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## The Thomson Scientific journal selection process

### Introduction

The Web of Knowledge is an electronic platform that consists of important searchable bibliographic databases and key analytical tools, such as the Journal Citation Reports (JCR). Several of these bibliographic databases provide extensive coverage of the literature of specific subjects, such as the Life Sciences, Agriculture and Forestry, Food Science, Physics and Engineering, Medicine, Behavioral Sciences, and Animal Biology (Fig. 1). The international patent literature and conference proceedings are also key components of the Web of Knowledge. In all, this environment covers over 22,000 unique journals, more than 60,000 conferences from 1990 to the present, and approximately one and a half million patents.

The cornerstone of the Web of Knowledge, however, is the highly selective multidisciplinary Web of Science (WoS), which the Institute for Scientific Information (ISI), and now Thomson Scientific, has developed and maintained for over 40 years. The WoS comprises

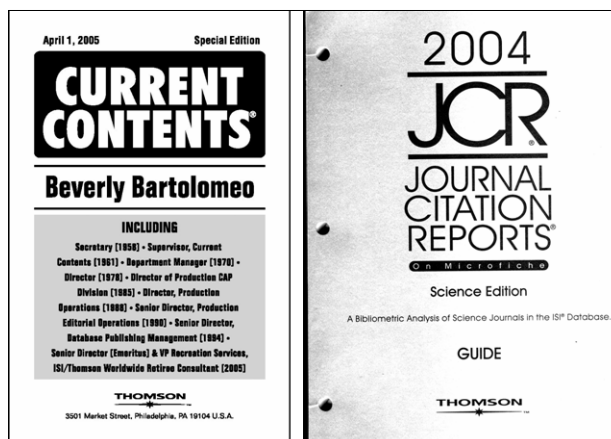
several multidisciplinary citation indexes. In addition to its three major components, the Science Citation Index Expanded, the Social Sciences Citation Index, and the Arts and Humanities Citation Index, it includes Index Chemicus and Current Chemical Reactions. Since significant resources are dedicated to the selection of the most important and influential journals for inclusion in the WoS, we will examine the

journal selection process used to achieve this goal, particularly with regard to citation analysis and the role of the impact factor.

The journal selection process has been applied consistently for more than 45 years. Every journal included in the WoS has been evaluated according to the highest standards, which were originally defined by Eugene Garfield, the founder and president Emeritus of ISI. This steady application of quality has enabled continuous develop-

ment of the WoS, whose primary purpose is to provide comprehensive coverage of the world's most important and influential scholarly journals. Nonetheless, comprehensive does not necessarily mean all-inclusive, since it has been demonstrated that a relatively small number of journals publish the bulk of scientific results.

An analysis of 7622 journals covered in the 2003 JCR revealed that as few as 300 journals account for more than



**Fig. 1.** *Current Contents* and *Journal Citation Reports*, two of the publications and bibliographic databases of Thomson Scientific.

half of what is cited and nearly one-third of what is published. It has also been shown that a core of 3000 of JCR journals accounts for about 80% of published articles and nearly 95% of cited articles. This core, however, is not static; new journals join it while others disappear. Every year, 2000 journals are evaluated, but only the most important and influential international and regional ones are selected, around 10%.

## The Thomson Scientific selection process

The team of editors select publications for the WoS. This team consists of information professionals with an educational background in science and librarians, all of whom are experts in the literature of their subject areas. There are four main components of the Thomson Scientific selection process of journals:

**Journal publishing standards.** (a) *Timeliness*: It is essential that each journal publishes according to its stated publication schedule in order to be considered for coverage in the WoS database. Three consecutive issues published on time must be received to confirm this. With e-journals that normally publish articles one at a time, editors look for a steady flow of articles over several months. (b) *International editorial conventions*: Certain editorial conventions are essential since the point of indexing articles is to be able to retrieve them in a search, and these include: informative journal titles, descriptive article titles, full address information for every author, and complete bibliographic information for all the cited references. (c) *English-language bibliographic information*: English has become the standard language in the international research community, especially in natural sciences. It is for this reason that Thomson Scientific tries to focus on journals that publish their full text or, at the very least, their bibliographic information in English. (d) *Peer review*: We expect peer review to be a part of the publishing process for all science journals. Application of the peer review process, which is normally done by the journal publisher, is an assurance and an indication of a journal's standards, the overall quality of research presented, and the completeness of the cited references.

**Editorial content.** The editorial content is evaluated to ensure that the content of a new journal will enrich the Thomson database or that the topic is already covered adequately. The goal of this process is to ensure that the overall editorial content of Thomson journal products is comprehensive and

complete, and that journal coverage in every subject meets the needs of our customers.

