

To Be Visible, or Not To Be, That Is the Question

Juan Gorraiz, Martin Wieland, and Christian Gumpenberger

Abstract—Due to the unstoppable and exponential growth of the scientific publication output going hand in hand with the evolution of the social web, visibility has become one of the major concerns for all the stakeholders involved in the process of scholarly communication. Bibliometrics can take advantage of this development. It should not only be reduced to an evaluative instrument for reward or punishment, but rather be used as a guiding compass for young scientists in order to improve their publication strategies and thereby to increase their visibility. This article, based on the experiences gained at the University of Vienna, provides a solid terminology by defining the term visibility. It furthermore describes applicable bibliometric methods in order to assess the concept of visibility for evaluative purposes, and finally suggests basic recommendations for scientists and organizations to be taken into consideration for their publication strategies or policies.

Index Terms—Publication output, bibliometrics, impact, scientometrics, publication strategy, visibility.

I. INTRODUCTION

Scientific publication output has been increasing constantly and incessantly within the last decades. Currently more than one publication per second is released and can potentially be promoted and multiplied in all traditional and novel communication channels. In their study based on the number of publications held as source items in the Web of Science (WoS, Thomson Reuters) per publication year as well as on the number of cited references in the publications of the source items per cited reference year, Bornmann & Mutz reported growth rates tripling in comparison with the previous phases: from less than 1% up to the middle of the 18th century, to 2 to 3% up to the period between the two world wars, and 8 to 9% to 2010 [1].

However, not everybody can embrace these developments in such a positive way. Despite multiple benefits, this might also result in unwanted burden and noise. This has been impressively exemplified by Dave Chaffey, who published real-time numbers that highlight the speed at which managing content is moving¹ According to these data, Google literally processes 3.1 million searches every minute. In that very same time span, Facebook accounts for around 3.3 million posts and Twitter for almost half of a million tweets, while Amazon sells over \$200,000 of physical and

digital goods² This phenomenon is not only restricted to private or corporate digital content, but has already gained momentum in the daily communication routine of scientists as well. They no longer only publish, but also promote and discuss their scientific output in manifold ways on the web.

This development sparks the debate whether this really means progress for scholarly communication or not. What if we are perhaps already building the literal tower of babel, where millions of scientists talk or write at the same time and produce billions of papers, talks, emails, blog entries, tweets, etc., to be evaluated, discussed, mentioned, commented, re-blogged, re-tweeted and scored by others? What if we might risk losing a common understanding on what this is all about at the end of the day [2].

Nowadays it is crucial for scientists, particularly for juniors, not simply to publish, but also to improve their publication strategies in order to make their results visible and thereby to increase their impact. The “publish or perish” dilemma is now being aggravated by this new one: “to be visible, or not to be, that is the question”.

In this study, we provide a definition of the term “visibility” according to bibliometric conventions, introduce methods in order to measure it appropriately, and finally suggest recommendations on how to increase it effectively beyond the traditional approaches.

II. THEORETICAL FRAME

According to our department's philosophy, bibliometrics is not only a helpful evaluation instrument in order to complement the peer review system. It is also meant as a compass for researchers in the „publish or perish“ dilemma in order to increase general visibility and to optimize publication strategies.

Therefore, the tasks of the department are not only restricted to support university administration in their research assessment exercises, but also include supportive services for the scientists themselves. Our primary concern is not only the prevention of “quick and dirty” evaluative bibliometrics and its consecutive incorrect and even harmful interpretations, but also to help scientists. This is particularly true for young scientists, who need to develop successful publication strategies in agreement with the different publication cultures of each discipline resulting in an increase of their visibility.

However, in many bibliometric analyses, the terms visibility and impact are used too indistinctly, even often as synonyms, leading to misunderstandings and false interpretations. Visibility and impact are rather the two faces of the same coin that represents the “value” of a publication [3], [4].

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¹ http://www.smartinsights.com/?attachment_id=64902.

