

researchtrends

IN THIS ISSUE:

PAGE 2

The value of bibliometric measures



Scientometrics from past to present: part two

The first part of this article covered the early interests of scholars in law and psychology at the beginning of the 19th century. Since that time, scientometrics has matured and developed into a respected and recognized field in its own right.

PAGE 3

Research trends



Mitochondrion fills the gap

A good idea is not enough to launch a new journal; there must also be demand for it. Bibliometric analysis of a newly launched journal can demonstrate how it contributes to the community it serves and whether it is meeting this demand.

PAGE 4 - 5

Country trends



Focus on Germany: quantity and quality

Germany is one of the world's oldest centers for journal literature, and its publication output continues to grow. We look at the ten most prolific subject areas in Germany and the continuing importance of the German language in scientific research.

PAGE 5

Expert opinion



Scopus data ranks the world

The THES-QS World University Rankings were published on November 9. For the first time, the data used to compile the rankings came from Scopus. Ben Sowter explains this and other key changes to QS' methodology.

PAGE 6

Why did you cite...?



In this section of Research Trends we ask the author of a recently published article what motivated them to cite a key reference.

Welcome to Issue 2 of Research Trends, the bi-monthly newsletter providing objective, up-to-the-minute insights into scientific trends based on bibliometric analysis. In this issue, we finish our history of scientometrics and focus on Germany and its prolific research output. We also look at the 2007 THES-QS World University Rankings, which are based on Scopus data for the first time, and much more.

We welcome your **feedback** to any of the topics covered.

Kind regards,

The Research Trends Editorial Board

Did you know?

The most highly cited 2006 article in Scopus, with a total of 539 citations so far, is currently: "Prevalence of overweight and obesity in the United States, 1999-2004". Ogden, C.L., Carroll M.D., Curtis. L. R., McDowell, M.A., Tabak, C.J., Flegal, K.M. (2006) *Journal of the American Medical Association* 295 (13), pp. 1549-1555.

The value of bibliometric measures



Scientometrics from past to present: part two

The first part of this article covered the early interests of scholars in law and psychology at the beginning of the 19th century. Since that time, scientometrics has matured and developed into a respected and recognized field in its own right.

In the 1980s, new technology was applied to bibliometric research, including citation mapping techniques from CWTS at the University of Leiden, and specialist research solutions from the Institute for Scientific Information, led by Eugene Garfield and Henry Small. The first major award for the scientometric field, the Derek John De Solla Price Award of the journal *Scientometrics*, was first awarded in 1984 to Eugene Garfield. Several of the key contributors to *Scientometrics* received this award throughout the 1980s: Michael Moravcsik, Tibor Braun, Vasily Nalimov, Henry Small, Francis Narin, Bertram Brookes and Jan Vlachý. The 1990s saw the birth of the first society for the scientometric community: the International Society for Scientometrics and Informetrics (ISSI). The De Solla Price Award is now presented biannually at the ISSI meeting.

The Web and web-based tools

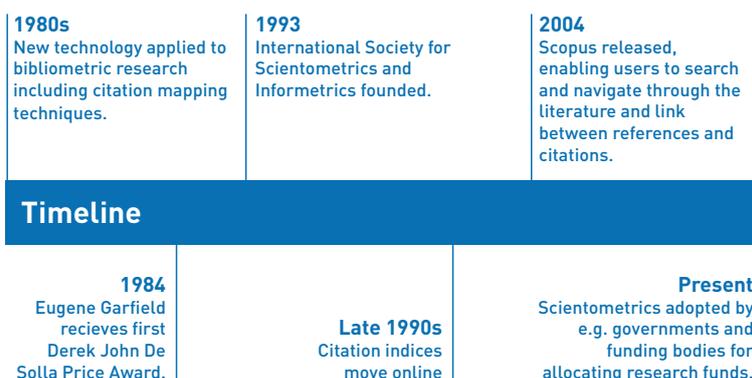
The Impact Factor continued to grow in significance within the scientific world. Many researchers started to use the metric in grant, funding and tenure applications. In the late 1990s Thomson Scientific launched a web-based version of the citation indices, allowing users to search across citation databases on the Internet. Indeed, the Internet has become a vital tool for investigation and has given rise to several new citation measures that were previously impossible. These include article download counts and Google's PageRank, a numerical value that represents the importance of a page on the Web. New areas such as webometrics have also developed to look at the quality of Web pages and links within them. Web usage and weblog analysis are sophisticated new techniques that allow researchers to understand how the Web is used for analysis.