**International diversity.** The presence of an international base of authors and editors is a good indicator of the health of a journal and a predictor of its ability to continue to publish important research in the future. Thomson also seeks to cover the best regional journals and to properly reflect the global context in which today's scientific research is carried out. For example, in the infectious diseases category, there are 41 journals published in eight countries, but a study at the article level reveals a community of authors representing 115 countries not including the EU or the USA—where most of the journals are normally published.

**Citation analysis.** Authoritative citation analysis is a key factor in the evaluation of journals, because all cited references to articles in both covered and non-covered articles are captured in order to measure the importance, influence, and overall usefulness of a journal. Discipline-specific citation rates tend to vary greatly; for example, small fields such as crystallography do not generate as many articles or citations as do larger fields such as biotechnology or genetics. In areas such as the arts and humanities, it may take a relatively long time for an article to attract a meaningful number of citations. These facts must be taken into consideration if citation data are to be used correctly.

Thomson Scientific's citation analysis takes place on at least two levels: citations to the journal itself and citations to the contributing authors and the editorial-board members. This is particularly useful in evaluating new journals, for which a citation history does not exist. For established journals, the impact factor—the average number of times that recent articles in a journal were cited in a particular year—is used. For example, in 2004 the impact factor for the journal *Emerging Infectious Diseases* was 5.643. This means that, on

**Table 1.** Calculation of the Impact Factor of a journal

Journal: <i>Emerging Infectious Diseases</i>	
2004 Impact Factor: 5.643	
Citations in 2004 to articles published in:	2003 = 1577 2002 = 1572 Total 2 years = 3149 citations
Number of articles published in:	2003 = 281 2002 = 277 Total 2 years = 558 articles
Calculation:	$3149 / 558 = 5.643$

**Table 2.** Citable items

	Articles	Reviews	Combined	Other items
Number in JCR in 2004 (A)	371	3	374	7
Number of references (B)	8041	52	8093	6
Ratio (B/A)	21.7	17.3	21.6	0.9

average, each article published in 2003 or 2002 received around five citations in 2004 (Table 1). We also note that, of the 374 articles published in the year 2004, 371 were original research and only three were review articles; hence, this journal would not be compared directly to one that published mostly review articles (Table 2). The Thomson Scientific editors also examine the publishing record of the journal's authors and editorial-board members to determine whether their work has been cited. This is particularly revealing for brand-new journals that do not have a citation history and is often an indicator of the journal's future success.

Self-citation rates relate a journal's self-citations to the total number of times it is cited by all journals, including itself. Eighty percent of all journals listed in the JCR Science Edition have self-citation rates of less than 20%. Significant deviations from this normal rate require examination to determine whether excessive self-citations are being used to artificially inflate the impact factor, thus weakening its integrity. Thomson Scientific is dedicated to insuring that the impact factor remains a solid indicator of quality.

With the release of the Century of Science in 2005, WoS coverage now goes back to 1900. Journal literature from 1900 to 1944 that had been cited more than 50 times by journals covered in the WoS from 1945 to the present were included and represent all areas of technology, biomedical, and physical sciences. While it is true that for most journals the peak years of citation impact are within 3–5 years of publication, it is also true that many journals have significantly longer cited half-lives—the median age of its articles cited in the current JCR year. Over 1100 journals in the 2004 JCR Science Edition (19%) and 400 journals in the 2004 JCR Social Science Edition (23%) have a cited half-life of 9.5 years, which means that half the citations they receive are to articles that are no more than 9.5 years old, and that half are older than 9.5 years.

Cited reference searching is perhaps the most significant by-product of the citation index and indispensable tool in the discovery process. Searching cited references for prior work on a subject is a sure way to avoid redundancy and to effectively build on past research. It is also an indispensable tool

in evaluating the work of individual researchers and for measuring the importance or influence of their work in the field.

