Lecture 1
An Overview of Scientific Writing

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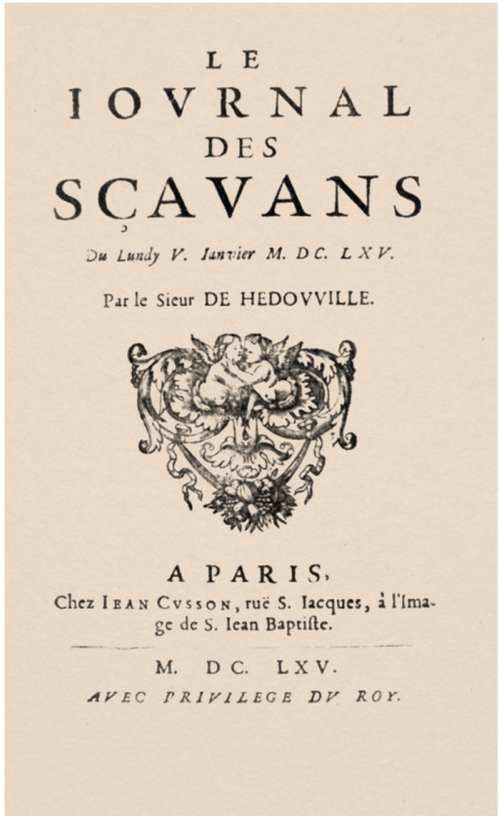
Lanzhou University

September 14, 2023

History of scientific publishing

What is the first scientific journal?

- Journal des Scavans, January 5, 1965;
- Philosophical Transaction of the Royal Society, March 6, 1665



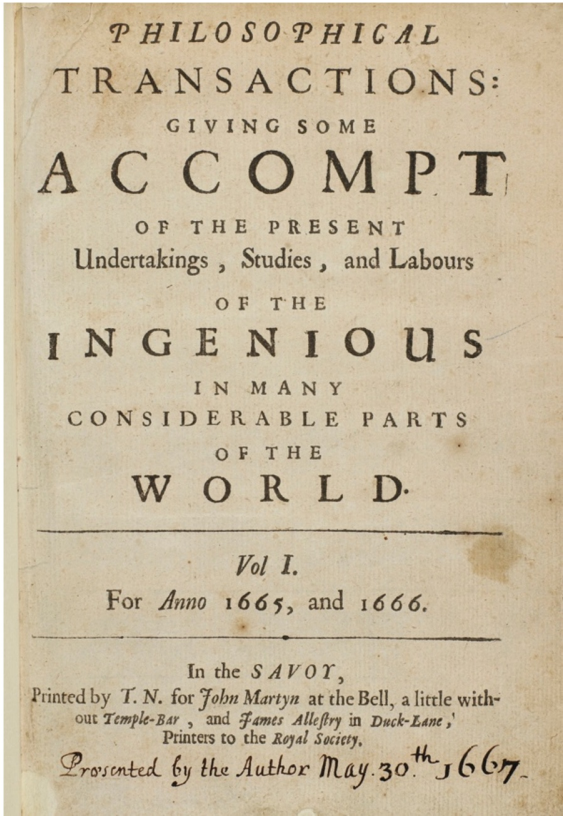
LE
IOVRNAL
DES
SÇAVANS

Du Lundy V. Ianvier M. DC. LXV.

Par le Sieur DE HEDOVVILLE.

A PARIS,
Chez IEAN CVSSON, ruë S. Iacques, à l'Image de S. Iean Baptiſte.

M. DC. LXV.
AVEC PRIVILEGE DV ROY.



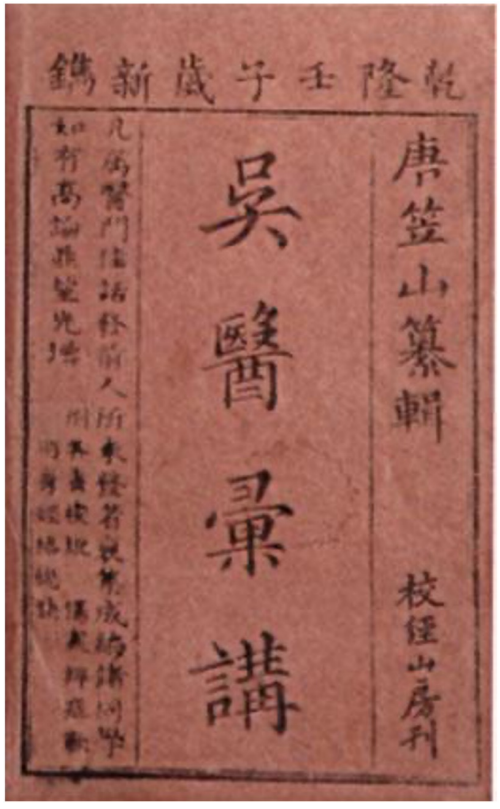
PHILOSOPHICAL
TRANSACTIONS:
GIVING SOME
ACCOMPT
OF THE PRESENT
Undertakings, Studies, and Labours
OF THE
INGENIOUS
IN MANY
CONSIDERABLE PARTS
OF THE
WORLD.

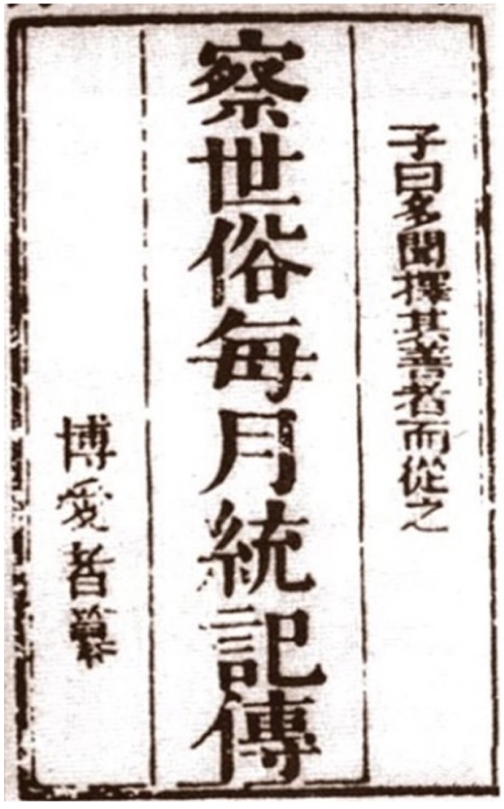
Vol I.
For *Anno* 1665, and 1666.

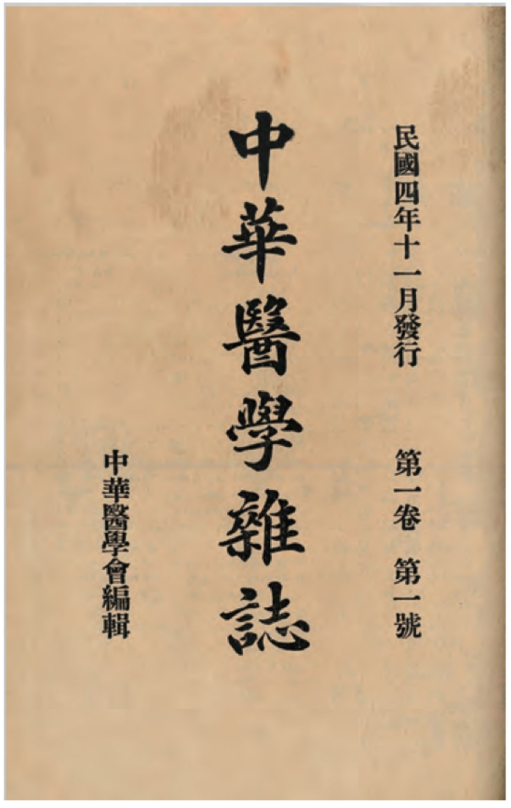
In the *SAVOY*,
Printed by *T. N.* for *John Martyn* at the Bell, a little without *Temple-Bar*, and *James Allestry* in *Duck-Lane*,
Printers to the *Royal Society*.
Presented by the Author May 30th 1667.

History of scientific publishing

The National Medical Journal of China is often considered the first scientific journal in China, but there are different opinions.