² <http://www.visualcapitalist.com/what-happens-internet-minute-2016/>

According to our definition, visibility of a document is predominantly determined by the reputation or the impact of the source where it was published. It thus reflects the editorial barrier and unveils publication strategies. However, the impact of a document itself is not determined by its visibility, but rather by the number of citations received, which is a measure of the resonance and recognition that this publication has obtained in the scientific community.

Thus, a multidimensional approach is suggested for evaluative practices, as used at the University of Vienna (see Fig. 1). The structure of the bibliometric reports provided as a quantitative description of the publication output generally comprises of the following main analyses: Publication activity, visibility, impact, network and cooperation, reference analysis and research focus [5].

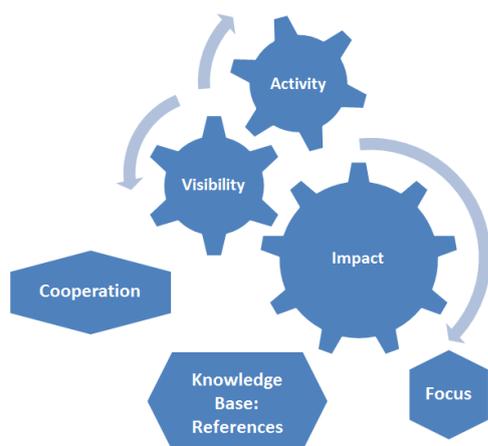


Fig. 1. Multidimensional approach for quantitative assessment of the publication output.

III. METHODOLOGICAL ASPECTS

A visibility analysis as part of a bibliometric report comprises the following steps:

- 1) The number and percentage of publications indexed in the different international, well-respected selected data sources. Publications, which are indexed in such data sources, can be easily retrieved, consulted and cited. Thus, the degree of coverage in international, well-respected selected data sources is an appropriate proxy for measuring the accessibility and visibility of the publication. For this purpose, we use the most renowned multidisciplinary and citation data sources, like Web of Science Core Collection, Scopus and Google Scholar. This is complemented by at least two of most relevant subject specific databases or repositories according to the discipline.
- 2) The number and percentage of publications in top journals or other publication types, where the researcher has published in, according to their prestige and impact. This analysis is highly dependent on the publication type: journals, books and other publication types. For journals, this part of the visibility analysis in bibliometric reports relies on the journal impact measures most frequently used in bibliometrics, e.g. according to their historical evolution: the Journal Impact Factor [6, 7], the Article Influence Score (based on the Eigenfactor metrics [8], SCImago Journal Rank

(SJR) [9] or the Source Normalised Impact per Paper (SNIP) [10].

This hypothesis relies on the well-known fact that it is so much more difficult to publish in journals with high impact measures (e.g. Impact Factors), especially because of the stricter peer review process and the higher rejection quotes. Therefore it is truly a merit to get accepted by such top journals, which should be recognised particularly for young scientists in individual evaluations. From a bibliometric point of view, the most common and renowned impact measure is the journal impact factor (JIF), even if the other alternative measures mentioned beforehand are equally suitable and even constructed much more correctly. Thus, a document has a high visibility in one research field, if it was published in a journal with a JIF bigger than the aggregate or the median IF of the corresponding subject category or field. Therefore, visibility can be quantified by the IF of the source in relation to the aggregated or median IF assigned to the corresponding subject category. A much more precise and suitable approach is the use of the JIF quartiles, as introduced by Eugene Garfield with the launch of the Journal Citation Reports (JCR) in the seventies of the last century. The quartiles (Q1 = Top 25%, Q2 = Top 25-50%, Q3 = Top 50-75%, Q4 = Top 75-100%) in the corresponding Web of Science Category are calculated based on the JIF data reported in the Journal Citation Reports (JCR).

