Supported by China Association for Science and Technology (CAST) (2021KJQK004)
Results of “Development on the World Journal Clout Index (2021 STM)”

World Journal Clout Index（WJCI）of Scientific and Technological Periodicals (2021) Research Description

Project research units

Institute of Scientific and Technical Information of China

China Academic Journals (CD Edition) Electronic Publishing House Co., Ltd.

Tsinghua University Library

Wanfang Data Co., Ltd.

Society of China University Journals

China Editology Society of Science Periodicals

The research description, journal directory and indicators of this report can be accessed free of charge on the Internet. The website is: HTTP://WJCI.CNKI.NET.

December, 2021

Acknowledgement

Peking University Library

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ABSTRACT

The results of “Development on the World Journal Clout Index (2021 STM)” supported by China Association for Science and Technology (CAST) have been officially released. The WJCI Report is a global-oriented journal impact evaluation report and jointly developed by the Institute of Scientific and Technical Information of China, China Academic Journals (CD Edition) Electronic Publishing House Co.Ltd, Library of Tsinghua University, Wanfang Data Co.Ltd, Society of China University Journals and China Editology Society of Science Periodicals.

The WJCI Report determines the proportion of source journals in each country/region from four dimensions: R&D input, output of research papers, number of researchers, and the scale and level of journals. This report selected 14665 high-level journals representative of the region, discipline and industry as source journals of "World Citation Database" built by the project team from about 60,000 sci-tech academic journals being published worldwide, of which 3072 were multilingual or non-English journals, mainly from China, Russia, Brazil, Germany, France, Spain, Japan, etc. "World Citation Database" included 97.87 million citations (6,616,400 citations from Chinese journals) from source journals in 2020 and carried out an academic impact evaluation of sci-tech journals worldwide based on this data.

On the basis of thorough research on the journal classification systems of different citation databases at home and abroad, the research group created a journal classification system covering all fields of science and technology, reflecting emerging and interdisciplinary areas from disciplines. This classification system had a total of 291 disciplines in 2020 so that Chinese and foreign journals can implement quantitative evaluation by different disciplines under the same standard.

The evaluation index released in the report——World Journal Clout Index (WJCI), which integrates the World Academic Journal Clout Index (WAJCI) based on citation data and Web Impact (WI) based on web usage data. The basic data of WAJCI was from "World Citation Database"; the basic data of WI was composed of three parts: the "total mentions" of journal articles in Altmetric (19,683,300 times), pageviews of Chinese and international journals in CNKI-Scholar (36.184 million times), pageviews (138 million times) and downloads (57.567 million times) from CNKI, Wanfang, and Chinese Medical Journal Full-text Database. WI is the first social impact evaluation index of journal evaluation worldwide: the wight of WI is 0.2 for journals in Science and Technology General, Science and Medicine, while 0.3 for journals in Engineering and Agriculture Science, highlighting the role of applied journals in practical work.

Among the source journals in WJCI, there are 1,584 journals in China, including 1,268 Chinese journals. The average WJCI index of Chinese journals is 1.331, ranking ninth in the world, which is lower than that of powerful countries of sci-tech journals, but higher than Japan, South Korea, Russia, India, Brazil and other BRICS countries. The total cites (TC) of Chinese journals is 2,851,900, of which 763,500 are from international journals, accounting

for 26.77%.

This project aims to establish a new journal evaluation system and to more comprehensively evaluate the publishing and dissemination services and their academic impact provided by sci-tech journals in today's society on global scientific and technological innovation activities.

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Contents

1 Objective and significance

(1) Conducting global STM journal evaluation to fairly reveal the current innovation worldwide

In the context of advancing scientific and technological revolution and industrial transformation, the input and output of emerging economies such as China, India, Brazil and Russia are constantly growing, profoundly shifting the global innovation map and facilitating the global innovation and economic development. In the publishing field of STM journals, the total number of STM journals in the world and the number in non-native English speaking countries/regions are both increasing.

International journal databases traditionally and mainly include English journals and Western journals in a long period, and pay insufficient attention to the journals in those from emerging economies, especially those from non-native English speaking countries/regions and developing countries/regions. With a limited coverage of journals, these databases can hardly give an authentic presentation of the sci-tech innovation in those countries/regions in the era of rapid scientific and technological development. In China, for example, there are 4963 STM journals, of which only around 200 are included in the WOS database and over 800 in SCOPUS database in 2020. A large number of journals published in China, especially Chinese-language journals are not included, leaving millions of published STM papers unnoticed by the world every year.