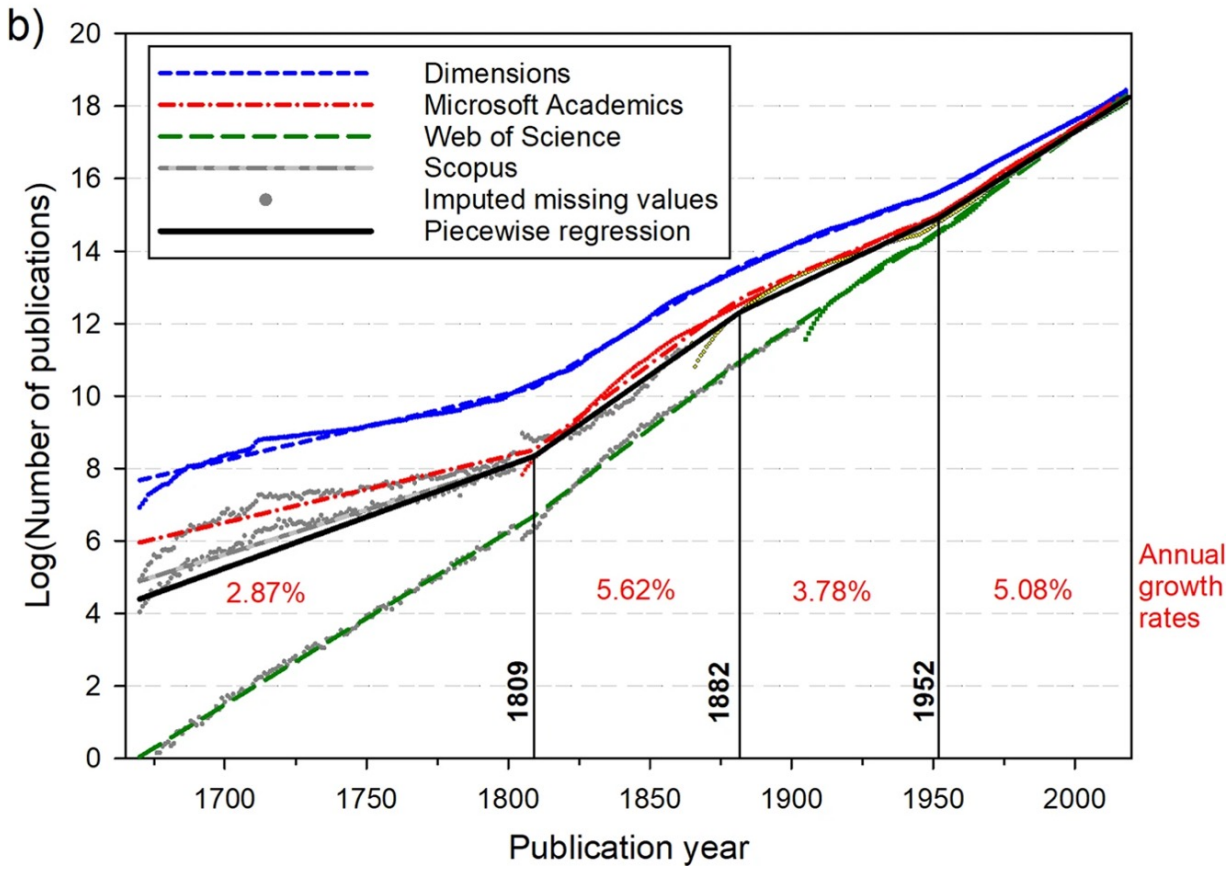






History of scientific publishing

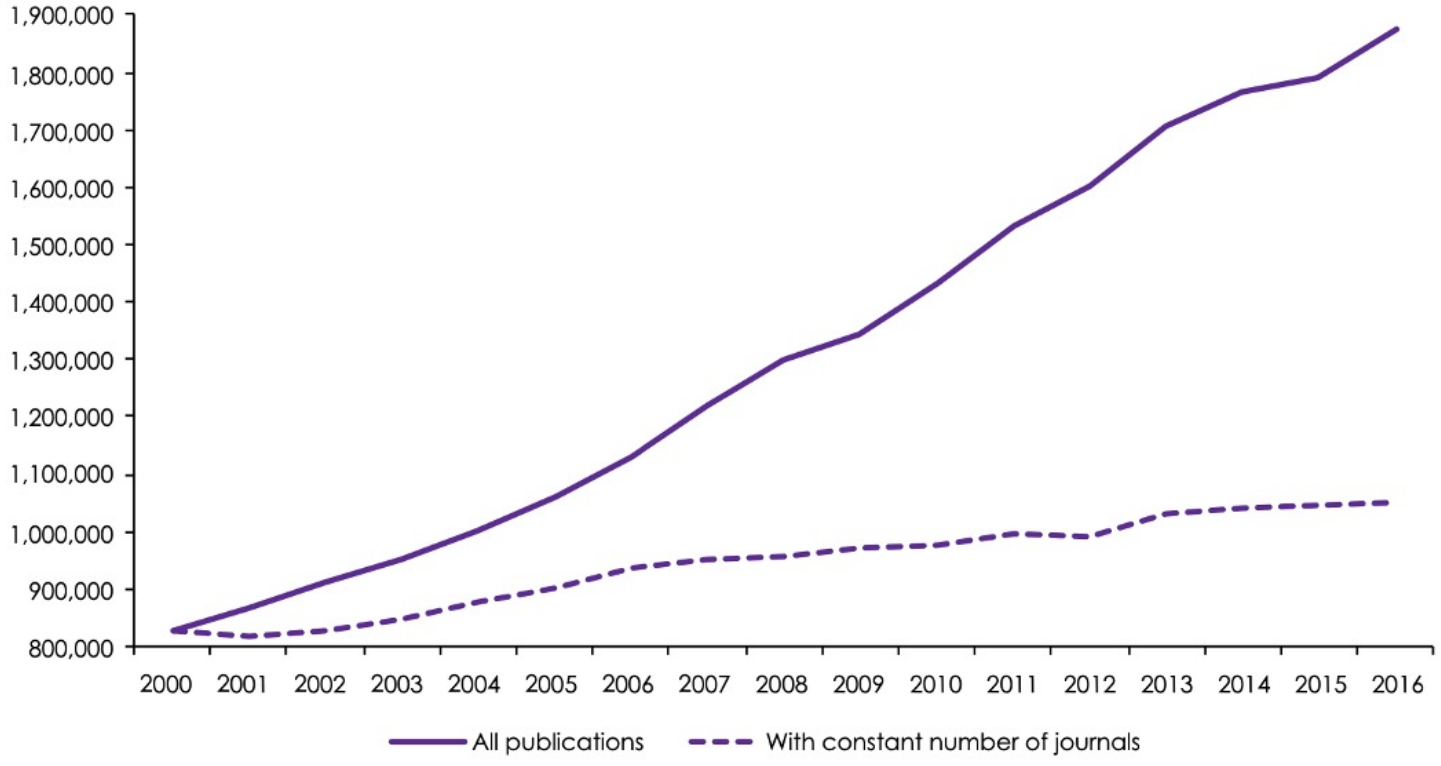
The number of publications grows exponentially over time, but growth rate differ at different historical epochs.



(Bornnman et al, 2021, Humanities and Social Science Communications)

History of scientific publishing

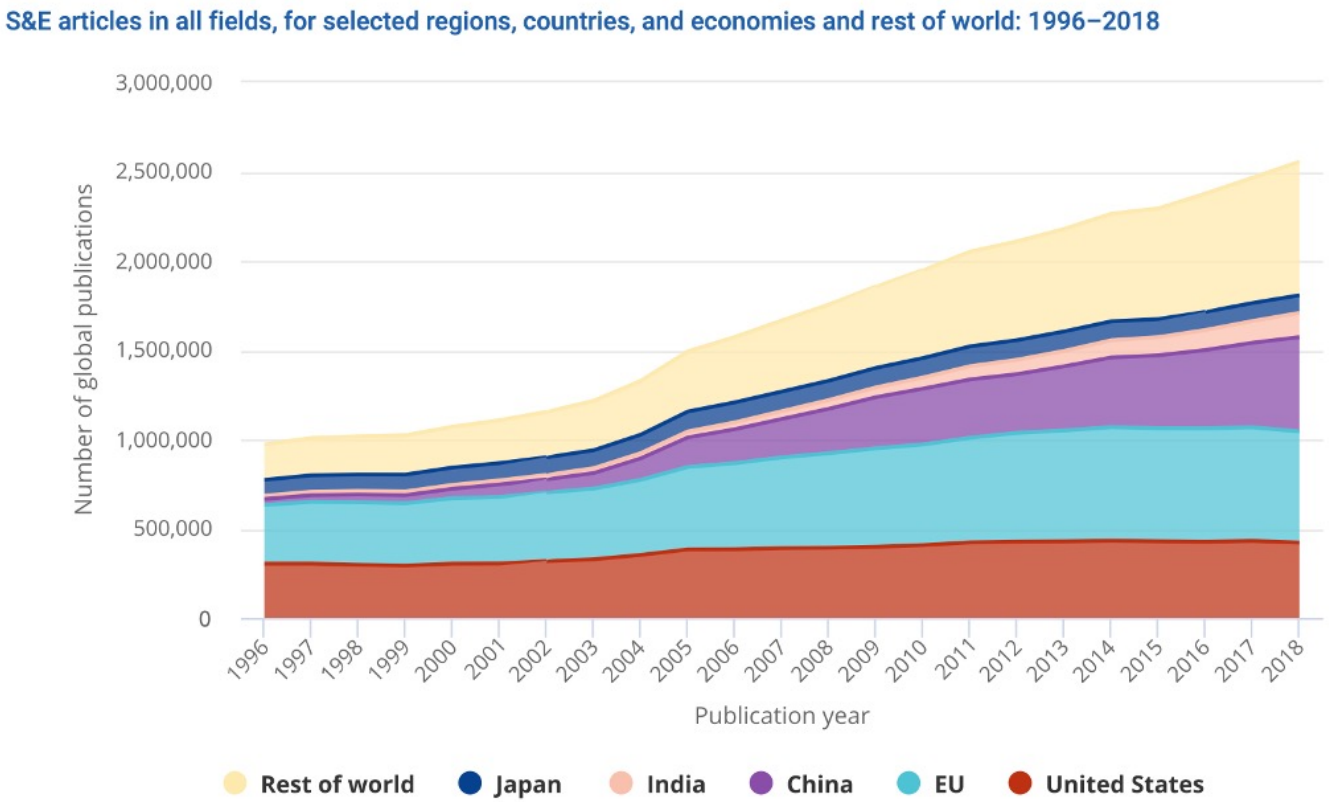
Growth in total scientific publication is driven by increase in both the number of journals and the number of publication per journal.



