

Citations

The number of citations received by the publication shows how much it has been used as a source by other research published since its publication.

Thus, the number of citations does not directly reflect the scientific content of a publication and should not be used as a measure of scientific *quality*. Instead, the citations can be seen as at least an indication of the relevance of the research presented in the publication, its topicality and usefulness to the scientific community and thus its **scientific impact**.

A citation can be used to support a claim, but it can also be listed among many other references, without the content of the cited research having a significant impact on the author. The author may refer to other research as particularly meritorious and useful for their own research, or to say that their results support those of the cited research. On the other hand, citations also occur when claims are made that challenge or contradict each other, and when research findings are shown to be incorrect or even falsified. Authors' self-citations to their own publications also add to the total number of citations, unless they are specifically excluded from the analysis.

At least so far, most citation analyses do not specify which content of a publication has been cited and how. However, the very essence of scientific citation is in its context and purpose. In recent years, machine-learning and the increase in computational processing power have made it possible to differentiate and analyse citations on a large scale. So far, however, developments in this area are still at an early stage, with few services available (e.g. [Scite](#)).

In practice, citation data can be obtained from [citation databases](#). Different citation databases do not extract citations from the same group of publications, and therefore the number of citations a publication receives will vary depending on which database is used. This should be taken into account in any comparisons. The major citation databases (Web of Science and Scopus) cover only a very small proportion of Finnish-language journals, and therefore the publications published by these journals are excluded from the analysis of these citation bases.

In addition, it is important to note that factors other than the scientific content of the publication and its importance also influence the accumulation of citations. For example, the [field of science](#) of the publication (Garfield, 1979; Moed et al., 1985), [the number of authors](#) and in particular, the international collaboration have a significant impact on average citation numbers. In general, the increase in the number of authors and, in particular, in the number of countries represented by the authors' affiliations, increases the number of citations received by the publication (Adams et al., 2019).

In addition to the ones mentioned above, factors such as the language of the publication, the publication type and the visibility and reputation of the journal also have an impact on the number of citations.

As citation practices differ significantly between different fields of science (Albarrán & Ruiz-Castillo, 2011), **the absolute number of citations received by publications from different fields of science are not comparable**. It is more responsible to use citation indicators that are [normalised](#) by the field of science.

[Citations accumulate with a considerable delay](#). The slowness of the scientific publication process alone means that the attention each publication receives in the form of citations in the subsequent research will only become apparent at the earliest 2–3 years after its publication (Abramo, Cicero & D'Angelo, 2011; Bornmann et al., 2014). The average length of time it takes to accumulate citations varies by the field of science. In many fields of natural sciences, publications start to receive a significant number of citations as early as two years after publication, but in fields such as mathematical sciences (Abramo et al., 2011) as well as social sciences and humanities (Albarrán & Ruiz-Castillo, 2011), the accumulation of citations is typically lower and slower. Sometimes a publication can also be significantly ahead of its time, and only receive citations years after its release.

The use of responsible metrics requires that a sufficiently long window of time is allowed for the citations to accumulate. Typically, the shortest time window used is three years. This means that after the year of publication, there will then be another two years before citation impact assessments are carried out. More information about the selection of time windows is available in the chapter [Methodological points of view](#).

The citations do not give a full picture of the scientific impact of the publication. However, to a limited extent, they can be used as a numerical measure of scientific impact, **complementing the qualitative evaluation carried out by representatives of the scientific community**.

Sources

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