In order to panoramically show the current situation of global sci-tech innovation and reflect the true contribution of emerging sci-tech powers, the study of “World Journal Clout Index (WJCI)” is carried out to objectively evaluate the publishing and communication services and academic impact of STM journals on current global sci-tech innovation activities.

(2) Improving academic evaluation when using existing databases

The SCI and SCOPUS are useful tools for journal retrieval and have being applied to research evaluation as its derived functions. The two databases mainly focus on English journals and Western journals from the aspects of cost, user market, positioning and main functions, in order to make the best use of resources available in their own database. However, they pay little attention to establishing a comprehensive evaluation system for global academic journals. Moreover, they only provide single index ranking such as cites or impact factor (IF), and do not comprehensively evaluate the academic impact of journals.

However, with the expansion of the scale and influence of the two databases, the bibliometric index of journals based on citation data has gradually been recognized by the academic circles and used for scientific research evaluation, and even evolved into the only academic evaluation tool in some scientific research institutions, resulting in “SCI fever” and

“IF-centered” problems. The single index evaluation is doubted by many scientific and technological circles and publishing circles due to its limitations and many professional institutions are constantly intending to introduce new evaluation indexes. Therefore, it is necessary to establish a comprehensive evaluation index of journals on scientific and reasonable basis which can change the negative tendency of just using the IF and other single evaluation indexes by academic circles, and reveal the journal academic impact more broadly and effectively.

To sum up, there is no scientific and comprehensive evaluation method for academic impact of journals in China and abroad. Thus, it is essential to establish an open and pluralistic evaluation system from current journals worldwide to correctly evaluate the true development level of academic journals in China and other non-English speaking countries/regions. For this purpose, China Scientometrics and Bibliometrics Research Center (CNKI) and other journal evaluation centers jointly conduct the “Research on the Comprehensive Evaluation Method of World Science & Technology Journal Impact” under the commission of China Association for Science and Technology (CAST), with a view to offering a more objective and reasonable method for journal evaluation and providing more objective statistical data for the evaluation of academic impact of journals in the world.

2 Research methods

The project team consists of the evaluation and research departments of China Academic Journals (CD Edition) Electronic Publishing House Co., Ltd., Institute of Scientific and Technical Information of China, Tsinghua University Library, Society of China University Journals, Wanfang Data Co., Ltd, and China Editology Society of Science Periodicals. Literature information professionals from Peking University Library, Capital Medical University Library, China Agricultural University Library,etc,were invited to participate in the joint research. This project also received data support from CrossRef , Digital Science, and Chinese Medical Association Publishing House. On the basis of full investigation of journal databases and journal evaluation results in China and abroad, our research focuses on 4 aspects: selection of statistical source journals, design of evaluation index system, discipline classification of journals, and construction of the World Citation Database.

2.1 Selection of statistical source journals

2.1.1 Proportion of statistical source journals from different countries/regions

The project team investigated comprehensive databases including Ulrich’s Periodicals

Directory, SCI database and SCOPUS database, 6 professional databases including EI (for engineering technology), MEDLINE and PMC (for biology and medicine), Chemical Abstracts (CA, for chemistry), MathSciNet (Mathematical Reviews, MR, for mathematics), GeoRef (for geoscience), and CABA (for agriculture), as well as international databases such as RSCI (Russia), JSTAGE (Japan), and KCI (Republic of Korea). The inclusion standard, discipline classification system, and journal directories of each database were summarized and analyzed, based on which a total of 61,000+ continually publishing STM journals worldwide were sorted out. In 2021, a quarter of the journals (about 15,000 journals) were selected as the source journals for statistics, and the final list was confirmed through primary quantitative selection and expert review.

In order to comprehensively evaluate the development status of science and technology and STM journals in each country/region on scientific basis, the number of statistical source journals from different countries/regions is determined from 4 dimensions: (1) R&D input; (2) output of scientific papers; (3) number of scientific researchers; and (4) the scale and level of journals. The distribution of statistical source journals is shown in Table 1.