(Science and Technology Observatory 2019, Dynamics of scientific production in the world, in Europe and in France, 2000-2016)

History of scientific publishing

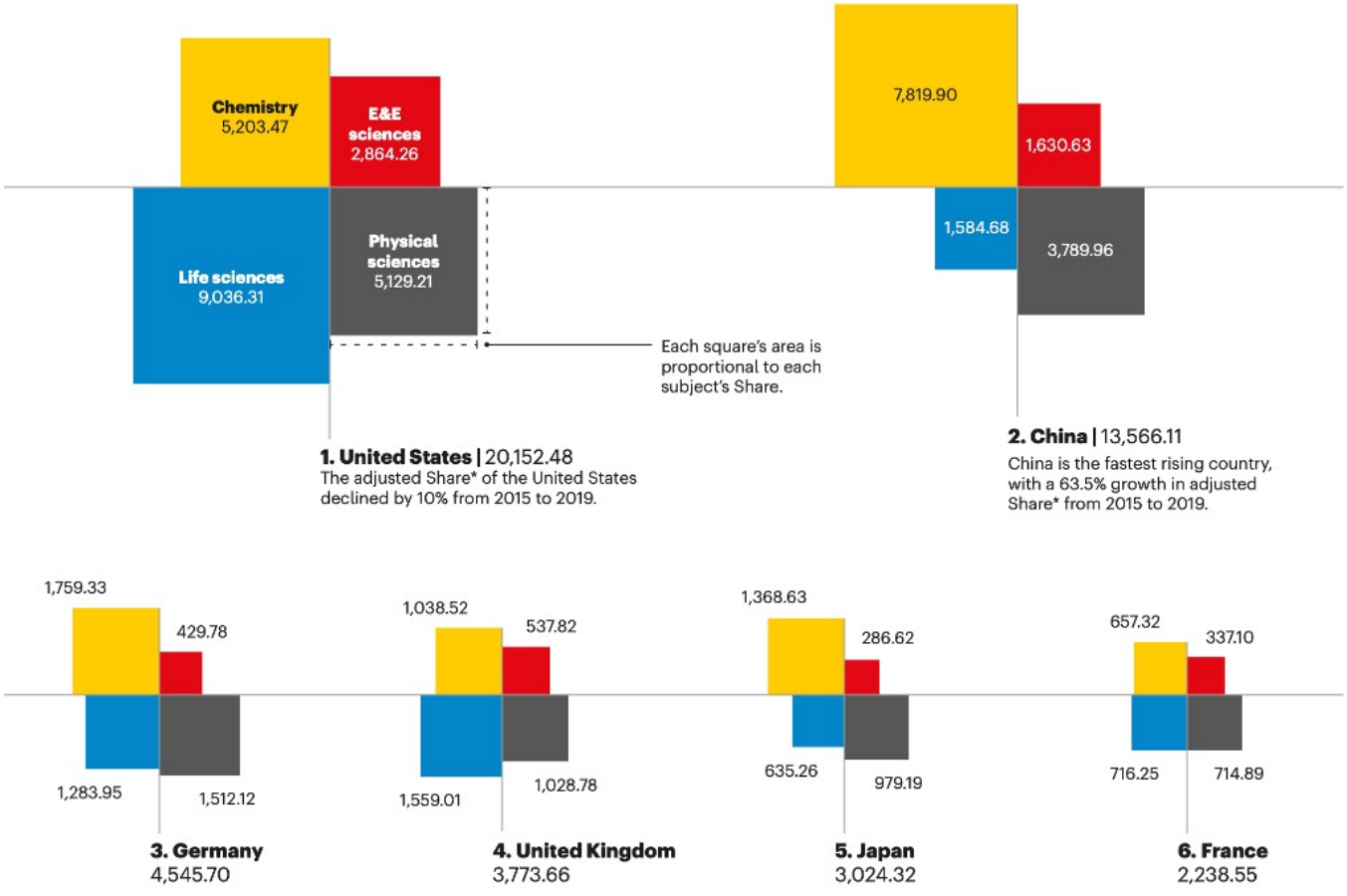
China produced 5% global scientific output in science and engineering field in 2000 and grew to 21% in 2018.



(National Science Board 2019, Publication Output: U.S. Trends and International Comparisons)

Subject strength in publishing

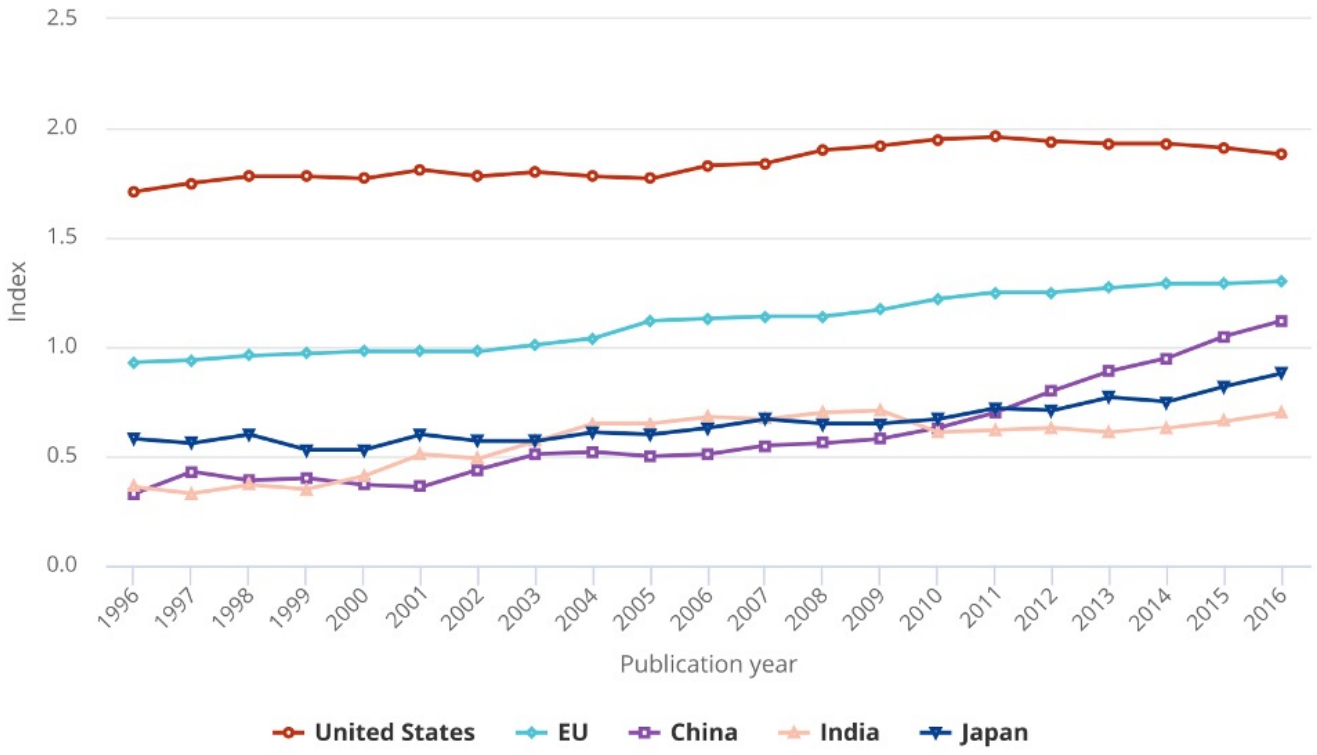
Countries differ in their subject strength in publishing.



