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# CONNECTING THE DOTS ACROSS THE RESEARCH ECOSYSTEM

A WHITE PAPER

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THOMSON REUTERS™

# CONNECTING THE DOTS ACROSS THE RESEARCH ECOSYSTEM

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Countries, institutions and corporations driving breakthrough science, leading-edge innovation and thriving knowledge economies have established research standards and benchmark their performance. Quality, curated scientific literature alongside cutting-edge analysis and evaluation tools are essential to their success. The Web of Science and InCites constitute the world's only integrated platform that supports discovery and evaluation on a content set that reflects the standards of the scientific community.

We started with the science that the scientific research community identified as most meaningful and important – through citations – and we built a database around that: the best science according to scientists. We've cultivated this scientific data collection for the scientific community, from the scientific community. And, today, it is depended on by 45 governments and thousands of institutions and corporations, to define their research standards, drive breakthrough science and benchmark performance.

Thomson Reuters takes its responsibility as provider of this information, the world's most trusted and authoritative collection of scholarly literature and benchmark analytics, very seriously. In today's age of information overload, it is absolutely essential that the scientific and research communities have solutions and tools that cut through the noise and find the most relevant signal.

**Gordon Macomber**

Managing Director, Scientific & Scholarly Research  
Thomson Reuters

# INTRODUCTION

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**The process of conducting scientific research depends on an accurate understanding of a subject area. It originates from the scientific community. Peerreviewed research that is deemed meaningful and impactful is cited by future researchers and scientists. Following the thread of citations leads to subsequent work that branches from the original, respected science. That research can then be benchmarked against a body of high-quality research using citations and other metrics. Thomson Reuters produces, in the Web of Science Core Collection, the only body of research for benchmarking and evaluation which reflects the standards of the scientific community., providing un-biased evaluation.**

The world has advanced to a point where research alone is not enough. Rather, what matters is meaningful and impactful research. In order to determine the value of research and make it as meaningful as possible, powerful measurement tools are needed to identify and benchmark individuals, institutions and countries.

An effective scientific process is one that enables the researcher, administrator, funder or government official to conduct high-quality research and then to measure, evaluate and refine that which was done. A balanced scientific ecosystem provides both components of the equation in order to achieve the highest-quality, most impactful results.

The Irish Council for Science, Technology & Innovation sums up the essence and importance of this balance in its statement: *“Research by its nature is uncertain, novel and risky. Its impacts can be long term, unexpected, or fail to materialise. They can be greatly affected by many external factors outside the scope of the initiative which supported the research. As such, it is important that evaluation and monitoring activities are supportive of these phenomena while also providing useful feedback to stakeholders on the nature, merits and likely impacts of research activity under review.”*<sup>1</sup>

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<sup>1</sup> [http://www.sciencecouncil.ie/media/icsti020827\\_measuring\\_evaluating\\_research.pdf](http://www.sciencecouncil.ie/media/icsti020827_measuring_evaluating_research.pdf), page 7



In the Internet age where anyone can publish anything and where Open Science is becoming increasingly popular, it is more important than ever to have curated, quality information that cuts through the noise. The volume of information available is daunting, and becoming ever more so. The world of Big Data is getting bigger and more complex. Similarly, pressures for improved performance, effectiveness and recognition have increased. Competition can be fierce and the goal is to be the best.

It is with this backdrop that Thomson Reuters has made it its mission to give the scientific research community the foundational platforms for success: Web of Science and next-generation InCites. Moving seamlessly from research to evaluation, iterating for peak performance, and refining and evolving based on feedback are fundamental to success, whether at the individual, institutional or governmental level. These platforms form the foundation for breakthrough science. It really does matter where you start.

# IT ALL STARTS WITH THE CONTENT

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Statements like “garbage in; garbage out” and “you are what you eat” underscore the significance of not only where one starts, but also of what is ingested or used. They apply equally to the world of scientific research as to computer science, nutrition and elsewhere.

Thomson Reuters, under the direction of Dr. Eugene Garfield at the Institute for Scientific Research (ISI), created the world’s first and most influential scholarly literature science citation index more than half a century ago. The company remains committed to continuing this legacy today, and long into the future.