But which edition of the JCR should be used? There are three possibilities, each with its pros and cons: However, none of them is completely correct. Nevertheless all of them provide similar and acceptable results. The first option is to use the data of the most recent JCR-edition for all publications. In this case, the latest impact measures of the journals are considered at the time of evaluation. This variant ignores possible fluctuations of annual IF values. The second option is to use the JCR-edition related to the publication year of each publication. This choice provides an apparently more correct assignment, since it considers biases caused by temporal fluctuations of the JIF. However, it is still not completely correct, because the editions appear regularly with a delay of almost one and a half years. Moreover, the calculation of the JIF is a synchronous approach and based on citations captured two or five years before according to the used JIF version (2-Year or 5-Year Impact Factor). The third and probably most common option is to use the mean value of all the years according to the time period under study. This variant considers annual fluctuations of the JIF, but requires a cumbersome calculation, because these data unfortunately are still not provided ready-to-use in JCR. Due to the fluctuations of the IF, discrepancies are expected according to the method employed. However, the use of quartiles alleviates these shortcomings significantly, because the quartiles are less volatile [11]. If the journal has been assigned to multiple WoS categories, the best quartile is used in general. This decision aims to help the researcher, who could always argue that multiple assignments can be discriminatory.

Fig. 2 shows an example of such an analysis performed at the University of Vienna for the publication output of the last complete ten years of a scientist.

Note that the visibility of a researcher is considered the better the more publications were published in journals with a

low quartile (Q1 = Top 25%). Average visibility would mean that a researcher's publications are equally assigned to all four IF quartiles.

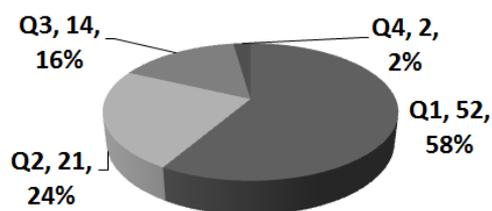


Fig. 2. Visibility chart: JIF quartiles distribution 2006-2015.

The JIF is a suitable visibility measure, but only for journals indexed in the Journal Citation Reports (JCR). Novel alternatives are based on the widely known PageRank like SJR and SNIP, referring to journals indexed in Scopus, which results in a considerable amount of "visible" journals totalling almost 21,000 journals. In disciplines where coverage in WoS and Scopus is known to be low, such as in the social sciences, mathematics and the computer sciences, other lists of "highly" reputed journals specific for each discipline or other checklists (like the one produced by our department in cooperation with the Austrian Open Access Network³ can be consulted.

Unfortunately, it is much more difficult to assess the visibility of monographs or books. Approaches may rely on the reputation of the editorial board, library loan statistics, the number of available editions, or holdings in international catalogues. All of these suggestions are highly controversial, and none of them has so-far proven to be suitable for research assessment purposes.

- 3) The number and percentage of publications in Open Access sources [5], [12]. Undoubtedly, Open Access increases the visibility and thereby the chance to be cited. There is a large number of studies corroborating this hypothesis and showing the citation advantages of OA publications [13], [14].

These three groups of indicators provide a first, valuable visibility assessment of the publication output of the researcher or the institution. The analysis can either be done for the certain periods or for the whole academic life of researchers or institutions. It is particularly useful to check the compliance with adopted institutional policies (OA policy, affiliation policy, etc.) or the success of self-developed publication strategies in the case of individuals.

Figure 3 shows the comparative IF quartiles distribution for the publications of the same scientist as in Fig. 2 from the period 2006-2010 and the period 2011-2015.

In this particular case, the visibility has increased in the second period according to the higher number and percentage of publications in the first and second quartile (Q1 and Q2).

Visibility analyses are suggested as an alternative approach and are meant to supplement traditional citation analyses for evaluative purposes. They are especially helpful, whenever assessment exercises are performed for the last, most recent years, meaning that the citation window is too short for retrieving a significant number of citations in many disciplines. This is particularly true for fields with a long

cited half-life, as it is usual in the social sciences and in the humanities.