(Nature Index 2020)

Output in top cited publications

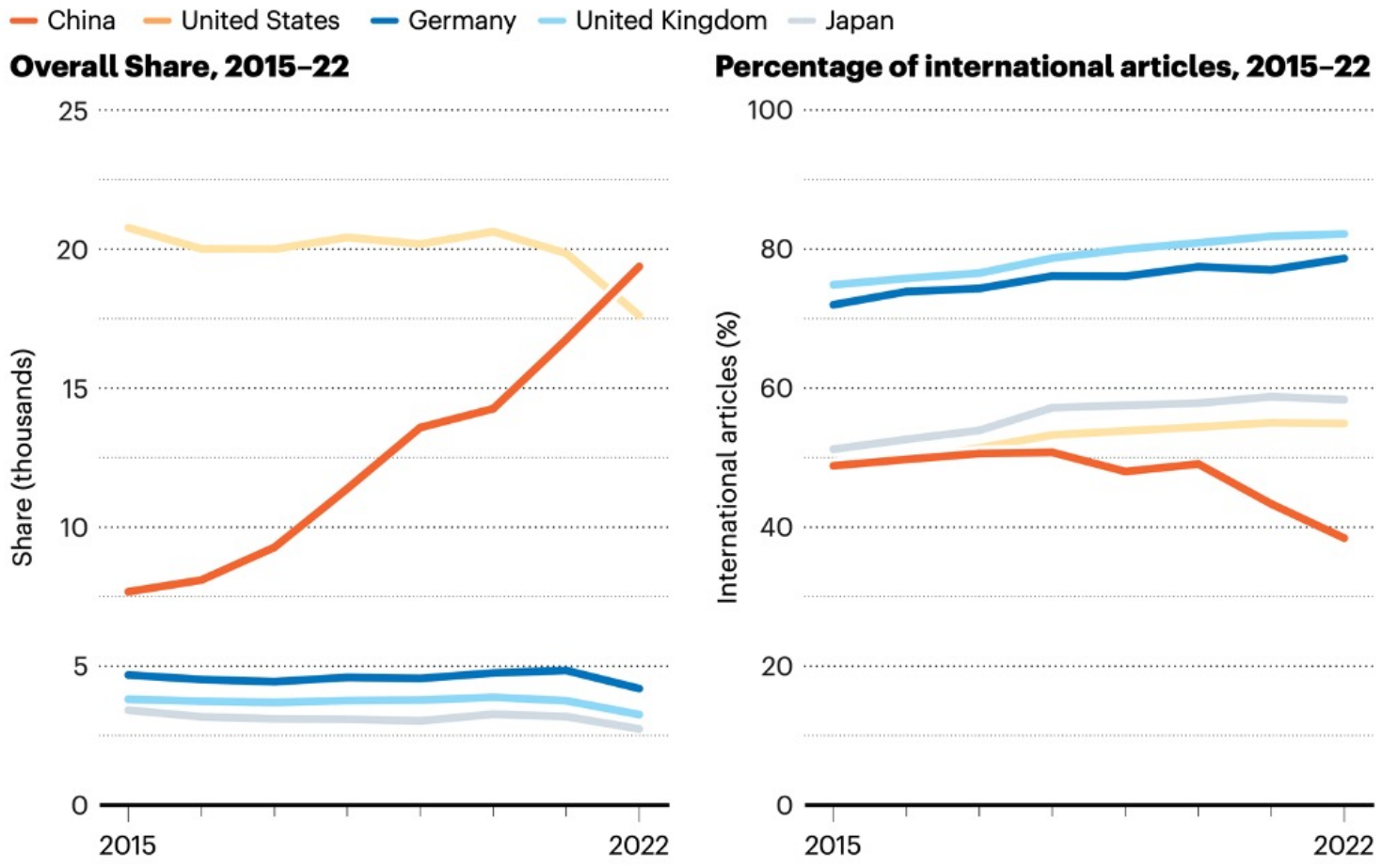
Trend of share in top 1% cited publications by country. Share is calculated as the share in top publications divided by share in total publications.



(National Science Board 2019, Publication Output: U.S. Trends and International Comparisons)

Output in Nature Index journals

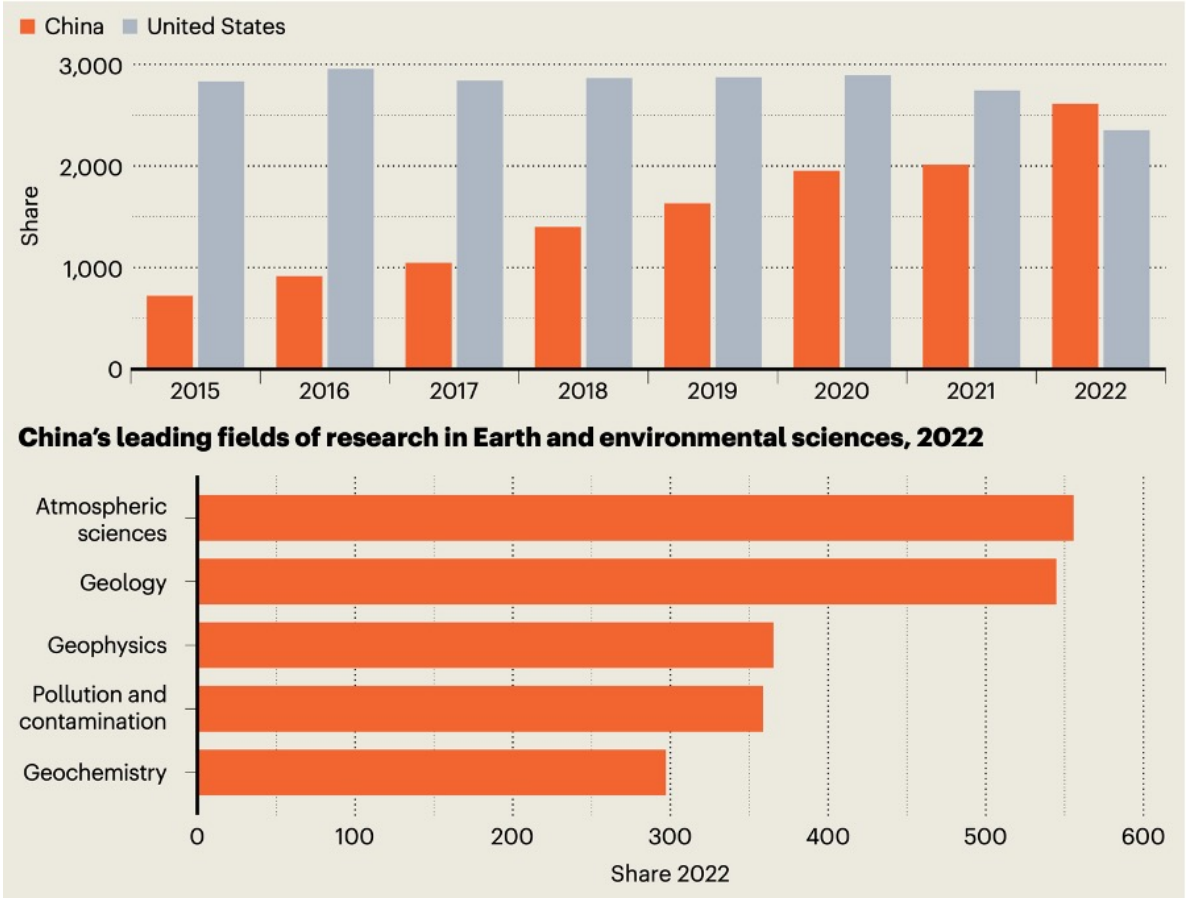
In 2022, China reaches the top spot in overall share in Nature Index journals.



(Nature Index 2022)

Output in Nature Index journals

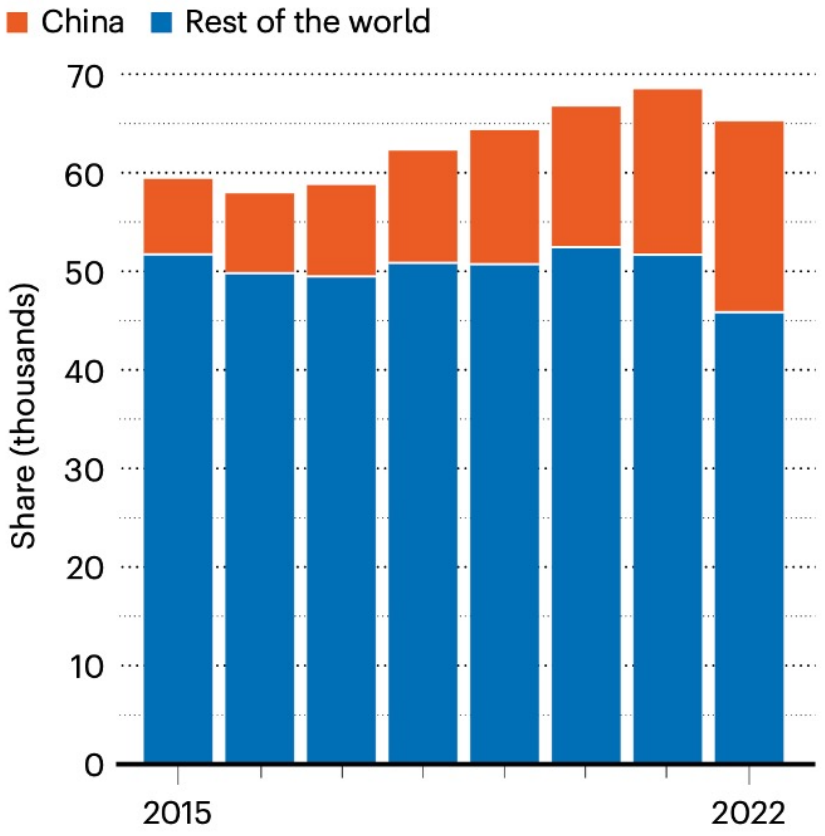
Research in **earth and environmental science** saw the most prominent increase in 2022.