The collective wisdom of the scientific community and thousands of years of scientific knowledge culminate in the Web of Science. The web of citation connections forms the unifying fabric of this data collection. It harnesses the power of the scientific community. Dr. Garfield created the Science Citation Index to codify, catalog and capture excellence in research. Thomson Reuters continues this legacy today.

*“What Eugene Garfield [published] 60 years ago in Science magazine about citation-based searching was the key building block in developing the Internet built on the link-ins and link-outs, which are the digital*

*equivalents of cited and citing references, offering instant gratification in discovering and finding research papers highly related to someone’s research interest,”* said Peter Jasco, professor at the Library and Information Science (LIS) Program of the Department of Information and Computer Sciences at the University of Hawaii. *“I am happy to see that almost all of the producers of the largest University Ranking services rely on data retrieved from Web of Science for determining the productivity and impact (citedness) of faculty members, which in turn is used around the world for the assessment of research activity of faculty members in making promotion, tenure and grant decisions. This is clearly a sign of the success of the idea conceived and implemented by Gene Garfield in his ‘garage,’ then implemented at the Institute for Scientific Information 10 years later.”*

The original Science Citation Index (SCI), formally launched in 1964, marks its 50th anniversary in 2014. Today, its expanded descendant, Thomson Reuters Web of Science Core Collection, covers more than 12,000 international journals representing the main fields of science, social sciences, and arts and humanities, with additional coverage of scholarly books and conference proceedings.



## AN EXACTING PROCESS

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Identifying this elite population of journals, and constantly monitoring and upgrading the quality of the collection, is a painstaking and exacting process. The challenge is heightened in this time of rapid change, not only in the nature of academic publishing, but in the constant evolution and expansion of scholarly research itself. Nevertheless, Thomson Reuters professionals in journal selection

meet the challenge, leveraging and deepening expertise that now extends back decades.

The exacting attention and expertise that go into journal selection are applied toward a single, direct result: optimizing the results from using the Web of Science and other Thomson Reuters data solutions.

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**Instead of facing an unfiltered, unruly, and indiscriminate torrent of research that might take hours to sift through and evaluate, the Web of Science provides research content from which the clutter and noise of insignificant results have been eliminated. An environment reflecting only high-quality, peer-reviewed research. And an environment in which research can be evaluated based on the standards of the scientific community.**

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If a researcher or scientist cites 45 sources, it is because there are only 45 that matter to his/her work. At Thomson Reuters, using this example, the 45 identified as the ones that matter are the ones that are collected and curated. It is not a game of numbers where quantity trumps quality. To the contrary, the Web of Science eliminates the superfluous based on what the scientific community says is superfluous and zeros in on that which is most relevant.

*“Science Citation Index/Web of Science has been invaluable in solving problems with incorrect references, quickly providing the latest articles on a wide variety of subjects, and for identifying key articles through the ability to sort retrieval by ‘Times Cited,’”* said Dana Roth, science reference librarian, faculty liaison and subject bibliographer, specializing in chemistry, from CalTech University. *“Citation indexing and analysis is critically important for relating seemingly disparate research studies, and introducing a completely new approach to information retrieval for scientific research and discovery. I was especially impressed with the ability to ‘View Related Records’ and quickly . . . determine h-index values.”*

The standards of quality maintained in the process of journal selection resound through every customer interaction with Thomson Reuters data. From the results of a simple keyword search to a detailed report based on customized data to sophisticated metrics for assessing performance, the foundation is the meticulous identification of the most pertinent, high-quality content.

*“We have been looking for an easy solution to enable our faculty to identify local and global research collaborators and for our administrators to honor faculty professional activities and accomplishments as part of Drexel University’s commitment to fostering scholarship and creative work,”* said Drexel University Provost Mark Greenberg. *“The tools Thomson Reuters developed are critical to our strategy for evidence-based assessment and tracking our impact in solving important social problems through practical research. We are excited to have Thomson Reuters as a partner and are working with experts in information technologies and services from across the campus to implement this new service.”*

# DELIVERING THE “200 ARTICLES”

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One might get the idea that, in order to reflect the world’s key scientific and scholarly literature, the curator of an index should attempt coverage of every journal—or, at least, as many as possible. The study of patterns and characteristics in the scientific literature itself, however, demonstrates otherwise. It is well known that a relatively small number of journals publish the majority of significant scholarly results—the classic example of the 80/20 rule, although the percentages may be slightly nuanced.