In 2004 Scopus was released as a new tool to search and navigate through the literature and link between references and citations. This abstract and citation database of peer-reviewed literature, patents and Web sources has also introduced additional tools that increase the speed and accuracy of research evaluation. One of these is the Author Identifier that automatically matches and de-duplicates author names, with a 99% accuracy rate. Attention is increasingly turning from rating the performance of journals to also rating individual authors. The h-index, a simple metric developed in 2005 by Professor J. Hirsch and adopted by Scopus and Web of Science is one way to do this, while the Scopus Citation Tracker allows users to track who is being cited, how often and by whom. This can also help identify research trends. Other key indicators that have been developed include the Eigenfactor, the Y factor and the **g-index**.

Wider relevance of scientometrics

A new journal for the scientometrics field was launched in 2006. The *Journal of Informetrics*, edited by Professor Leo Egghe, is an additional forum to disseminate scientometric research findings, alongside established journals such as *Scientometrics*, *Journal of the American Society for Information Science & Technology* and the *Journal of Information Science*.

While the development of a new journal in the field illustrates the growth and proliferation of research within the scientometrics community, it is also important to recognize the science's wider relevance and application. Scientometrics has been used in creating thesauri and exploring the grammatical and syntactical structures of texts. Governments and policymakers are also increasingly adopting scientometrics, for example in the UK Research Assessment Exercise and the Australian Research Quality Framework, as a means of allocating research funds or to ensure the decisions they make are based on unbiased, credible research.



Research trends



Mitochondrion fills the gap

“This is truly the decade of the journal and one should seek to limit their number rather than to increase them, since there can be too many periodicals.”

Neues medizinisches Wochenblatt fur Aerzte (1789)

For every generation of scholars, the problem of information overload has always seemed insurmountable. The annual launch of new journals has often been seen as a contributing factor to the burgeoning literature, rather than a consequence of it. Bibliometric analysis of a newly launched journal can demonstrate how it contributes uniquely to the community it serves and paves the way for the dissemination of research, which, particularly in the case of biomedical journals, can ultimately save lives.

Mitochondrion was launched in June 2001 as the official journal of the Mitochondria Research Society. In recent years, malfunctions in mitochondria, microscopic cellular compartments, have been implicated in neurodegenerative diseases (including Alzheimer’s disease and Parkinson’s disease), mental health issues (schizophrenia and bipolar disorder), epilepsy, stroke, heart disease and diabetes.

“In the decade before the journal was launched, more than 45,000 mitochondria articles were published across thousands of journals,” explains *Mitochondrion*’s Editor-in-Chief Dr. Keshav Singh (figure 1). “It was a great challenge keeping up with important developments related to mitochondrial research and medicine. Since 2001, *Mitochondrion* has provided a common platform for the scientists and clinicians who work in diverse scientific disciplines but have an interest in mitochondria.”

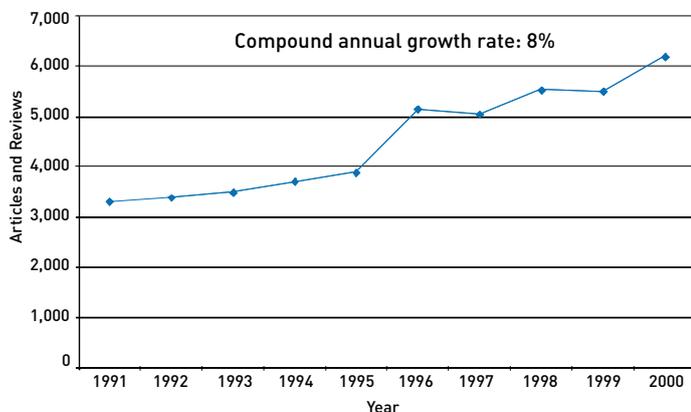


Figure 1 - Number of articles and reviews on mitochondria from 1991 to 2000. Source: Scopus

Crossing the disciplinary divide

Mitochondrion’s stated mission (1) is “to provide a rapid and dramatic advancement in our understanding of the basic science of mitochondria, mitochondrial pathology and in badly needed therapies for mitochondrial diseases.” Since its launch, the journal has published over 300 articles and reviews, including a special issue on Mitochondrial Medicine in 2004, containing 38 papers on all aspects of the field. The rapid and sustained accumulation of citations to the journal’s articles (figure 2) demonstrates the clear need for a journal focused on this key area and is a testament to the publication’s quality.

Citations from such prestigious basic research journals as *Molecular Cell*, *Journal of Biological Chemistry* and *Nature Genetics* and clinical journals such as *The Lancet* further reinforce the success of the journal in crossing the disciplinary divide. “The future of mitochondrial research is bright,” says Singh. “The field is one the fastest growing disciplines in biomedicine. There is still so much to learn about mitochondria including fusion, fission, distribution and their role in many diseases.”

Bibliometric analysis of *Mitochondrion* has demonstrated that it was launched in response to an existing need, and since then has provided an important conduit for communicating research outcomes to the wider scientific community.