(Nature Index 2022)

Output in Nature Index journals

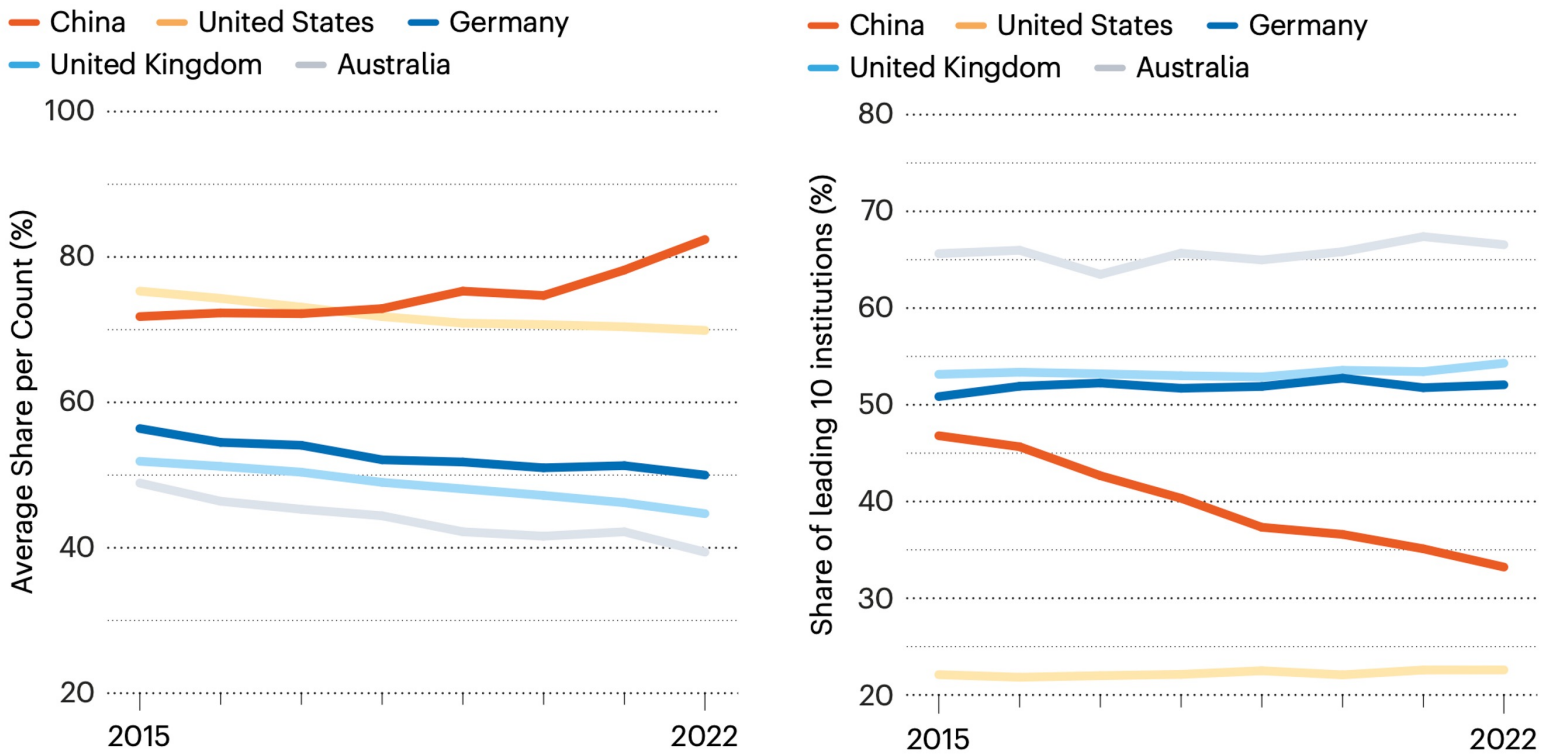
China‘s proportion of Nature Index share had a notable increase in 2022 compared to the rest of the world.



(Nature Index 2022)

Output in Nature Index journals

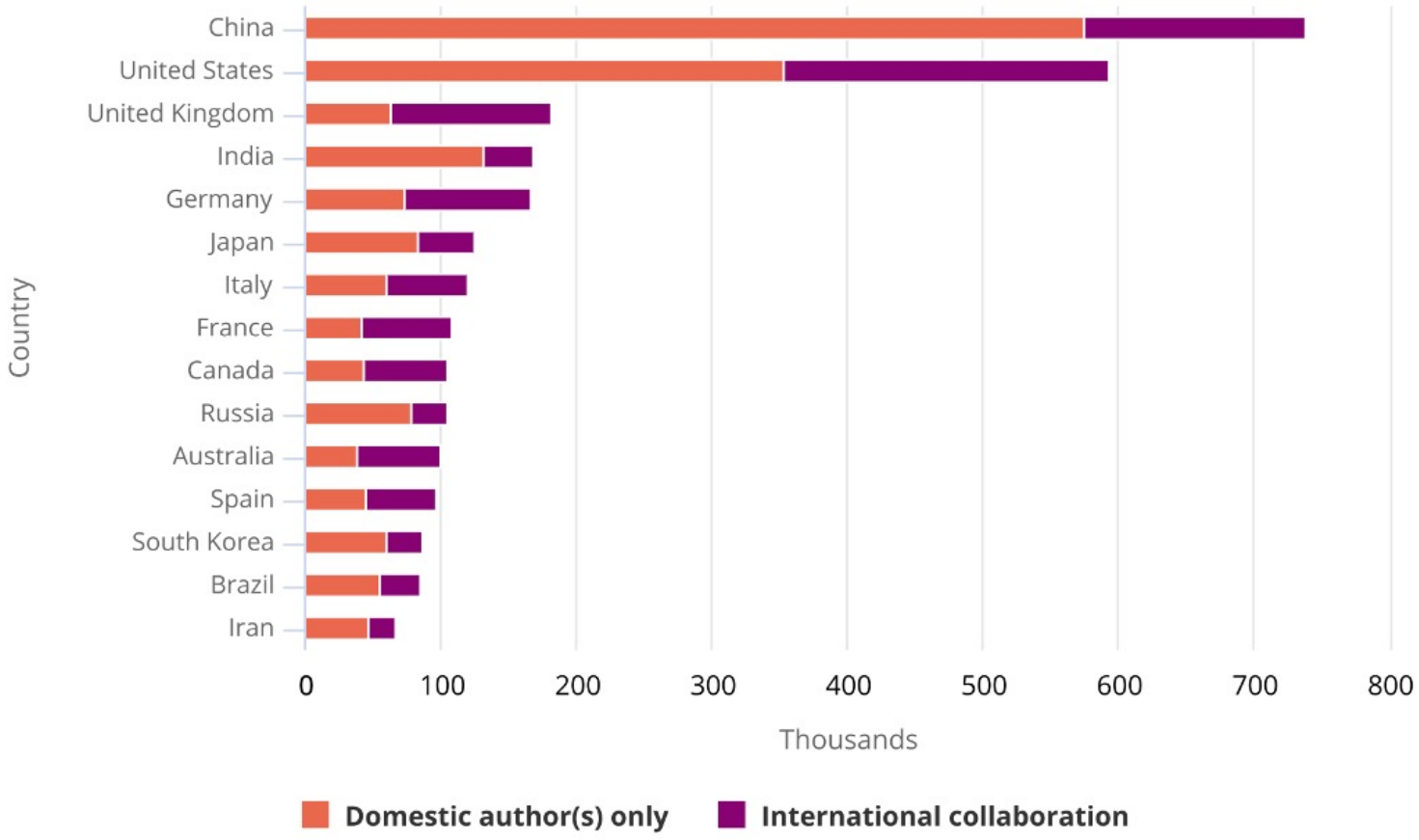
The increase in Nature Index metric for China is fueled by more local authors in the paper and fewer relative contribution from top 10 leading institutions within the country.



(Nature Index 2022)

Collaboration in scientific publications

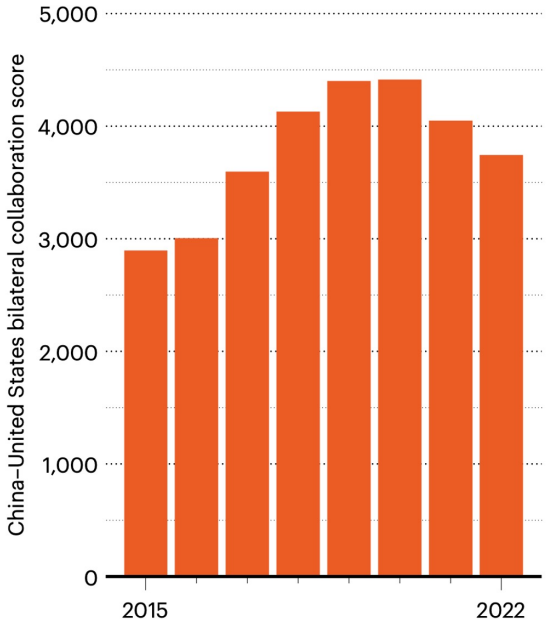
Scientific research is highly collaborative.