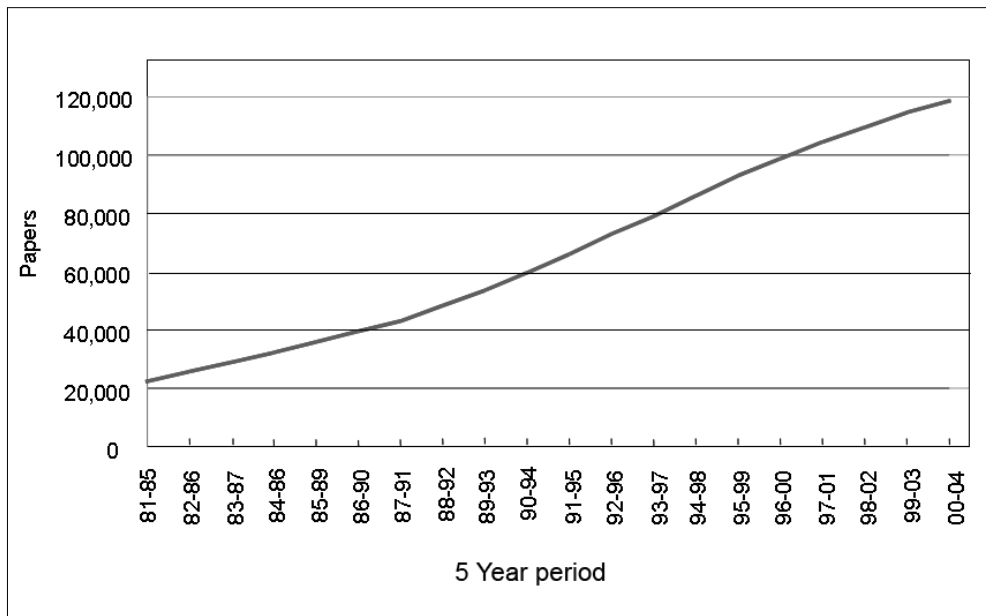
## Citation Indexes

**Science Citation Index Expanded and the Science Citation Index.** The Science Citation Index Expanded (SCIE) is an international, interdisciplinary index covering approximately 6200 journals in science, medicine, agriculture, technology, and the behavioral sciences. Every journal has been carefully selected according to the process above. The SCIE is available online through the WoS. The Science Citation Index (SCI) is a subset of the SCIE that is available on CD-ROM and in print. Its coverage is limited to only the most highly cited, high-impact journals in each category, and it comprises approximately 3800 journals and book series. Whenever possible, it includes the best journal from each country provided it meets all the standard selection criteria.

**Social Sciences Citation Index.** The Social Sciences Citation Index (SSCI) covers 1798 journals. Standard citation metrics are included in the selection criteria, while keeping in mind at the same time that, in general, impact factors and overall citation rates in the social sciences are generally lower than those in the natural sciences and that these tend to rise, peak, and decline. Coverage of non-English, regional journals in the SSCI is also becoming increasingly important to Thomson Scientific.

**Art and Humanities Citation Index.** The Arts and Humanities Citation Index (AHCI) covers 1123 journals. Although they all meet Thomson Scientific selection criteria, citations in the Arts and Humanities do not necessarily follow the same pattern as citations to social sciences and natural sciences articles. In addition, arts and humanities journal articles frequently reference non-journal sources (e.g., books, musical compositions, works of art and literature). Consequently, citation data, while sometimes useful, are frequently much less important in journal evaluations in the arts and humanities.

**Citation Indexes in Spain.** Currently, there are 51 journals in the WoS that are published in Spain: 30 in the SCIE, 19 in the AHCI, and 2 in the SSCI, and it is expected that 21 more journals will be added to this figure in the near future. From 1981 to 2004, there was a steady stream of articles from Spanish authors in Thomson Scientific products.



**Fig. 2.** Number of papers published in Spain in all fields in 5-year overlapping periods from 1981 to 2004.

In 2000–2004, the last 5-year period measured, Thomson Scientific covered over 118,000 papers by Spanish researchers. The geographic origin of these articles was determined by the author's address regardless of the country of publication of the journal (Fig. 2).

## Open access journals

Open access (OA) publishing is defined as not charging readers or their institutions for the right to access, download, copy, print, distribute, or search an article. In order to identify OA journals, Thomson Scientific uses a number of sources, including J-Stage [<http://www.jstage.jst.go.jp/browse>], the Scientific Electronic Library Online (SciELO) [[www.scielo.br](http://www.scielo.br)], [[www.scielo.isciii.es](http://www.scielo.isciii.es)], and the Directory of Open Access Journals (DOAJ) at Lund University [[www.doaj.org](http://www.doaj.org)]. These sources list more than 2000 journals, of which there are currently over 260 OA journals that meet the Thomson Scientific selec-

tion criteria and are covered in the WoS. The number of OA journals is growing rapidly, since new journals are adopting this model and older journals are changing their business model to OA. Surely this trend will continue and OA will become more widespread.

All of the OA journals covered by Thomson Scientific have been evaluated and selected according to the same standards as journals with a more traditional business model. What matters to Thomson Scientific is the potential value of the contents of the journal to users of the WoS.

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As a whole, Thomson Scientific remains committed to bringing its users the most important and influential scholarly information in a timely manner. It focuses on the world's most important journals through the WoS, so that investigators will find the best, most relevant, and influential research quickly and efficiently.