Table 1 Number and selection basis of statistical source journals from different countries/regions

Country/Regiom	**R&D input (%)**	**Journal papers (%)**	**Researchers (%)**	**Journals (%)**	**Selected journals (%)**	***n* of journals selected**
Total	-	-	-	-		14,000–15,000
USA	27.6	20.1	22.9	19.4	20–28	3,000–4,100
UK	2.5	5.2	4.6	9.8	3–10	450–1,500
China	26.3	24.7	27.8	8.0	9–11	1,400–1,700
Germany	6.7	5.1	6.7	6.8	5–9	800–1,300
Japan	8.1	4.6	10.8	6.3	4–8	630–1,200
Russia	2.0	3.1	6.5	4.7	3–5	380–730
India	-	4.5	-	4.6	2–5	280–700
Netherlands	1.0	1.8	1.3	4.4	4–8	550–1,200
France	3.3	3.4	4.7	2.1	2–4	330–530
Switzerland	0.9	1.4	-	2.0	1–3	220–500
Italy	1.7	3.5	2.2	1.8	2–3	230–500
Brazil	-	2.3	-	1.7	1–2	110–360
Spain	1.1	2.8	2.1	1.7	1–3	210–440
Poland	0.7	1.4	1.8	1.6	1–2	100–240
Korea (Republic	4.7	3.4	6.1	1.6	2–3	250–400

Country/Regiom	R&D input (%)	Journal papers (%)	Researchers (%)	Journals (%)	Selected journals (%)	*n* of journals selected
of)						
Others	13.4	12.7	-	23.7	11–14	1,600–2,100

Note: (1) Data of R&D (scientific research input) and number of researchers are derived from the official data released by the Organisation for Economic Co-operation and Development (OECD). (2) The output of scientific papers is based on the proportion of scientific papers published in 4 databases. The 4 databases and the total number of papers are detailed as follows: WoS (2,290,000), Scopus (2,110,000), EI (1,600,000) and Biosys (880,000).

2.1.2 Selection method and results

(1) Preliminary selection using the citation-based WAJCI index

The statistical source journals were preliminarily selected using quantitative evaluation indexes based on citation. We counted the cites of all journals in the statistical year, IF and total cites (TC), and World Academic Journal Clout Index (WAJCI) in "World Citation Database" built by the project team. And then, the statistical source journals were determined according to the value of WAJCI.

(2) High-quality journals of other evaluation institutions as references

Internationally, JCR-SCIE 2020 Q1/Q2 journals and Scopus 2020 Q1/Q2 journals were referenced. Domestically, the selected journals in "China STEM Journal Excellence Action Plan", the T1-level journals of the high-quality sci-tech journals directory by CAST in 20 fields and the latest source/core journals of major evaluation institutions were introduced.

(3) Special adjustments

The UK has a large number of journals with a long history and good quality. Therefore, we re-determined the number of source journals in this country/region. As the evaluation of the "World Citation Database" for non-native English language journals cannot fully reflect their research level in 6 countries of Germany, Italy, Japan, France, Russia, and Republic of Korea, journals in these countries were dealt with separately.

(4) Excluding journals with low WJCI index

Journals whose WJCI index falls in Q4 among the newly selected journals in 2021 were excluded.

(5) Expert review

Based on the journal list 2020, the project team selected the statistical source journals in 2021 according to the above method, and checked the publication status of the included journals. After exclusion of the journals that had been suspended, journals with low article

quantity, in social science, non-academic, and unsuitable for evaluation (data papers, comprehensive conference proceedings, and unstable publication series) and journals deemed by peer reviewers to be of low quality, 14,665 source journals were finally determined. The number of source journals from each country/region is shown in Table 2.

Table 2 Number of WJCI source journals by country/region

Country/Region	*n* of journals (target)	*n* of journals (final)	Coverage of SCIE	Reference		
				n of journals (SCIE)	*n* of journals (SCOPUS)	*n* of English journals
Total	14000-15000	14665	88%	9465	18774	36708
USA	3000-4100	3811	92%	2810	4695	12099
UK	450-1500	2819	92%	2259	3735	5673
China	1400-1700	1584	100%	230	788	496
Netherlands	800-1300	1071	93%	902	1438	2338
Germany	630-1200	800	83%	715	1190	1317
Switzerland	280-700	462	89%	325	581	1032
Russia	380-730	433	48%	109	418	522
Japan	550-1200	330	91%	210	436	923
India	330-530	285	69%	96	410	3366
Korea (Republic of)	220-500	257	92%	135	307	347
Brazil	230-500	218	92%	107	288	80
Italy	250-400	208	85%	115	340	283
Poland	110-360	201	73%	131	355	353
France	210-440	185	76%	172	345	154
Canada	100-240	157	88%	95	210	441
Others	1600-2100	1844	74%	1054	3238	7284

Note: The journals published in China in this table have CN numbers or country is China in the ISSN Center, the same below.