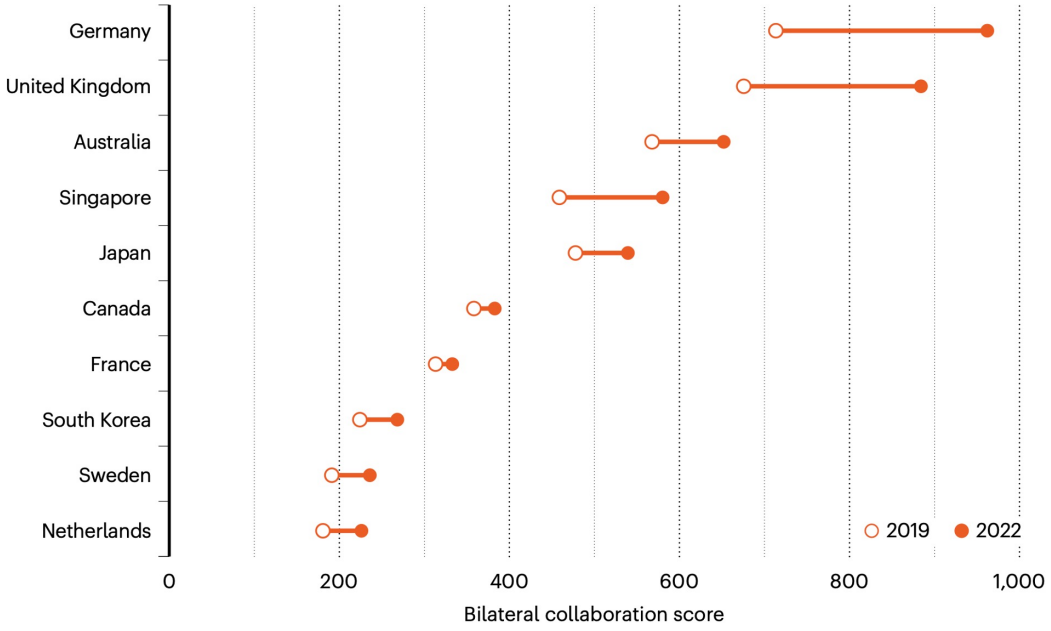


(National Science Board 2022, Science and Engineering Indicators 2022: The State of U.S. Science and Engineering)

Collaboration in scientific publications

Collaboration can be influenced by geopolitical factors.





(Nature Index 2022)

What is scientific writing?

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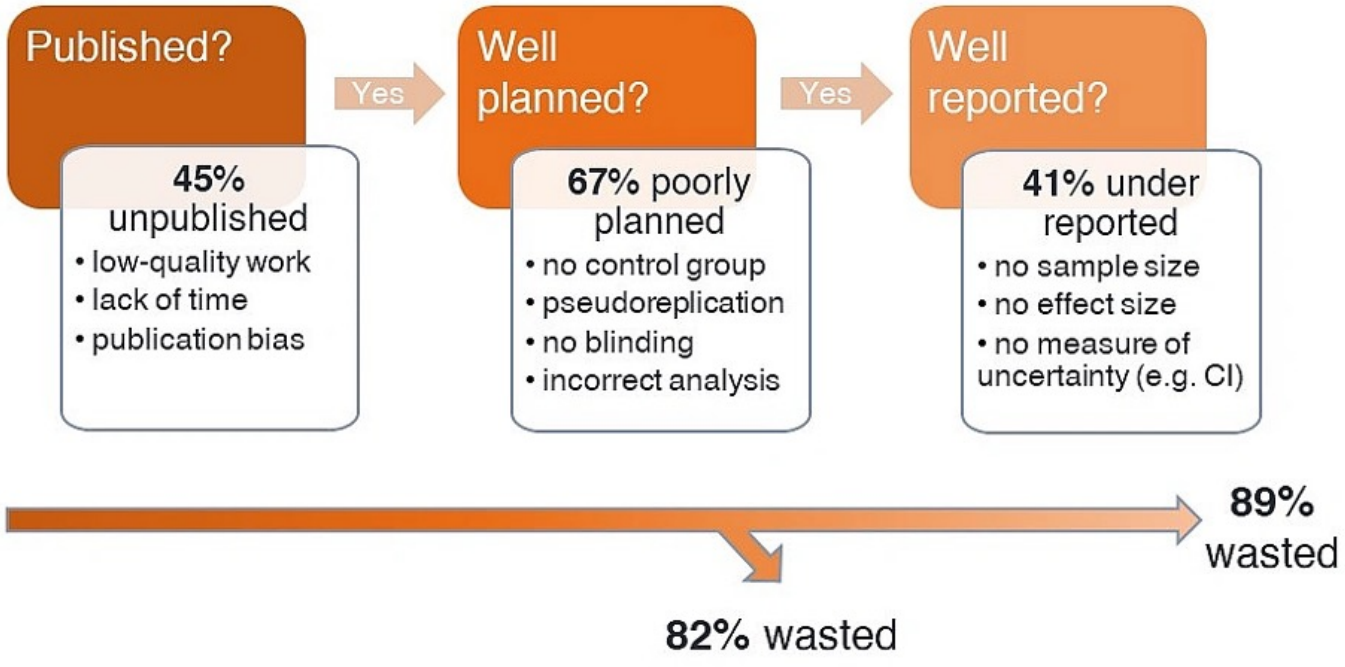
In a still broader sense, it includes other types of professional communication by scientists—for example, grant proposals, oral presentations, and poster presentations.

Why do we need to write well?

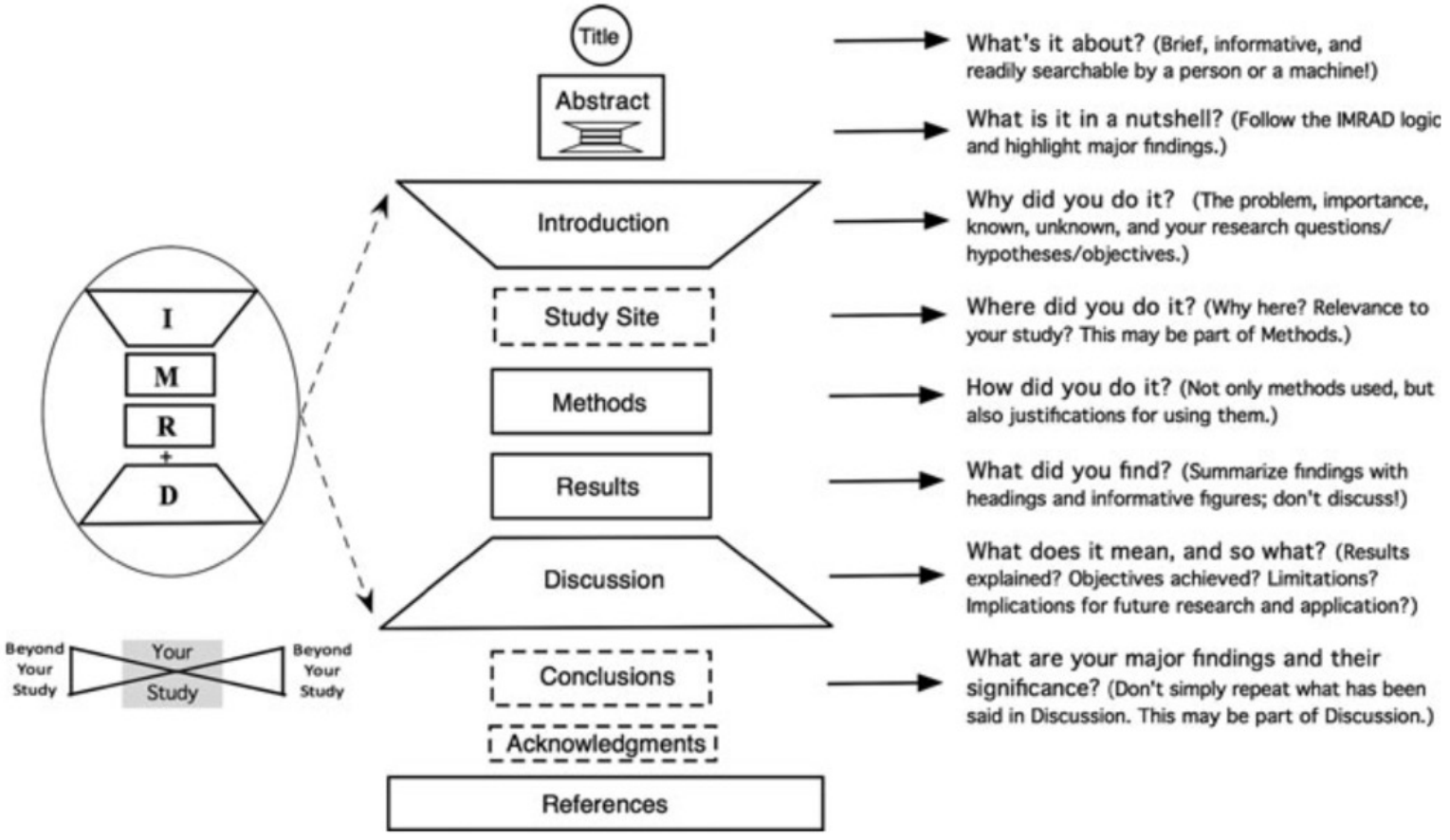
Poor writing quality is a major source of scientific research waste.



