sciecominfo
Nordic-Baltic Forum for Scientific Communication

FACTORS IN OPEN ACCESS WHICH INFLUENCE THE IMPACT CYCLE

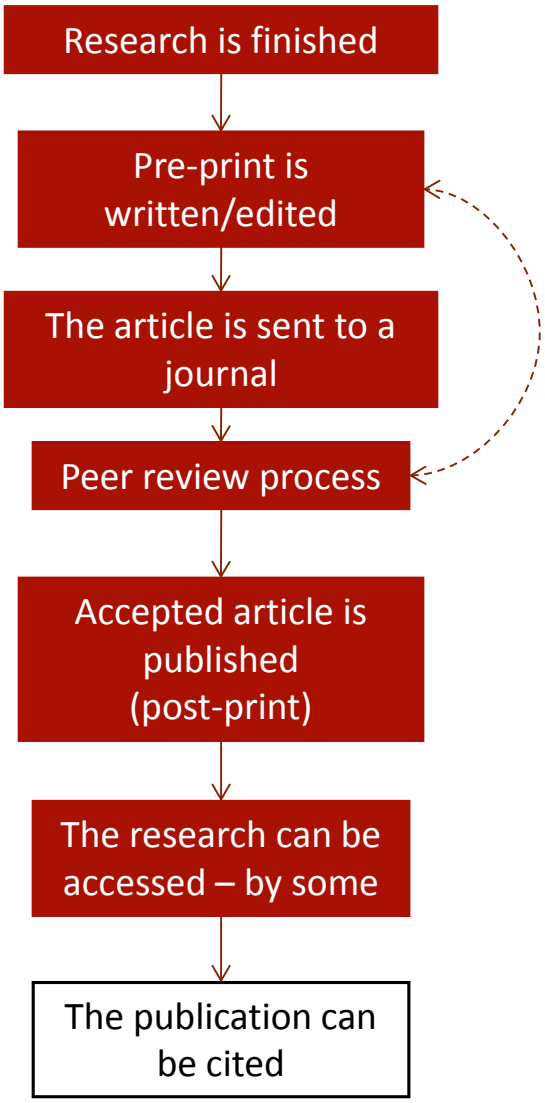
Anders Agerbæk Kjøller Nielsen

Introduction

The number of Open Access journals has been on the rise in recent years. This is believed to have had an influence on what can be termed the impact cycle: the cycle from the end of research to the production of a (citeable) publication. Open Access provides free and early access to publications, thus creating a more dynamic impact cycle. This article will explore the impact cycle, and the changes brought on by Open Access.

Toll access – limited access

The impact cycle refers to the process that a scientific article goes through from its inception, to a pre-print phase, through peer review to, at the final step, publication in a journal. It is a cycle, because of the iterative nature of scientific research: it builds on the already existing body of knowledge. Once research is published, it has an impact on the existing body of knowledge, and may also be cited, thereby providing part of the foundation for new research – starting the impact cycle again. The impact cycle in traditional, non-Open Access publishing, can be illustrated the following way: (See right)