2.1.3 Language analysis of statistical source journals

(1) A total of 11,593 English journals are included in the WJCI source journals.

Table3 Statistics of English and non-English journals by country

No.	Country	*n* of English Journals	*n* of non-English Journals
1	USA	3769	42
2	UK	2744	75
3	Netherlands	1007	64
4	Germany	657	143
5	Switzerland	417	45

6	China	325	1259
7	India	284	1
8	Japan	237	93
9	Korea (Republic of)	186	71
10	Australia	146	1
11	Poland	141	60
12	Russia	129	304
13	Italy	117	91
14	Canada	116	41
15	Singapore	100	0

(2) A total of 3,072 non-English journals are included, mainly from China, Russia, Brazil, Germany, France, Spain, and Japan, etc.

Table 4 Country distribution of non-English journals

No.	Country	*n* of non-English journals	*n* of English journals
1	China	1259	325
2	Russia	304	129
3	Brazil	176	42
4	Germany	143	658
5	France	108	77
6	Spain	105	37
7	Japan	93	237
8	Italy	91	117
9	UK	75	2744
10	Korea (Republic of)	71	186
11	Netherlands	64	1007
12	Poland	60	141
13	Switzerland	45	417
14	USA	42	3769
15	Indonesia	42	17
16	Turkey	42	46
17	Canada	41	116

（3）Non-English journals account for 20.95% of the total source journals, mainly in Chinese, French and Russian.

Table 5 Language statistics of non-English journals

No.	Language	*n* of journals	Proportion (%)
1	Chinese	1268	8.65%
2	French	372	2.54%
3	Russian	304	2.07%

No.	Language	*n* of journals	Proportion (%)
4	Spanish	264	1.80%
5	German	152	1.04%
6	Portuguese	135	0.92%
7	Italian	95	0.65%
8	Japanese	86	0.59%
9	Korean	70	0.48%
10	Polish	46	0.31%

2.2 Evaluation index——World Journal Clout Index (WJCI)

In order to reflect the journal impact more comprehensively and objectively, the project team developed a new evaluation index——World Journal Clout Index (WJCI), which integrates the World Academic Journal Clout Index (WAJCI) based on citation data and Web Impact (WI) based on web usage data.

The World Academic Journal Clout Index (WAJCI) was first proposed by CNKI in its Annual Report on the Impact Factor Index of World Academic Journals (2018), and it is a comprehensive index for evaluating the citation impact of journals with the CI standardization in disciplines.

The Web Impact (WI), first proposed in this study, is a new evaluation index based on the usage data of international web users and the download data from journal full-text databases in China.

2.2.1 Academic impact indexes based on citation data (CI, WAJCI)

(1) Clout Index (CI)

Statistics show that the most influential journals in a field should be those with both the highest total citations (TC) and impact factor (IF) in the subject, such as the position of *The New England Journal of Medicine*. CI is a value calculated by vector equal weight after linearly normalizing the IF and TC of journals in a group in a statistical year. It represents the similarity between a certain journal and the journal with the highest impact in the field. The greater the CI value, the closer the impact of the journal is to the best position. CI is a comprehensive index that takes into account TC (representing the effective impact of a journal's article quantity and history) that reflects its importance in the discipline and IF (a representative index of the average article quality) reflecting its advancement in the discipline. To a certain extent, the combined use of TC and IF can correct the one-sided evaluation of journals brought about by single use of IF or TC.

Definition 1: Journal impact ranking space

The IF and TC of journals in the same discipline are mapped to a two-dimensional space,

which is called “journal impact ranking space.” The 2 values are divided by the maximum of the discipline and normalized to obtain A and B. The “journal impact ranking space” is a plane orthogonal coordinate system, where the abscissa is the normalized IF, and the ordinate is the normalized TC. According to (A, B), each journal corresponds to a point in this space (Figure 1), and the best position is (1, 1).