(Purgar et al 2022, Nature Ecology and Evolution)

General structure of scientific writing

IMRaD structure: introduction, methods, results, and discussions.



(Wu 2011, Landscape Ecology)

Measuring the impact of scientific journals

Impact factor (IF) is devised by Eugene Garfield (1925–2017), the founder of the Institute of Scientific Information (ISI);

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ISI was acquired by Thomson Reuters in 1992. In 2016, it was sold and became Clarivate, which publishes JCR annually now.

Clarivate
Analytics

Journal Citation Reports

Eugene Garfield and the logo of Carivate, the current publisher of JCR.

Impact factor

Impact factor is the ratio between the number of citations received in one year for publications in the two preceding years and the total number of ”citable items” published in that journal during the two preceding years.

$$IF_y = \frac{Citations_y}{Publications_{y-1} + Publications_{y-2}}$$

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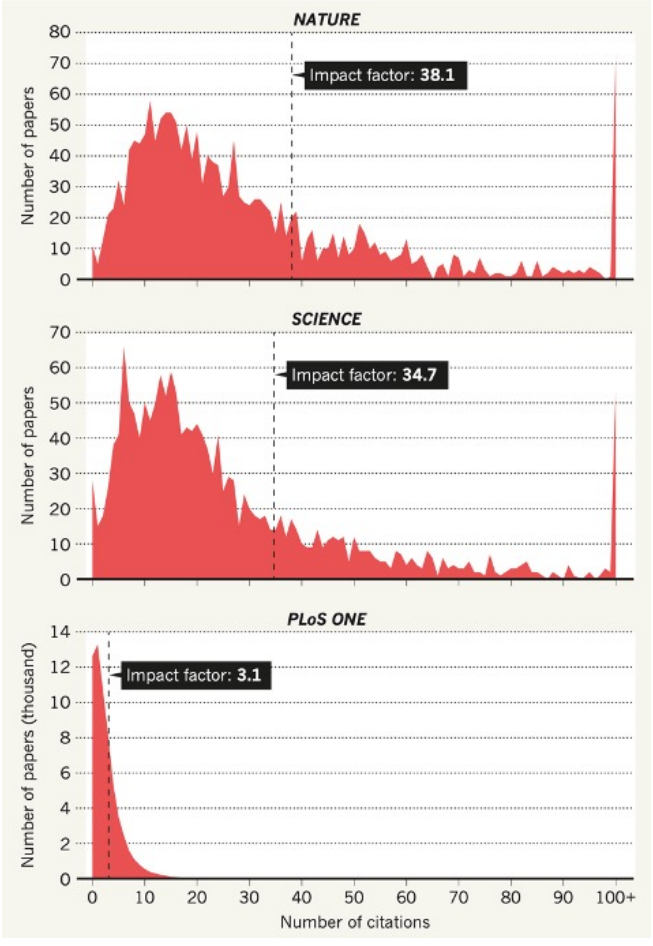
Impact is usually calculated based on publications from previous **two** years. Some also calculated based on publications from previous five years. In generally, **IF_5 is larger than IF_2.**

Issues with impact factor

Impact factor is heavily influenced by a few highly-cited papers. Most paper receive far fewer citations than what the impact factor indicates.



(Callaway 2016, Nature)

Issues with impact factor

Editorial policy influences impact factor. Example: *Folia Phoniatrica et Logopaedica* published an editorial protesting the abuse of IF. It cites all its articles from 2006 and 2006. IF increased from 0.66 to 1.44.

Reaction of *Folia Phoniatrica et Logopaedica* on the Current Trend of Impact Factor Measures

Harm K. Schutte[a] Jan G. Švec[b, c]

[a] Groningen Voice Research Lab, University of Groningen, The Netherlands; [b] Department of Experimental Physics, Laboratory of Biophysics, Palacký University, Olomouc, Czech Republic; [c] Voice Research Laboratory, Medical Healthcom, Ltd., Prague, Czech Republic

It has become the current trend to measure the status of a scientific journal by its impact factor and to measure a scientist by the impact factor of journals in which he/she publishes. While the underlying idea is good, applying the measure universally leads to highly disturbing trends. Based on country policies, some universities and their departments, especially in Europe, have started to distribute finances based on the average impact factor and average 'relative impact factor' (i.e., journal ranking based on impact factor within a subject category recognized by the Thomson Scientific Institute for Scientific Information, ISI) calculated from all the publications published by the scientific staff. In order to financially survive, the scientific staff should publish in journals with the highest impact factor possible. Any publication in a journal with a low impact factor or low relative impact factor decreases the overall score of the department. Consequently, researchers are strongly recommended to avoid journals with low impact factors.

These criteria negatively affect the scientists working in small under-researched and nonlucrative fields [1]. The fields of logopedics and phoniatrics are good examples of such fields. The field of logopedics has been assigned by ISI to the more general category of 'rehabilitation', while phoniatrics belongs to the ISI category of 'otorhinolaryngology'. Both these ISI categories contain other fields which are of larger impact than logopedics and phoniatrics. For instance, in the ISI category of otorhinolaryngology, the journals devoted to otology have generally a higher impact factor than journals in laryngology and a much higher impact factor than a journal devoted specially to phoniatrics. Based on this, the 'importance' of phoniatricians is considered to be lower than that of laryngologists and much lower than that of otologists. Consequently, phoniatricians are judged as less 'scientifically valuable' than otologists and laryngologists. To defend their scientific value, the phoniatricians are forced to avoid their special journal, i.e., our journal *Folia Phoniatrica and Logopaedica* (FPL), and publish in other, larger and usually more widespread journals. This has a negative effect on our journal.

In the case of logopedics, belonging to the ISI category of 'rehabilitation', the situation is comparable. In this ISI category there are also journals covering, e.g., neurology, sport sciences, cancer rehabilitation, orthopedics or emergency medicine. These are fields which are larger, especially in manpower working in this field, and more lucrative than speech rehabilitation and consequently have a larger impact factor. Specifically, the impact factor of our FPL journal reached the value of 0.655 in 2006, which is the highest in the journal's history. Still, according to the Social Sciences Edition of the ISI Journal Citation Report, this value of the impact factor makes the FPL to rank only at the 33rd place out of 49

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1021–7762/07/0596–0281$23.50/0

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h–index

h–index is an author-level metric that measures both productivity and citation impact of the publications. It was developed by Jorge Hirsch.

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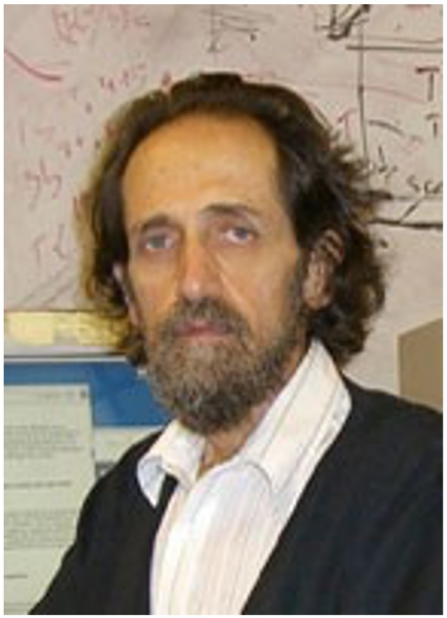
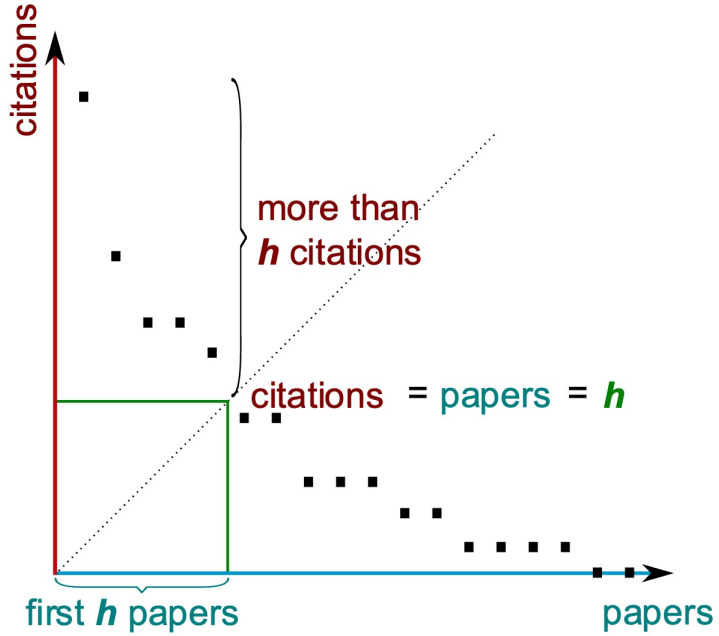
h–index is defined as the maximum value of h such that the given author has published at least h papers that have each been cited at least h times.