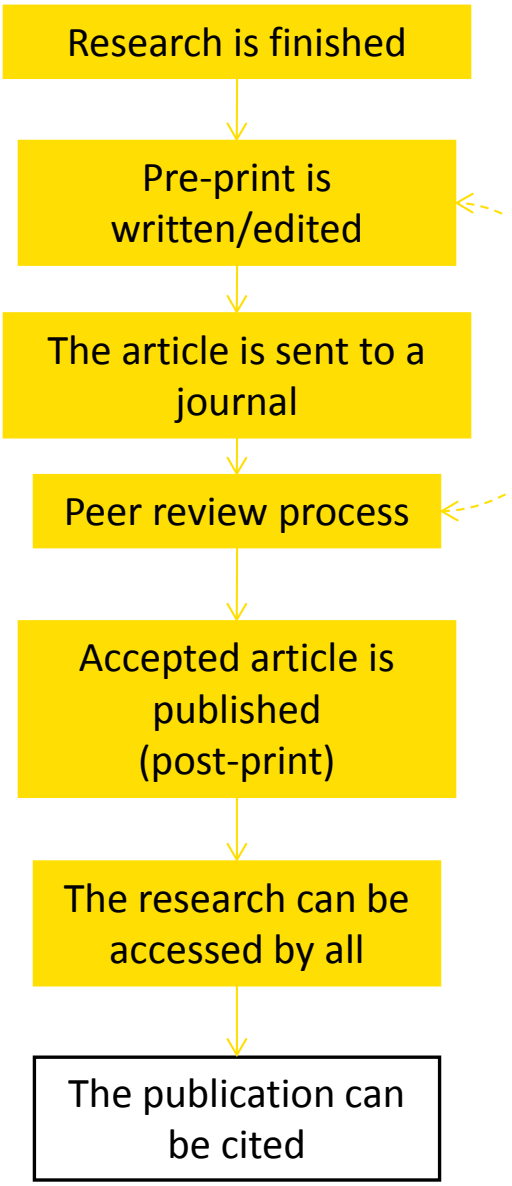


For the sake of clarity, the flowchart is not shown as a cycle.

The flowchart is, of course, only a brief description of the scientific publishing process, but it serves to illustrate some of the elements an article will go through. The point of the flowchart is specifically to illustrate the many steps the article will go through before it can be accessed and used for further research – before it can have an impact. If the article is published in a traditional toll access journal, as in the case above, the distribution of the article will be limited, and thus only have limited impact.
One of the important steps that this flowchart doesn't illustrate is the knowledge-sharing that takes place among colleagues/the scientific community. Researchers will undoubtedly share their research results, often also at an early stage (that is, before peer review and final publication). However, this knowledge sharing is limited, and the research will only be made available to some, often in an informal manner. This is not believed to change the impact cycle in any major way.

Golden Open Access – Access for all

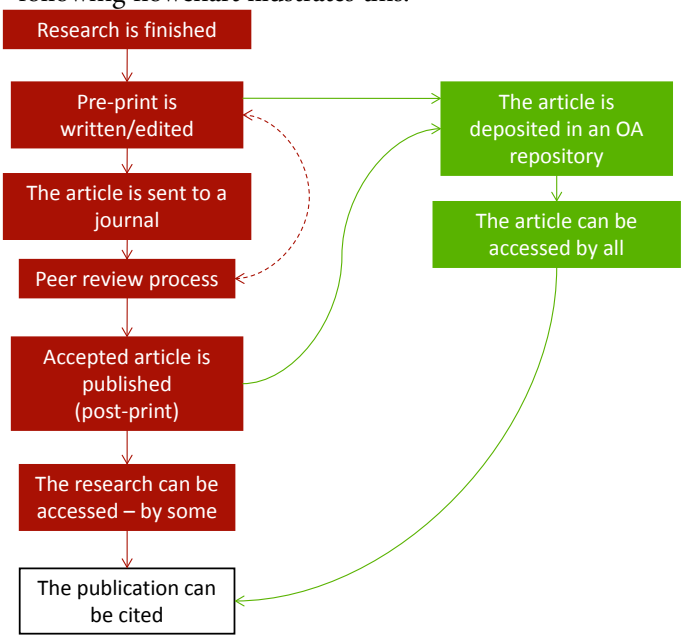
One of the factors that Open Access changes in the traditional publication model is the limited access to publications. Golden Open Access journals change this aspect. The business model of these journals is "pay-to-publish", that is, a fee is paid when an article is published – after this, the article is freely available to all. The following flowchart illustrates this:



By making the publications freely accessible to all, they can potentially be disseminated further – when artificial barriers for digital content distribution, set up by the toll-access journals, are removed, the content can be spread freely. Making content freely available will help disseminate the content – in the case of scientific publications; the dissemination of content will likely influence the amount of citations the article will receive.

