

# Relative Visibility: Methodological Considerations on a New Scientometric Indicator Based upon Personal Publication Lists

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## INTRODUCTION

The determination of the visibility of a scientist, an institute, a scientific discipline, a city, a country, etc. is a well-known practice in many empirical scientometric studies. But what exactly is visibility?

For Cole and Cole (1968, p. 398), visibility in science is an indicator that “characterizes the men being looked at.” They define visibility through “how well known” a scientist is and apply questionnaires as their methodology (Cole & Cole, 1968, p. 398). Ingwersen (2000) limits visibility to an author’s publications, i.e., the absolute number of publications in the National Science Indicators (NSI) database. NSI is derived from Web of Science (WoS), and consequently, the visibility is dependent on an author’s publication count within this information service. Schlögl (2013) also defines visibility as the absolute number of publications in an information service (again, in WoS). Miguel (2011, p. 1130) considers visibility as a valuing criterion that states “how avidly published work is received by the academic or scientific community.” However, visibility may not only refer to publication and citation counts within established academic databases as WoS and Scopus. Social media services (e.g., Mendeley or CiteULike) can also be used to study the visibility of an author (Bar-Ilan et al. 2012), and thus, the use of social media for scientific purposes can increase an author’s visibility (Fitzgerald & Radmanesh, 2015).

However, visibility can also be defined as a relative value depending on the considered information service (Dorsch, 2017). It is based on the ideally complete personal publication list of an author, institution, etc. and does not only originate from the publication count in an information service. Consequently, it shows how visible an author, institution, etc. in a certain database or service is and allows the inclusion of an author’s total publication count for scientometric analyses. What has to be considered for the application of this newly introduced relative visibility indicator? Are there any methodological problems or pitfalls?

## METHODICAL CONSIDERATION

Visibility is calculated as follows: *Relative Visibility (IS)* =  $(d/r)*100$  where  $d$  is the total number of an author’s publications within the information service and  $r$  is the number of publications in the personal publication list of the same author. Thereby, it is necessary to consider the parameters  $r$  and  $d$  and the potentially existing problems of counting correctly in terms of access and completeness.

*Personal publication list (r)*

*Access:* Where can I receive the list? *Completeness:* Is the list complete and up-to-date for the investigated time period? Does it contain all scientific publications? What is counted as a (scientific) publication (Stock, 2000)? Do they contain only formally published scientific publications?

*Author’s publication list within the information service (d)*

*Access:* Does there exist an author profile or are there several profiles which have to be merged? *Completeness:* Has the scientometricians access to the entire database or only to some segments (e.g., in WoS with or without book citation index)? Does the retrieved publication list contain false information (e.g. misdirected publications, missing information)? Are there problems concerning homonymy or synonymy of authors’ names?

The multidimensional access and completeness parameters have to be considered carefully, since they could cause methodological issues for the usage of the relative visibility indicator. Personal publication lists can be obtained from personal/institutional websites or by requesting the author. It is possible that there exist several lists for the same author. If this is the case, the latest (and also most completed) should be chosen. Otherwise or in case of any ambiguity, it is recommended to ask the author. The publication list has to be complete, since it is the basis for all further analysis. It is necessary, to define exactly what a publication, a *scientific* publication as well as *one* scientific publication is. Should there be a restriction for some document types? Should all publications weighted equally or is there for some document types a higher or lower weighting appropriated (Stock, 2000)? Furthermore, these definitions only apply for one’s own chosen analysis

criteria. The respective author of the personal publication list may have selected quite different criteria for her or his list, as our case study examples (N = 2) for testing the relative visibility indicator (Dorsch, 2017) and an ongoing study with a broader author audience (9 authors of the ISSI committee) showed. For example, the personal publication list of Blaise Cronin included also some self-published novels. These ones are definitely publications, but does not assort, if the chosen analysis criteria only refer to scientific publications. The same applies to the following examples from the case studies. Sometimes, single publications are missing in the personal publication lists of an author. It can be assumed, that some scientists forgot to state them, because they were not one of the main authors or because they were so productive, that they did not realized the publication. In the case of the author Stock, there was found one publication he never heard about before. However, it turned out that it was a translated publication, which can be considered as recreation and thus as an independent publication. In contradiction to missing scientific publications, there were publications in some author lists which had a scientific content, but were not formally published (e.g. scientific contributions only in repositories like arXiv).

Both conducted case studies show that the stated observations only apply on a small amount of publications, so that the personal publication lists cover the majority of each author's publications. For example, in the analysis of the ISSI committee, seven out of nine lists contain over 90% of the publications. The work with personal publication lists provides a good basis for the calculation of the relative visibility of an author.

Regarding the author's publications within an information service, it is possible to search by author name or profile as well as with title terms. As for any search, one should mind if there are special characters/variations within the author

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name or several author profiles for one and the same author which have to be merged.

For both studies, none of the considered information services provided a complete publication list of any investigated author. Relative visibility values for all authors' publications (both studies) were highest in Google Scholar. Besides missing publications, some publication information was false or faulty. It is well known (and also appeared for the data collection in both studies), that Google Scholar contains false publication entries (partly false/missing statements) or material which does not match our definition of a formal published scientific publication (e.g., informal notes, slides, etc.). Surprisingly, the other considered information services contained faulty material, too. It is therefore recommended to check the value for *d* regarding its correctness, when calculating the relative visibility value for an information service. Even for a "metric-wise" author (Rousseau & Rousseau, 2015) as Stefanie Haustein the relative visibility is only 26.4 percent in WoS and 44.4 percent in Scopus. At the same time, this methodical issue shows the importance of the new introduced indicator. Information services do not cover an author's complete publication list, and in some cases they include faulty statements, so that the indicator can reveal the relative visibility of an author.

## DISCUSSION

For both, personal publication lists as well as hit lists of an author's publications within an information service, parameters regarding accessibility and completeness have to be considered when calculating relative visibility. In doing so, one is able to determine the visibility, based upon all publications of an author, institution, etc., without a bias of the calculated visibility values. Future work should also investigate discipline specific visibility. Which problems arise for authors who publish in multidisciplinary fields?

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