identical first authors are considered self-citations (Garfield, 1979). Garfield & Welljams-Dorof (1992) emphasized that excessive self-citations are easily visible by readers and must be corrected in the editorial and peer review processes. They are responsible for a relatively high percentage of all citations (Phelan, 1999).

Occurrence of self-citations varies according to the studied concentration field, for example: 15% in agronomy, 10% in oncology, (Lawani, 1982), 3 to 11% in social and human sciences, 16% in physical sciences (chemistry and geology) (Bonzi & Snyder, 1991; Snyder & Bonzi, 1998), and 10 to 20% in natural sciences and medicine (Aksnes, 2003).

Hyland (2003), verified that self-citation is more frequent for "hard" sciences such as biology, engineering and physics, in which it represents around 12% of all references, compared to only 4% for sociology, philosophy, linguistics or marketing.

A survey conducted by Aksnes (2003), evidenced 36% self-citations in a three-year period, and this percentage decreased when the monitoring period was longer. Scientists also tend to cite themselves in order to establish their own scientific authority, obtain visibility to their team (Lawani, 1982), reinforce a statement or for self-praise (Hyland, 2003; Fowler & Aksnes, 2007).

The point is that there is no penalty for the excessive number of self-citations. A study evidenced that self-citation levels were lower in Egypt, Algeria, Ukraine and Indonesia and higher in China (Minasny et al. 2010).

Investigation into 222 journals from the latter country, including: 76 of agronomy (representing 34.2%), 57 of biology (25.7%), 28 of environmental sciences and technology (12.6%), 15 of forestry (6.8%), 24 academic journals of agrarian universities (10.8%), 9 of aquatic sciences (4.1%) and 13 of livestock and veterinary medicine (5.9%), evidenced that the mean self-citation rate ranged from 2 to 67% in 2006, from one to 68% in 2007 and from 0 to 67% in 2008 (Xiao-Dong & Ya-Wen, 2011).

Self-citation is not itself an erroneous behavior in science but becomes a problem when is made at a high rate, superior to 20% (Fassoulaki et al., 2000; Miguel & Bon-Matí, 2002; Gami et al., 2004; Falagas & Kavvadia, 2006; Hakkalamani et al., 2006; Mavrogenis et al., 2010; Volpato, 2012). High self-citation rates are evidenced for specialized journals (Fassoulaki et al., 2000; Miguel & Bon-Matí, 2002; Epstein, 2007). Kurmis & Kurmis (2010) and Minasny et al., (2010) highlighted a positive correlation between the impact factor and the self-citation rate of papers, differently from the findings of Andrade et al. (2009) and Volpato (2012). The editor who cites papers from their own journal increases the impact factor of the latter (González & Campanário, 2007; Epstein, 2007; Minasny et al., 2007; Ruano-Ravina & Álvarez-Dardet, 2012).

The number of citations of a certain scientific article should be considered a partial indicator of its quality since it depends on the reputation of the author(s), on their institution, on the updating degree of the investigated theme, on the language, on the periodical in which it was published (Silva & Bianchi, 2001; Ruano-Ravina & Álvarez-Dardet, 2012), as well as on the number of references of the given paper (Bornmann, et al., 2012). When the paper has many authors, the possibility for self-citations is greater (Aksnes, 2003; Schreiber, 2007; Della Sala & Brooks, 2008). Martin et al. (2013) noted that the authors tend to cite their own recently published papers earlier than their co-authors, and the latter do it before those who did not carried out the study. Thus, there has been a current in favor of self-citation; on the other hand, there is an increasing movement supporting the removal of self-citations from a certain body of work to obtain more significant results relative to the impact factor (Schreiber, 2007; Carley et al., 2013).

Considering the above-mentioned aspects in the addressed literature, we can conclude that there is the need of deeper reflection to extend the discussion about the use of self-citations and their consequences on the impact factor, since the latter is an important indicator of the quality of scientific production.

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