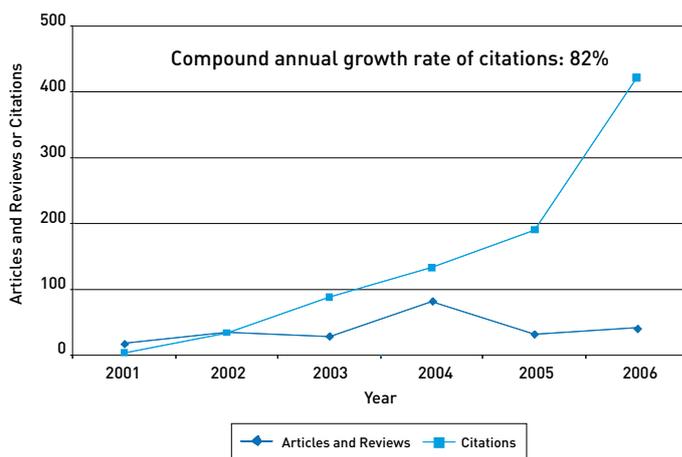


Figure 2 - Number of articles and reviews in *Mitochondrion* and the number of citations to them, from 2001 to 2006. Source: Scopus

References:

(1) Singh (2001) “Mitochondrial me and the *Mitochondrion* journal”, *Mitochondrion*, Vol. 1, No.1, pp. 1-2..

Country trends



Focus on Germany: quantity and quality

In the previous issue of Research Trends, we presented citation and article data on ten countries whose researchers produce a particularly high number of journal articles. In this issue, we have extended this analysis to eight additional countries including one of the oldest centers for journal literature, Germany. Ulrich’s Periodical Directory lists the *Goettingische Gelehrte Anzeigen* as the first German journal, founded in 1739.

On average, Germany’s publication output has been growing at a cumulative rate of 5% since 2002, as shown in figure 1. The abundance of quality German journals in areas such as Chemistry, Engineering, Life Sciences, Medicine and Physics was reason enough to analyze the recent patterns for publications in Germany.

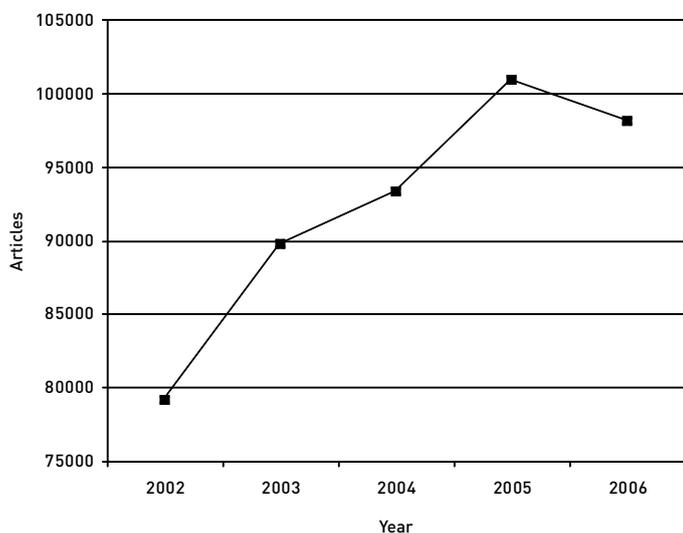


Figure 1 – Number of articles published by German researchers 2002-2006. Source: Scopus

Methodology

An analysis was performed in Scopus to identify the top 1% and 5% of cited papers per subject area. Table 1 denotes the number of papers published in Germany for the period 2002-2006. These counts were then separated into 27 subject categories (as specified in Scopus.com), with table 1 showing the top ten

most prolific fields. For each of these years and for each subject category, the number of papers that forms a part of the top 1% and 5% of highly cited papers was derived.

Subject Area	Publications	Article #	1% Threshold	Article #	5% Threshold
Agricultural and Biological Sciences	6705	85	12	415	6
Biochemistry, Genetics and Molecular Biology	16287	175	21	918	10
Chemistry	8832	92	16	529	8
Computer Science	4852	62	6	244	3
Earth and Planetary Sciences	5694	58	20	339	9
Engineering	10282	139	6	549	3
Materials Science	7484	81	11	506	5
Mathematics	5702	82	5	304	3
Medicine	28124	289	19	1512	8
Physics and Astronomy	17686	195	11	969	5

Table 1 – A snapshot of the ten subject categories in Germany with the highest number of publications from 2002-2006. Medicine was the most prolific. Source: Scopus

The German language continues to be of major importance to many of these fields and to local research within German-speaking countries. Indeed, in 2006 Scopus identified almost 12,000 articles published in German, accounting for 11% of Germany’s total article output. It is interesting to note that this accounts for only 32% of the total article output in German, indicating German’s diversity as a research language throughout the world.