In the mid-1930s, while studying the literature of electrical engineering, the English mathematician and librarian Samuel C. Bradford noted that the key literature for a given specialty tends to form itself into a discrete core of journals. He also noted that expanding a search beyond this core leads to rapidly diminishing returns in terms of pertinent data for the subject at hand. The principle he ultimately formulated, now known as Bradford’s Law, holds that in any given field, relatively few journals account for a substantial majority of important findings and advancements.

In addition to being extended and applied in many fields, Bradford’s Law has been repeatedly verified in the Thomson Reuters database. A study of the SCI more than four decades ago, for example, revealed that only 500 journals accounted for

70 percent of the papers indexed in the database in 1969. More recently, a 2008 analysis of the 7,621 journals then covered in the Journal Citation Reports showed that 50 percent of the citations generated by that journal collection derived from only about 300 journals, and that those 300 journals accounted for 30 percent of all the articles published by the total collection.

This point is corroborated by a leading bibliometrician from the University of Amsterdam, Loet Leydesdorff, who recently did an analysis of *“Aggregated journal-journal citation relations in Scopus and Web of Science matched and compared in terms of networks, maps, and interactive overlays.”* Along with the work of two of his colleagues, Felix de Moya-Anegón and Wouter de Nooy, they concluded that, *“the journals unique to Scopus are relatively unimportant for the structure of the network and that the [Thomson Reuters] JCR includes the most important journals from the larger set of journals covered by Scopus.”*

The key for the most effective coverage, then, is not necessarily a sprawling assemblage of journals, but rather a collection that is carefully selected, assiduously curated, and constantly evaluated for improvement, reflecting the knowledge of the collective academic community. Far from being fixed or static, the Thomson Reuters journal collection



undergoes continuous updating in order to keep pace with the ever-changing, international landscape of science and scholarship, as new subject areas emerge while older ones contract or transform. This process—the addition of proven new titles, and the deletion of those whose relevance and utility have been displaced—constitutes the central activity of the Thomson Reuters specialists involved in journal selection.

*“What we really want is not to have everything, but to represent everything. We cover all the research that matters and we cite all the research that matters, even outside of our curated journal collection,”* said Christopher Burghardt, vice president of Product and Marketing Strategy at Thomson Reuters.

By starting with the highest quality, curated information, one significantly improves the quality of analysis and benchmarking possible. Like ingredients used in baking a cake, the finer

they are, the richer the end results. Information cluttered with irrelevant data or inaccuracies will lead to further irrelevance and mis-information if processed through the evaluation engine. Thomson Reuters adheres to the motto: *“quality in, quality out.”*

**“The average scientist reads 200 articles in the course of a year,” Burghardt went on. “Our goal is to give that scientist, via the Web of Science and InCites, the 200 articles that he or she must read, and the tools and metrics to place that work in context in terms of influence in its respective field as well as in the continuum of scholarly research as a whole. The key is to identify the most important, the most valuable, and the most critical information, and use that as the input for analysis work.”**

*“The Web of Science will allow us to be even more effective stewards of our donors’ funds, by giving us more specific and objective metrics to measure the impact of our research dollars,”* said Stephanie Birkey Reffey, managing director of Evaluation and Outcomes for Susan G. Komen. *“As one of the largest organizations funding breast cancer research globally, it is critical to have a comprehensive view of the impact of the research we support. The Web of Science will help us identify the researchers and papers that have the most traction, ensuring our funds are spent where they will make the most impact toward finding the cures for breast cancer.”*

# IN WITH THE NEW

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In the ongoing process of selecting journals for coverage, the Thomson Reuters editorial staff reviews 2,000 to 3,000 journal titles per year for inclusion in the Web of Science. At present, approximately 10 to 20 percent of them are accepted for coverage.

The Thomson Reuters editors who evaluate journals possess advanced degrees relevant to the subject areas under their supervision, and their constant monitoring of virtually all new journal titles affords them expertise in the evolving literature of their fields.