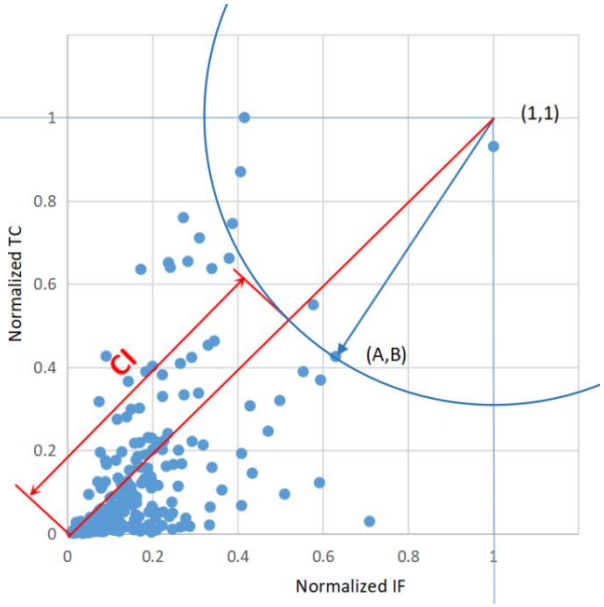

Figure 1 Schematic diagram of clout index (CI)

Definition 2: Equiimpact line of journals

In the “Journal impact ranking space,” the journal with the highest clout is defined as (1, 1). The line formed by the points with equal distance with point (1, 1) is the equiimpact line of journals. Obviously, the equiimpact line is an arc centered on (1, 1).

Definition 3: Clout Index (CI)

The Clout Index (CI) is the distance from the intersection of the equiimpact line where the journal is located and the connection between (0, 0) and (1, 1) to the origin (0, 0). The calculation formula is as follows:

$$CI = \sqrt{2} - \sqrt{(1-A)^2 + (1-B)^2}$$

$$\text{where} \quad A = \frac{IF_{journal} - IF_{min}}{IF_{max} - IF_{min}} \qquad A \in [0,1]$$

$$B = \frac{TC_{journal} - TC_{min}}{TC_{max} - TC_{min}} \qquad B \in [0,1]$$

(2) World Academic Journal Clout Index (WAJCI)

WAJCI is the ratio of a journal’s CI to the median CI of the worldwide journals in this discipline. This value reflects the multiple of the CI of a journal relative to the CI of the

journal ranked in the middle in this discipline, and can be used for discipline ranking and cross-year comparison of the journal.

WAJCI = Journal CI/Median CI of journals in the discipline

When WAJCI = 1, the CI of a journal is equal to the median of journals in the discipline. A larger WAJCI value indicates a higher level of the journal. The WAJCI reflects the relative position of academic impact of a journal in the discipline, which can be applied to cross-disciplinary and cross-year comparison.

For special adjustments, the research group searched out 26 journals in the top 1% of global publication volume and the bottom 2% of global Journal Mass Index (JMI), which basically covered the list of "megajournals" provided by experts. The weight of the cites in CI of these journals was lowered (multiplied by 0.05).

2.2.2 A bibliometrical index based on web usage: WI

Network communication and mobile internet have brought about new formats of scientific research and publishing, such as open science and open access. Citations do not reflect the impact of academic research results in a timely and complete manner due to certain lag and limitations that they must be cited by users in published articles. Therefore, it is necessary to find new indicators to supplement it. This study is a preliminary attempt to introduce the statistical results of users' mention and usage data of the latest published articles of journals on the Internet to reflect the comprehensive impact of the latest academic results of journals in the academic community and society.

For the usage data of international network users, the index of "total mentions" for 2020 journal articles in **Altmetric** provided by **Digital Science & Research Solutions** is introduced through collaboration.

Due to the particularity of Chinese language and network environment, the usage of Chinese journals can hardly be illustrated now in Altmetric. Under this context, we introduced the pageviews and downloads from CNKI, Wanfang, and Chinese Medical Journal Full-text Database as alternatives to show the function of Chinese journals for Chinese scholars (accounting for 27% of the global scholars). To reflect the web impact of Chinese and international journals in China, the project team calculated pageviews of Chinese and international journals in CNKI database. In this study, the sum of pageviews and downloads of journal articles published in 2020 by CNKI users, Wanfang users and Chinese Medical Journal Full-text Database in 2020 is used as the original index.

Statistics show that the web usage data vary greatly among journals, with a large number of mentions and downloads in several leading journals, while extremely low in most journals.

Taking “total mentions” as an example, the maximum is 11,690 times the median value and 839 times the average value. For most journals, this index is approximately equal to 0 if the conventional normalization method is used. For this reason, we adopt a segment assignment method for both data and set the weight of “total mentions” in and China to be 0.7 and 0.3, respectively, in the calculation of WI.