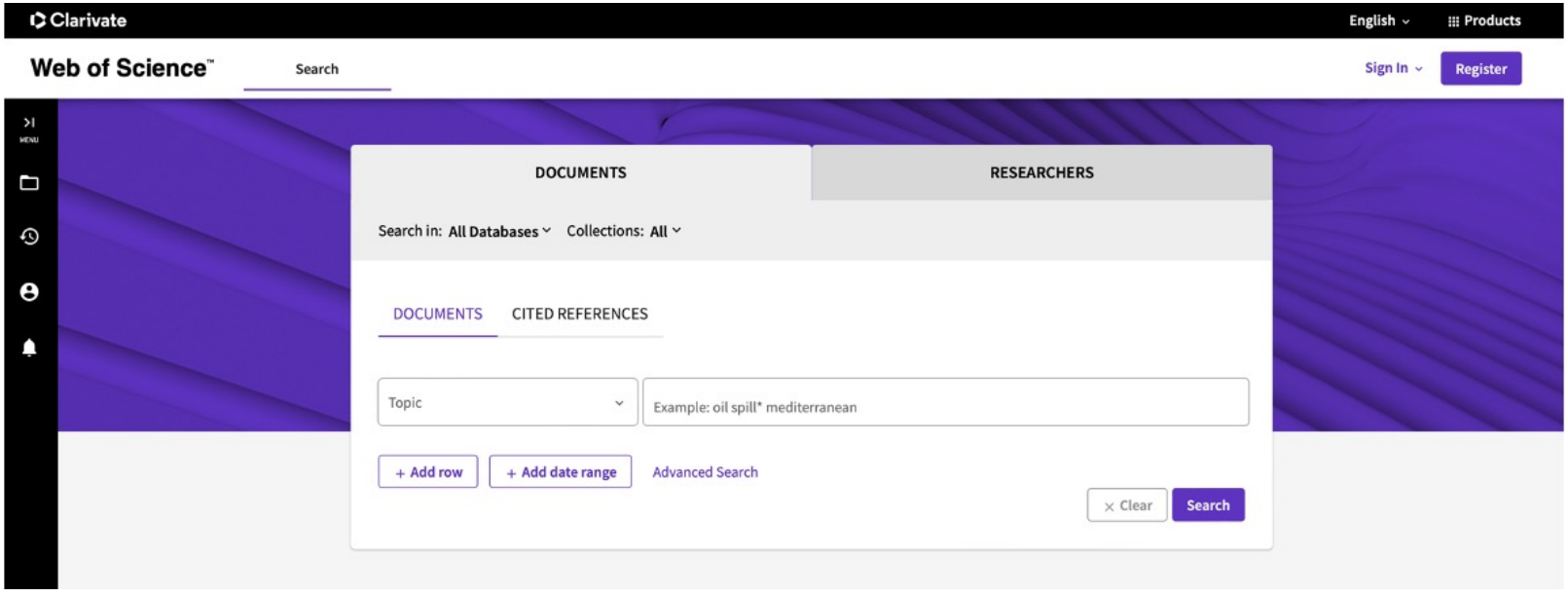




Jorge Hirsch and the calculation of *h*–index.

Science Citation Index (SCI)

SCI, now known as **Science Citation Index Expanded**, is a science index first developed by the Institute of Scientific Information. The indexing database covers more than 9500 journals across 178 scientific disciplines;



Web of Science search engine.

Science Citation Index (SCI)

Journals indexed in SCI must pass an evaluation process that access its editorial quality and impact quality.

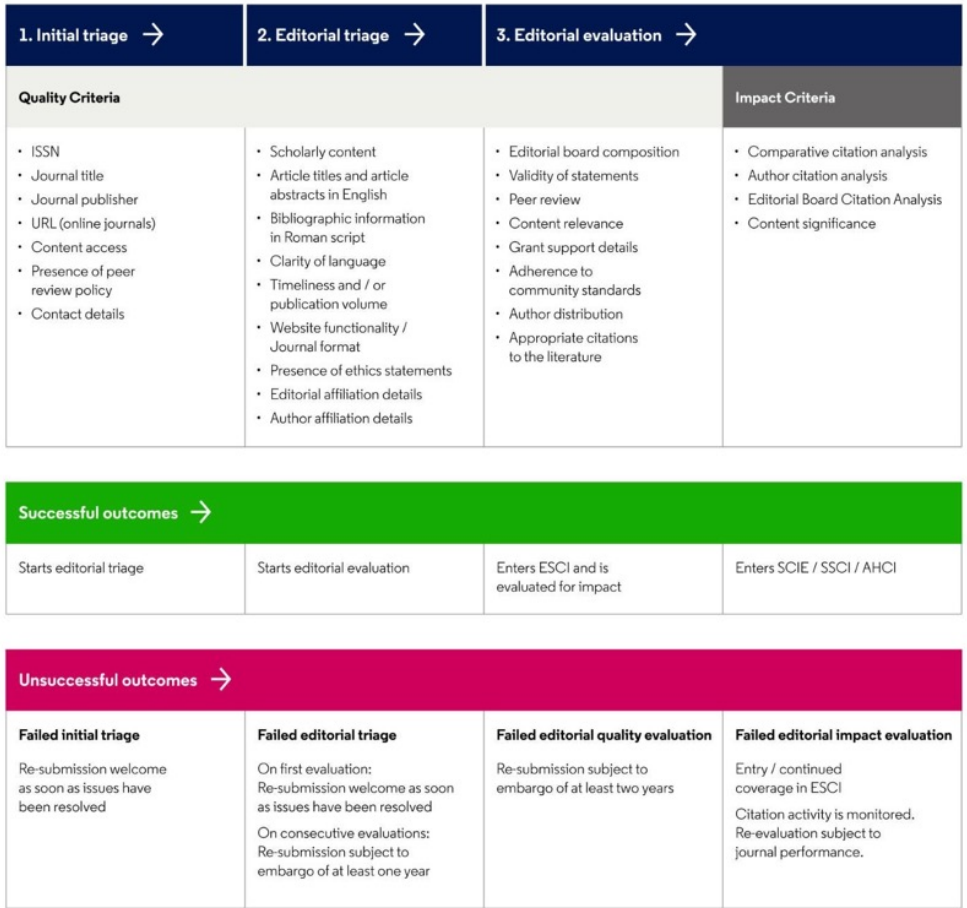


Diagram illustration the SCI evaluation process.

Journal ranking

Journal Citation Report ranks journals based on its impact factor within a subject category.

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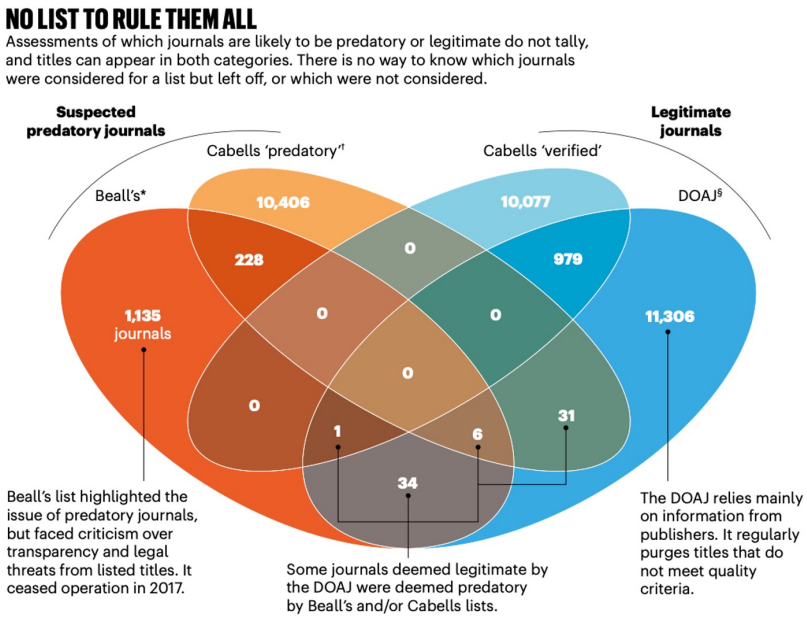
Chinese Academy of Science also publishes its journal ranking based on impact factor within subject category. It puts journals into four categories: top 5%, 6-20%, 21%-50%, and the rest.

Predatory journals

Predatory publishing is an exploitive academic publishing business model that involves charging publication fees to authors only superficially checking articales for quality and legitimancy, and without providing editorial and publishing services.



(Grudniewicz et al 2019, Nature)

Where to submit your manuscript?

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