*"The editors of our scholarly literature team truly love the information they manage," said Burghardt. "They understand where and how a given journal fits because they have a deep understanding of the subject area and of what matters to the scientific community. The Web of Science represents a scholarly network of information, and our editors have a network view of the material."*

In evaluating journals, Thomson Reuters editors take many factors into account, both quantitative and qualitative. No one factor is considered in isolation. Rather, by weighing an interrelated array of data and characteristics, the editors are able to determine the overall strengths and weaknesses of a given journal.

The journal-selection process described here is applied to all journals in the Web of Science, whether covered in Science Citation Index Expanded, Social Sciences Citation Index, or Arts & Humanities Citation Index. Although these main groupings each involve their own

characteristics and dynamics in terms of publication and citation practices, and therefore demand somewhat different standards of evaluation, Thomson Reuters editors apply the same rigor and thoroughness to all, based on a firm set of criteria, which include:

- Timeliness
- Compliance with international editorial conventions
- Language: Bibliographic information, at a minimum, must be published in English
- Author and editorial board international diversity
- Editorial content
- Citation analysis

Similarly, technologists and product managers overseeing the development of next generation InCites are equally in tune with industry needs. They work closely with the Web of Science product team and clients to ensure the platform meets user requirements. They are actively involved in industry initiatives and collaborate with community members through a strategic advisory board to use this data to create leading-edge benchmarking and evaluation metrics. No other industry provider has such synchronized data and analytics.

*"We considered many information databases in our search for an authority on the emerging markets, and unanimously chose Thomson Reuters Web of Science for our portal."* Richard J. Coyle, executive director for the Emerging Markets Institute of Cornell University.

# BASIC PUBLISHING STANDARDS

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## TIMELINESS

The basic criterion in the evaluation process is seemingly simple but actually of primary and fundamental importance: timeliness of publication. To be considered for coverage in the Web of Science, a journal must be published according to its stated frequency. The ability to publish on time implies a healthy backlog of manuscripts, essential for ongoing viability. The chronically late appearance of a journal is not acceptable.

To gauge the timeliness of a journal, the selection process requires that the publication produce a minimum of three consecutive, current issues in accordance with its specified schedule, as soon as it is published. This establishes that the current content flow of the journal is robust.

In instances where a journal electronically publishes articles one at a time instead of collecting articles for release as an “issue,” the editor looks for a steady flow of articles over a period of up to a year. “If a journal isn’t publishing on time,” said Burghardt, “it simply isn’t meeting the needs of its audience.”

Once timeliness has been established, Thomson Reuters editors can proceed with other aspects of the evaluation process. The entire process, however, is deliberate and takes time. Evaluations vary in length but can last a year or more, depending on the subject needs of the Web of Science. Editors are thorough in the tasks at hand, ensuring each journal receives the same level of attention and proper vetting.



MARIANA BOLETTA  
Senior Editor,  
Scientific & Scholarly Research  
Thomson Reuters

A senior editor with nearly 15 years in her current position, Mariana Boletta is part of a team of editorial specialists with background and experience in subject fields that include the Life

Sciences, Social Sciences, Environmental Sciences, Medicine, and Arts & Humanities.

“Our editors have substantial experience in their fields,” said Boletta. “It takes many years to get to know the given area and our collection, and to create a stable base while also adapting to new trends in the industry.”

Boletta and her colleagues evaluate hundreds of titles annually—for new coverage, as well as for expanded coverage in different Thomson Reuters products and subject categories, all in the interest of creating a stable and rich scholarly-literature collection. As she puts it, “Our work never ends. Titles are evaluated on a continuous basis.”

The effort, she adds, is abundantly worthwhile. **“In our experience, a researcher needs reliable, accurate, and precise information fast. Among the many thousands of journals already published, and those that pop up electronically every day, it is essential that Thomson Reuters selects the most important and valuable resources so that the customer can trust his or her search.”**

Boletta notes that the most significant trend in recent years, as might be expected, is the acceleration in the availability and variety of electronic content. “This transition is keeping pace with the expansion of global information,” she says. “But, it has dangerous pitfalls that we’ve been noticing more and more: false journal sites, pirated sites, plagiarism, and the like. We believe that, in such an environment, our role will grow. There is a stringent need for a reliable, trustworthy information provider—that is what Thomson Reuters is and what we provide.”