Green Open Access – Early access for all

Free access to all is something that is provided by golden Open Access, but it has no effect on when the publication is available. The publication still has to go through peer review and the ordinary publication process before being available. Green Open Access changes this. Green Open Access refers to the practice of depositing a publication in an Open Access repository, from which it will be available to all. This archiving can happen early in the publication process, providing early access (relative to the point at which the final, published article will be available). The following flowchart illustrates this:



A noteworthy detail in this flowchart is the fact that the publication deposited in the repository can be both the pre-print edition (that is, the publication as it exists before the peer review process) or the post-print edition (the publication as it exists after the peer review process – with content similar to what can be found in the journal). The publication will still undergo the traditional publication process, and will eventually be published in a journal.
What green Open Access adds, is the early availability of publications to everyone. This will have both the advantage that golden Open Access provides (access to everyone), and the added bonus of being available much earlier than through the journal in which it will eventually be available. Green Open Access thus decreases the period of time from when the research is finished, to the information becoming a part of the collected body of information that scientific publications represent. In other words, the

"publication-to-knowledge" period is shortened, thereby also shortening the impact cycle time.
The flowchart also points out, that citations to an article should not be to the pre-print edition, but rather to the article in its final, published edition, as it is this article that (most) citation databases include in their indexes. The authors should be careful to note the full citation along with the deposited article, so as to make the readers aware of where the published edition can be found, and what they should cite.
There has been some discussion about the effects on citation rate of depositing articles. It is believed that early access will lead to citations being received earlier than usual (Eysenbach, 2006). González-Pereira et al (Gonzalez-Pereira, Guerrero-Bote, & Moya-Anegon, 2009) notes, that all subject areas in the citation database SCOPUS have a citation peak within a three-year time frame - that is, research articles from all fields of science receive the most citations in a single year, within a three-year time frame from the date of publication of the original article. Green Open Access may simply move this citation peak closer to the date of publication.

More citations to Open Access articles?

Whether Open Access articles receive more citations is also debated. A number of studies (Antelman, 2004), (Eysenbach, 2006) indicate that Open Access articles receive more citations, while other studies (Craig, Plume, McVeigh, Pringle, & Amin, 2007) point out, that this increase in the number of received citations varies depending on which scientific field the cited article belongs to. Some fields of science, such as physics and mathematics, have a strong tradition for self-archiving their publications. Differing from the norm in these fields is likely to be associated with fewer received citations than could otherwise be expected. On the other hand, in fields of science where Open Access is not yet an established tradition, depositing research articles will most likely increase the dispersion of the article, increasing the visibility of the article, which, in turn, may lead to more received citations.

In summary: to increase the potential number of citations to an article, that article must be dispersed as widely as possible as soon as possible in the publication process. Open Access will help achieve this goal. By depositing an article in an Open Access repository at an early stage, that article will be available for all to access. This will help increase the visibility, which, in turn, may lead to more received citations. This holds especially true for areas in which it is uncommon to use Open Access - due to a likely first-mover advantage.

References

Antelman, K. (2004). Do Open-Access Articles Have a Greater Research. College and Research Libraries , 65 (5), 372-382.

Craig, I. D., Plume, A. M., McVeigh, M. E., Pringle, J., & Amin, M. (2007). Do Open Access Articles Have Greater Citation Impact? A critical review of the literature. Journal of Informetrics , 1 (3), 239-248.

Eysenbach, G. (2006, May). Citation Advantage of Open Access Articles. PLoS Biology , e157.

Gonzalez-Pereira, B., Guerrero-Bote, V., & Moya-Anegon, F. (2009). The SJR indicator: A new indicator of journals' scientific prestige. arXiv:0912.4141v1 .

Anders Agerbæk Kjøller Nielsen is an information specialist at the Faculty of Life Sciences Library at the University of Copenhagen, Denmark. He is also a part-time employee at Wiley-Blackwell.