Continued from page 4

Prize winners

The influence of Germany on science was clear to see this year, with the announcement of two Nobel Prize-winning German researchers. Gerhard Ertl of the Fritz-Haber-Institut der Max-Planck-Gesellschaft, Berlin and Honorary Professor at Freie Universität Berlin and Technische Universität Berlin, won the Nobel Prize in Chemistry for his studies of chemical processes on solid surfaces. Peter Grünberg shared the Nobel Prize in Physics for the discovery of Giant Magnetoresistance, which resulted in a breakthrough in gigabyte hard disk drives.

In addition, Olaf Hohmeyer, University of Flensburg, is Vice Chair of the Working Group III of the Intergovernmental Panel on Climate Change. This Group was awarded the 2007 Nobel Peace

Prize for its efforts to spread awareness of man-made climate change and lay the foundations for counteracting it.

To see the analysis for the eight countries mentioned at the start of this article (Argentina, Brazil, Chile, Columbia, Mexico, Poland, Turkey and Egypt), please [click here](#)

To visit the first issue of Research Trends and see the original ten-country analysis, [click here](#).

Expert opinion



Scopus data ranks the world

Ben Sowter



In an editorial in *Current Science*, P. Balamam observed that “rankings and ratings enter every sphere of human activity” (1) and even went so far as to compare institutional rankings to a “beauty contest”. With the publication of The THES-QS World University Rankings on November 9, the winners of the 2007 beauty contest were announced.

The Times Higher Education Supplement (THES), a London-based weekly newspaper that reports specifically on higher education issues, has published its World University Rankings annually since 2004. It works closely with Quacquarelli Symonds (QS), a leading independent network for higher education and related careers that acts as its research and data analysis arm.

Switch to Scopus

For the first time, the data used to compile the World University Rankings have come from Scopus. “As our own methodology developed and improved, we felt we needed a more comprehensive data source,” explains Ben Sowter, QS’ Head of Research. “We chose Scopus for several reasons: the quality of the data, which will provide enhanced transparency and

clarity for the rankings; strong journal representation outside the United States; and more non-English content than other databases. We believe that the strong data found in Scopus,

combined with other enhancements we’ve made to our methodology, will help stabilize rankings, making them more effective for tracking year-on-year performance. They will also result in a more robust and balanced measure of comparative international university quality.”

In addition to the switch to Scopus for citation data, the key enhancements to QS’ methodology are:

- Z-score aggregation of indicators to generate overall scores
- Peer reviewers prevented from promoting their own university
- Consistent usage of Full-time Equivalent (FTE) data for all personnel-related data

Assessment indicators

Institutions are assessed on six indicators that carry different weightings. These indicators are based on what THES considers the template of a world-class university:

- Research quality (peer review 40%, citations per faculty 20%)
- Graduate employability (recruiter review 10%)
- International outlook (international faculty 5%, international students 5%)
- Teaching quality (student faculty 20%)

For more information on the effect these changes will have on the data and thus the rankings, please [click here](#).

References:

- (1) Balamam, P. (2004) “The Shanghai Rankings”, *Current Science*, Vol. 86, No. 10 from the [World Wide Web](#)

Why did you cite...?



Why did you cite...?

The meaning and value of citation linkages between scholarly works has been a topic of great interest and debate for many years (1). In this feature we ask the author of a recently published article what motivated them to cite a key reference.

Dr. Teunis B.H. Geijtenbeek heads up the Host-Pathogen Interactions workgroup within the Molecular Cell Biology & Immunology department at the VU University Medical Center in Amsterdam, The Netherlands. His current research focus is investigation into the molecular mechanisms by which human Langerhans cells, present in the skin and genital tract linings, interact with HIV-1, and how these interactions subsequently direct immune responses.

Dr. Geijtenbeek has recently published a paper (2) showing that Langerhans cells capture and degrade infecting HIV-1, so forming a natural barrier. This knowledge is critical to the development of a treatment to combat HIV-1, since Langerhans

cell function must be at least preserved, or enhanced. In this paper, Dr. Geijtenbeek has cited a 2004 paper published in *Blood* (3), and he explains why: "This article very nicely demonstrates that there are two distinct mechanisms by which HIV can be transmitted to T-cells, with the mechanisms being important at different phases of infection. This has clarified several other reports which argued for either one or the other."

References:

[1] Bornmann & Daniel (2007) "What do citation counts measure? A review of studies on citing behavior", *Journal of Documentation* (in press).

[2] de Witte *et al.* (2007) "Langerin is a natural barrier to HIV-1 transmission by Langerhans cells", *Nature Medicine*, Vol. 13, No. 3, pp. 367-371.

[3] Turville *et al.* (2004) "Immunodeficiency virus uptake, turnover and 2-phase transfer in human dendritic cells", *Blood*, Vol. 103, No. 6, pp. 2170-2179.