After evaluating thousands of journals over the years, does she happen to have a favorite? “My preferred journal,” Boletta notes, “is one that is well-produced, publishes on time, has a diverse and competent editorial board, and attracts valuable contributors. Publishers and editors often ask for guidance on strategies to improve their journals. Thomson Reuters has built lasting partnerships with the global scholarly publishing community. The journal selection team collaborates closely with publishers and editors and can offer advice on how to improve the quality of scholarly communication.”

## EDITORIAL CONVENTIONS

Along with ascertaining timeliness, journal-selection editors determine if a journal follows international editorial conventions. These include: an informative title for the journal; fully descriptive article titles and author abstracts; complete bibliographic information for all cited references; and full address information for every author. These conventions are intended to optimize retrievability of the journal's source articles.

Language is another consideration. English is currently the global language of science. For this reason, Thomson Reuters focuses on journals that publish full text in English, or, at the very least, bibliographic information—such as titles, abstracts, and cited references—in English, in order to allow thorough cross-searching by Web of Science users worldwide. Cited references must also be listed in the Roman alphabet. Although many journals covered in the Web of Science publish articles with bibliographic information in English and full text in another language, the evident trend is that the journals most important to the international research community will publish full text in English. This is particularly true in the natural sciences. There are exceptions to this rule in the Arts & Humanities and in Social Sciences. For example, English-language text is not a requirement in areas of Arts & Humanities scholarship in which a work's national focus takes precedence—in studies of regional or national literature. Nonetheless, full-text English is highly

desirable, especially if the journal intends to serve an international community of researchers.

In a similar vein, Thomson Reuters editors look for international diversity among the journal's contributing authors, editors, and editorial advisory board members. This is particularly important in journals targeting an international audience. Today's scientific research takes place in a global context, and an internationally diverse journal is more likely to have importance in this context. Additionally, regional journals, which target a local rather than an international audience, are also considered. Thomson Reuters selects a relatively small proportion of such journals for inclusion, provided that they meet the editorial criteria and that their content will strengthen coverage of a given subject.

*"Say, for example, that we select an Indonesian ecology journal for coverage," said Burghardt. "Such a journal is going to be unique. Once we absorb it into the Web of Science, it opens up our view because it represents Indonesian ecologists. By selecting the journal, we've learned what they've learned, and we're making that knowledge available to the world."*

*"Supported by the São Paulo Research Foundation (FAPESP) since its inception in 1998, SciELO is one of the earliest initiatives to provide Open Access to scientific literature. The agreement with Thomson Reuters opens new horizons in SciELO's mission to enhance the visibility of science*

*in Latin America, Spain, Portugal and South Africa,”* said Carlos Henrique de Brito Cruz, scientific director of FAPESP.

Along with editorial conventions, another key criterion in journal evaluation, as might be expected, involves editorial content itself. As Bradford and others noted several decades ago, an essential core of scientific literature forms the basis for all scholarly disciplines. However, in any given field, this core is not static; scientific research continues to give rise to specialized fields of study, and new journals emerge as published research on new topics achieves critical mass.

Thomson Reuters editors determine if the content of a journal under evaluation will enrich the database, or if the topic is already adequately addressed as part of existing journal coverage.

Said Burghardt, *“Perhaps we’ll be confronted with five candidate journals in biochemistry, but we already cover a hundred in that field. The question in evaluating each of the five is, does this journal reveal or promise something new? We want the journals that have, or are likely to have, a disproportionate influence among scientists.”*

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**One invaluable resource for journal-selection specialists, not only for assessing the emergence of new subject fields but for general evaluation, is the vast store of Thomson Reuters citation data. This unique repository, embodied in the Web of Science, represents millions of individual judgments from scientists themselves regarding the research they view as most significant and useful.**

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These citation data, which are proprietary to Thomson Reuters and part of the company’s unique differentiators, make the Web of Science even more valuable.

The combined criterion on which the Web of Science is founded is the heart of why the metrics in InCites are so valuable. The thorough, stringent standards applied to the selection of content directly influence the accuracy and insight of the evaluation and benchmarking from InCites.