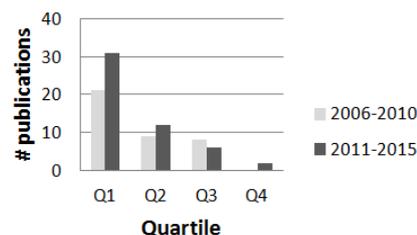


Fig. 3. Comparative IF quartiles distribution 2006-10 versus 2011-15.

It is stressed that visibility analysis is NEITHER used to assess the quality NOR the impact of single publications. It is rather meant to assess the reputation or impact of the sources in which original research was published.

Visibility analyses based on journal impact measures can only tell a part of the whole story. In order to paint a more complete picture it is nowadays possible to exploit the wealth of scholarly communication channels available on the web, which is particularly promising for the social sciences and the humanities. The next section will focus on possibilities going beyond the beforehand-described visibility analysis. Publication strategies related to alternative data sources and metrics will be addressed as well as the use of individual permanent identifiers (ORCID, etc.) and correct affiliations.

IV. RECOMMENDATIONS TO INCREASE THE VISIBILITY IN THE SSH

Unfortunately scientometric and bibliometric methods are not as easily applicable to the Social Sciences and Humanities (SSH) as in the Sciences, mainly due to different publication cultures and the low coverage in international citation databases.

But which measures should then be taken into account to increase the visibility of the quantity and quality of the research output in the SSH?

To shed light on this issue a study at the University of Vienna was commissioned by the Rectorate, which started in 2013 and comprised of the three following phases:

- First phase: quantitative analysis of the longitudinal research output development in the SSH (2007-2012) [15].
- Second phase: qualitative analysis with semi-structured interviews of researchers in the SSH (2014-2015) [16].
- Third phase: online survey performed at the University of Vienna amongst all researchers in the SSH (2016)

The most important aims of this study were:

- a) Getting a better understanding of publication habits in the SSH
- b) Discussing the limitations of citation-based methods in the SSH
- c) Suggesting new metrics (e.g. usage metrics, altmetrics) for broader visibility and impact assessment
- d) Pinpointing the low coverage of the SSH in WoS and Scopus and suggesting Google Scholar as a complementary data source
- e) Developing appropriate strategies to increase international visibility in the SSH

The activities of the two first phases resulted in the

³ http://www.oana.at/fileadmin/user_upload/p_oana/oana/OANA-Checklist-OA-Journals_en.pdf

following list of suggestions compiled by our “Department for Bibliometrics and Publication Strategies”:

Suggestion 1 – Database Indexing

Whenever you publish in journals, do not only focus on peer-review but also on database indexing as a quality criterion. For monographs invite for book reviews which are published in beforehand mentioned database-indexed journals.

Suggestion 2 – Research Documentation

Make sure your research is completely covered in the Vienna University current research information system u:cris. Via the u:cris web portal your research output will become detectable for Google Scholar within the next months. <http://ucrisinfo.univie.ac.at/en/home/>

Suggestion 3 – Language

Whenever you publish in non-English language provide at least title, abstract and keywords in English. This will allow indexing in international databases, particularly Web of Science and Scopus. If possible, prefer publication channels which allow this minimum bibliographic information in English language.

Suggestion 4 – Google Scholar

Create a Google Scholar Citations profile and make use of the extensive coverage of Google Scholar in comparison to Web of Science and Scopus. Your individual profile can be edited at your own convenience, thus it will only include what you wish to be included.

Suggestion 5 – Identifiers

Use the “Open Researcher and Contributor ID” (ORCID)⁴. It allows the creation of a permanent, clear and unambiguous record of research and scholarly communication by enabling reliable attribution of authors and contributors (see <http://orcid.org/about/what-is-orcid>)

Use “Digital Object Identifiers” (DOI). Publications equipped with DOIs can be analyzed more easily with the so-called “altmetrics” [17].

Suggestion 6 – Publication Strategy

Develop an appropriate publication strategy according to your disciplinary focus, target groups and suitable publication channels.

Publish in Open Access channels whenever available and appropriate (Gold Open Access).

Also submit your research to Open Access repositories (Green Open Access) – either institutional or disciplinary repositories.