*“The partnership with Thomson Reuters will enable our researchers to access the most influential scholarly content in order to advance their work, which will be very beneficial to our decision-makers in charge of national policy research,”* said Professor Mohamed Haouari, principal advisor to the Tunisian Minister of Higher Education and Scientific Research. *“Thanks to several relevant indicators, InCites allows for a detailed study of our national scientific production by discipline and helps us follow its evolution over time.”*

# RESEARCH ANALYTICS

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The process of journal selection at Thomson Reuters is unique in that specialty editors have a wealth of citation data available to them. Because the Web of Science is a true citation index, all cited references from every item in every journal covered in the Web of Science are indexed, whether or not the work being cited is also covered as a source publication. (That is, although the cited item might have appeared in a journal or other source not indexed by Thomson Reuters, the citation will still be registered in the Web of Science.) Through the use of these data, it is possible to measure the citation impact of journals under evaluation.

Citation data, however, must be interpreted and understood correctly—a point that cannot be emphasized enough.

Citation practices and patterns differ sharply between disciplines. Using quantitative citation data to measure impact is meaningful only in the context of journals in the same general discipline. For example, smaller fields, such as Agricultural Engineering, do not generate

as many articles and citations as do larger fields like Biotechnology or Genetics. In some areas, particularly in the Arts & Humanities, it may take a relatively long time for an article to attract a meaningful number of citations. But in other areas, such as those within the Life Sciences, it is not unusual for citations to accrue rapidly and peak after two or three years. These factors must be taken into account if citation data are to be used correctly.

Thomson Reuters editors look for citations in Web of Science to a candidate journal as part of the evaluation process. For new journals that do not yet have a citation history, editors examine the citation records of the journal's contributing authors and editorial board members, ascertaining whether the journal is able to attract contributions from scholars whose prior work has been useful to the research community.

In many instances, established journals that may be initially turned down for coverage are re-evaluated. Subsequent to an earlier evaluation, these journals might have experienced new growth in citation



impact resulting from such changes as translation into English, a shift in editorial focus, a change in publisher, a switch to a new medium of delivery, etc. Hence, many such journals eventually find their way to regular coverage.

One citation-related factor that is constantly monitored, both in evaluating journals for coverage and in assessing existing coverage, is the rate of journal self-citation. This measure relates a journal's self-citations to the number of times it is cited by all journals, including itself. For example, Journal X was cited 15,000 times over a given time period by all journals, including the 2,000 times it cited itself. Its self-cited rate is therefore  $2/15$ , or 13 percent.

For authors, a certain rate of self-citation is considered normative, given that it is routine and expected for researchers and scholars to reference instances of their own prior work that are most relevant to their current results, regardless of the source journal in which the work was published. There are, however, journals in which the observed rate of self-citation is a dominant influence in the total level of citation. For

these journals, self-citation threatens to distort the true role of the journal within the literature of its given field.

Among all the journals listed in a recent annual edition of the Journal Citation Reports Science Edition, 85 percent demonstrated journal self-citation rates of less than 15 percent. This shows that, as noted above, self-citation is quite normal for most journals. Significant deviation from this normal rate, however, prompts an examination by Thomson Reuters editors to determine if excessive self-citations have inflated the Journal Impact Factor. (A publication's Journal Impact Factor is defined as citations in year three to Journal X, divided by the number of citable items [articles and reviews] published by that journal in the previous two years.) If careful analysis determines that self-citation has significantly distorted the Journal Impact Factor and its rank in category, remedial steps might include suppression of the publication's Journal Impact Factor from that Journal Citations Reports edition, and the journal may be considered for de-selection from the Web of Science.

# MYRIAD METRICS

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The Journal Citation Reports are just one of several metrics within the next generation InCites. Thomson Reuters brought all of its research analytic solutions together in InCites to provide customers with a complete, integrated search-discover-evaluate-and-benchmark experience. Journal Citation Reports, containing the Journal Impact Factor, are best used for evaluating journals, but there are also metrics within InCites for evaluating, benchmarking and analyzing people, articles, institutions, regions, subjects, and more.

Citation data is used to evaluate people through InCites Profiles (previously referred to as Research Performance Profiles). Articles, institutions and regions are benchmarked using InCites Benchmarking & Analytics (previously known as Global Comparisons). All areas can be analyzed using Essential Science Indicators. These are just some of the metrics in InCites that are used to process the search results from the Web of Science and turn them into actionable intelligence.

*“Choosing Thomson Reuters as one of our partners was essential to assess the impact of indexed journal articles within the VQR*

*for the largest research assessment Italy has ever undertaken,”* said Professor Sergio Benedetto, coordinator of the Valutazione della Qualità della Ricerca (VQR), a national exercise to evaluate the quality of Italy’s research efforts. *“The bibliometric data from Thomson Reuters were crucial to compute the two indicators used in the VQR bibliometric evaluation, as were the custom reports from InCites in a global comparison of Italy’s research strength as compared to other industrial countries.”*

*“Objective and qualitative assessment of Russian scientists and research groups is very important, as Ural Federal University seeks to quantify the scientific activities of its employees and to determine the relevance of those activities to the world of science,”* said Vladimir Kruzhaev, vice rector on research, Ural Federal University. *“After assessing our intellectual property and our role in the world of science using Thomson Reuters InCites, as well as our efficiency in different fields of science, we will be able to effectively allocate resources and improve the competitiveness of UrFU among the world’s leading research and education centers.”*

# JOURNAL IMPACT FACTOR: USES AND MISUSES

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The subject of Journal Impact Factor has given rise to discussion and debate since the statistic was first made available in 1975. Throughout the years, Thomson Reuters has maintained a consistent stance, emphasizing that Journal Impact Factor is a specific metric for gauging a journal's recent citation influence within its particular field. It is not intended to serve in isolation as a definitive or ultimate measurement; the Journal Impact Factor is but one data point, which must be considered in context and in combination with other elements, such as the overall citation patterns in the field in which the journal is categorized.

In recent years, some observers in academia and publishing have criticized instances in which Journal Impact Factor figures, subsequent to their publication by Thomson Reuters, have been misused. There have been instances where the Journal Impact Factor was improperly extended to the evaluation of individual authors. The faulty inference is that if an author publishes a paper in a journal with a comparatively high Journal Impact Factor, this is somehow an automatic reflection of the quality of the author's work—and even, by extension, of the author's institution. This is a misuse of the Journal Impact Factor that is not condoned by

Thomson Reuters. The company instead recommends the use of other citation-based metrics in InCites specifically designed to assess the output and impact of people, papers or programs.

There are many authors who make legitimate use of Journal Impact Factor in targeting their manuscripts at high-impact journals in their specialty areas. Publication in such journals, however, and the Journal Impact Factor of the journals themselves, should not be hastily treated as some kind of surrogate to replace detailed, informed assessments of individual authors and their published research. Thomson Reuters has consistently sought to promote understanding of the Journal Impact Factor, its limitations, and its proper application. (See M. McVeigh, *JAMA*, 302[10]: 1107-9, 2009; and S. Hubbard, M. McVeigh, *Learned Publishing*, 24[2]: 133-7, 2011.)

*"There are so many different ways to analyze citations – do co-citation analysis, develop clusters, develop mapping. It's now a worldwide topic. I think the emphasis, as Web of Science expands, will be on the use and modification of citation analysis for evaluating individuals, their impact, group impact, and universities' impact,"* said Dr. Eugene Garfield, father of the Science Citation Index at Thomson Reuters.

# START WITH THE BEST, END WITH SUCCESS

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***“There’s been massive change regarding what constitutes a publication, or what constitutes a journal,” said Burghardt. “It’s now easier than ever to launch a ‘journal,’ although the ‘journal’ might actually be little more than an attractive website. The ability of Thomson Reuters to identify, select, and maintain a high-quality journal collection is more critical than ever. The Web of Science, with its selection of prominent journals, can be likened to a mountaintop, affording an elevated, extended view of the scientific and scholarly landscape.”***

The detailed and meticulous process of journal selection has a single objective: making the Web of Science and other Thomson Reuters data solutions the most efficient and productive vehicles for acquiring essential, relevant information.

Users are spared the time-consuming task of attempting to evaluate search results on their own. Instead, results have already been subjected to expert evaluation, and already reflect the highest standards of the research community.