Suggestion 7 – Dissemination and self-promotion

Make up your mind how actively you are willing to play the dissemination and self-promotion game. Consider the following questions and decide for yourself, which options sit you best: Do you maintain a website with an online profile or CV which contains details of your current research and which lists all your publications? Do you have an entry in Wikipedia? Do you use and regularly maintain a reference manager enhanced with social media functionality? Do you use mailing lists, discussion groups or scientific blogs? Do you use professional social networks like „Academia.edu“, „ResearchGate“, „CiteULike“ or others and maintain a corresponding profile? Do you use services like „altmetric.com“, „PlumX“ or „Impact Story“ and maintain a

corresponding profile?

These suggestions were presented and discussed in the Faculties. The majority of them were finally issued by the Rectorate in 2016 as official recommendations⁵ to increase the visibility of academic achievements in SSH.

V. CONCLUSIONS

The 21st century started with two highly revolutionary improvements.

The first one was the rapid adoption of digital availability of information on the web, especially of e-journals [18, 19]. However, the speed of this transformation is different according to disciplines and their publication cultures. For the sciences the development was faster than for the social sciences and the humanities. Consequently, several studies and surveys confirm that we are still far from the proclaimed “digital humanities” [20, 21]. This is probably also due to the lower degree of competitiveness in the humanities in comparison to the natural and exact sciences. The higher competitiveness certainly requests immediate and broad dissemination of information.

Due to the increasing amount of available digital information the tracking and collection of usage data (e.g. views and downloads) has become much easier compared to the print-only era. This resulted in a renaissance of the usage metrics, which have become increasingly popular beyond librarian practices and are now used in scientometric analyses as complementary data to citation metrics.

The second revolution was the evolution of the internet into a more social medium and the vast adoption of Web 2.0 practices, even if still strongly influenced by demographic characteristics, such as age and gender, but also by position, and discipline [22].

Thus, social media have not only changed all our daily routine habits, but also introduced substantial and pervasive changes into the scientific communication between organizations, communities, and individuals [23]. Undisputedly, social media increase the visibility of the research output of individuals as well as of institutions, and thereby increase the chance for higher impact. At the same time, they are certainly popular and very easy-to-use means for scientists, institutions or publishers to promote their research output and to enhance their visibility. This means that visibility is no longer restricted to prestigious journals and according rankings in the “publish or perish” community, but extends to the social web with all its different target groups. Thus, all academic sectors and players involved in scientific communication need to rise to this new challenge and confront it somehow.

This “somehow” is certainly attached to many unresolved issues and challenges. Many questions arise like: Do researchers run the risk of being taken hostage by globally implied visibility frenzy? How much visibility is really desirable and necessary? How can we prevent scientists from turning into individuals driven by unwanted self-marketing coercion? And if it is not desirable for scientists to dedicate too much time on self-promotion, who could step in on their behalf to fill this roll? Should we create special departments

⁴ <http://orcid.org>

⁵ <https://phaidra.univie.ac.at/view/o:408056>

and services particularly dedicated to this purpose? And finally, a much broader and philosophical question: How can social media be consistent with ethical and legal rules? Is visibility desirable at any cost, particularly at the expense of its own privacy? [24]

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Dr. Gorraiz is a member of the International Society for Scientometrics and Informetrics (ISSI), a founding member and steering committee member of the European Summer School for Scientometrics (esss) and a reviewer of numerous prestigious journals incl. *Scientometrics* and *PloSOne*. Apart from this mentioned ongoing commitment he rendered outstanding services to the scientometric community as an organizer and programme chair of the „10th International Conference on Science & Technical Indicators“ 2008 in Vienna as well as an organizer of the "14th International Society of Scientometrics and Informetrics Conference" 2013 in Vienna. Last, but not least he has authored many publications in the field of scientometrics.



Martin Wieland was born in Salzburg (Austria) in 1968. He studied at the Department of Social and Cultural Anthropology (University of Vienna) and specialised in Mongolian- and Gender Studies.

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