Journal selection, in sum, is not an end in itself but rather a starting point that informs every subsequent aspect of scholarly work across the research and evaluation continuum. It impacts the filtered, precise results of a Web of Science search. It impacts the array of metrics used in the citation-based assessment of individuals, institutions, nations and regions. And it impacts the customized extraction of data or the generation of special reports based on specific needs and developed in partnership with Thomson Reuters.

Thomson Reuters has always endeavored to be as informative and transparent as possible about its journal-selection process. This openness has engendered trust on the part of long-time users of its scholarly research and analysis solutions. As Michael Peper, a science librarian at Duke University, said: ***“An open selection process is valuable because we all know what material is covered, and we know that it has been reviewed by a long-standing resource that we have trusted over time... our researchers value Web of Science as a place to search for articles on a topic across many disciplines and to find relevant, high-quality content. It’s good because it’s comprehensive without being overwhelming.”***

Even while the shape of science and the forms of scientific communication undergo continuous change, the commitment of Thomson Reuters to capture and present the world’s most significant scientific and scholarly literature remains constant. As does its commitment to provide the most powerful and robust metrics to put research in its proper context. Breakthrough science doesn’t just happen. It is the result of hard work, patience, perseverance and the use of the right resources. The Web of Science and InCites are just those resources that enable breakthroughs by connecting dots across the scholarly ecosystem.



KATHLEEN MICHAEL  
**Editor,**  
**Scientific & Scholarly Research**  
Thomson Reuters

For 13 years, Kathleen Michael has been a Thomson Reuters editor in the area of Life Sciences, covering Andrology, Neuroscience, Pharmacology, Research & Experimental

Medicine, and more. With a Master of Science degree in Biochemistry, a concentration in Neuroscience, and several years as a researcher prior to joining Thomson Reuters, she brings particular expertise to her work. And she is clear about the value of the exhaustive journal-selection process.

***“In this world of information overload, it’s easy to get lost in the sea of data,”*** says Michael. ***“Thomson Reuters provides a filter, a means of identifying what’s important, what’s timely, and what’s most related. How many times have we all done a Google search and, even knowing that Google doesn’t rank things the way we might, we never get beyond the first page of results? Most search engines provide you with data. They don’t provide you with a judgment of whether or not that data is valid. Thomson Reuters does that for you.”***

As Michael notes, the exacting criteria mean that approximately 80 to 90 percent of journals submitted for evaluation will not be accepted. *“Journals get rejected for a variety of reasons,”* says Michael, *“and there’s never just one reason for the rejection. Journals can be rejected for a combination of timeliness, format, and content, for example. We do require the receipt of a minimum of three on-time issues before we proceed with an evaluation. Therefore, a journal that is running late according to its stated publication schedule will face rejection.”*

Michael also acknowledges that the rapid changes sweeping through the publishing industry make the future difficult to predict. *“Because there’s so much going on, it’s hard to foresee what’s going to happen. We’re heading in the direction of more electronic journals, where many journals have an online presence, offering types of materials you can’t get in a print journal, such as videos and extremely large data sets. There have also been a large number of new journals being produced, as it’s now easier and cheaper to start an electronic journal. There is also a lot of movement surrounding the process of peer review. No one can predict where all of this is going, but I believe that Thomson Reuters plays an important role—even more so now—which is to make the world’s best research more accessible to the community.”*

# WHO WE ARE

The IP & Science business of Thomson Reuters is a team of 4,000 people passionate about science, innovation and improving our planet. Our broad knowledge of intellectual property, life sciences and scholarly research, coupled with deep vertical industry expertise, feed our genuine interest in helping our customers achieve their goals and make our world better.

Our backgrounds as scientists, lawyers, engineers, and academics allows us to virtually walk beside our clients – in research labs, courtrooms and university classrooms – in all the actions they perform each day.

From urban innovation centers to remote farmland fields, we are committed to raising the bar, pushing the envelope and going the extra mile. We bring the right technology, content and services to those who need them, where they need them, for the decisions that matter the most.

A series of small steps, each day, every day, every year, across all 4,000 members of our team, amount to giant leaps in science and innovation for our clients – and the world.

We know we wouldn't exist at Thomson Reuters without our customers. That's why we're committed to walking beside them, understanding their needs and strategizing together – so we can collectively make a difference in this world.

We promise our best, so you can be at yours.

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