Taking “total mentions” as an example, the specific segment assignment method is as follows: The source journals in a discipline are ranked by “total mentions” and divided into ten equal segments. The WI of journals in each segment is obtained by backward induction from the weight corresponding to the average WAJCI value of journals in each segment and extensively consulted with experts. All journals in the same segment have the same WI score.

2.2.3 World Journal Clout Index (WJCI)

$$WJCI_i = WAJCI_i + WI_i$$

2.3 Discipline classification system

2.3.1 Design principle

(1) Practicability——classification oriented toward scientific research activities.

(2) Foresight——in response to the rapid development of disciplines in recent years, emerging and interdisciplinary disciplines forming a certain scale are independently set into one category.

(3) Internationalization——compatible with the classification systems of international libraries and databases as much as possible, and fully learn from international standards and achievements.

(4) Rationality of scale——disciplines with a large quantity are split and highly interdisciplinary disciplines are merged.

2.3.2 Design method

On the basis of thorough research on the classification systems and journal directories of 8 international index databases (WOS, SCOPUS, MEDLINE, EI, JST, KCI, CABA and RSCI), the project team innovatively re-compiled the discipline classification system containing 279 disciplines (STM), following the general outline of the *Classification and Code Disciplines of the People’s Republic of China* (CCD), with reference to *Chinese Library Classification* and *Catalogue of Degree Granting and Talent Training Disciplines*. In 2021, the project team split emerging or interdisciplinary areas from disciplines that included more than 300 journals based on the 2020 classification system to meet the needs of the journal

editorial departments and scholars, finally adding 12 disciplines and obtaining totally 291 disciplines.

2.3.3 Research results

Compared with 2020, there were a total of 1,710 journals with adjusted disciplines or newly selected statistical sources, followed by soliciting opinions from the classification experts from 4 library and information institutions (Tsinghua University Library, Peking University Library, Capital Medical University Library and China Agricultural University Library). After adjusting according to the opinions of all parties, the final WJCI discipline system consists of 5 Level-1 categories, 46 Level-2 categories and 291 Level-3 categories (Table6). For details, please see the Discipline Classification System of World Journal Clout Index（WJCI）of Scientific and Technological Periodicals (2021).

Table 6 WJCI discipline system biref sheet

Level-1 category code	Level-1 category	Level-2 category code	Level-2 category	Level-3 category code	Level-3 category
NX	Multidisciplinary	NX001	Science and Technology General	O1000	Science and Technology General
NX	Multidisciplinary	NX002	History of Science	O1010	History of Science
N	Science	N002	Mathematics	O1100	Mathematics General
N	Science	N002	Mathematics	O11014	Mathematical Logic and Foundations of Mathematics
N	Science	N002	Mathematics	O11021	Algebra, Number Theory, Combinatorics
N	Science	N002	Mathematics	O11027	Geometry, Topology
N	Science	N002	Mathematics	O11034	Mathematical Analysis
N	Science	N002	Mathematics	O11041	Function Theory
N	Science	N002	Mathematics	O11045	Differential Equations, Integral Equations and Other Mathematical Equations
N	Science	N002	Mathematics	O1105755	Nonlinear Science
N	Science	N002	Mathematics	O11061	Computational Mathematics

Level-1 category code	Level-1 category	Level-2 category code	Level-2 category	Level-3 category code	Level-3 category
N	Science	N002	Mathematics	O1106150	Numerical Analysis
N	Science	N002	Mathematics	O11064	Probability Theory and Mathematical Statistics
N	Science	N002	Mathematics	O11074	Operations Research and Management Science
N	Science	N002	Mathematics	O11081	Discrete Mathematics
N	Science	N002	Mathematics	O11087	Applied Mathematics
N	Science	N003	Information Science and System Science	O12010	Information Science
N	Science	N003	Information Science and System Science	O12020	System Science
N	Science	N004	Mechanics	O130	Mechanics General
N	Science	N004	Mechanics	O13015	Solid Mechanics
N	Science	N004	Mechanics	O1301570	Computational Mechanics
N	Science	N004	Mechanics	O13025	Fluid Mechanics, Rheology
N	Science	N005	Physics	O140	Physics General
N	Science	N005	Physics	O14015	Theoretical Physics
N	Science	N005	Physics	O1401550	Quantum Science and Technology
N	Science	N005	Physics	O14020	Acoustics
N	Science	N005	Physics	O14025	Thermodynamics
N	Science	N005	Physics	O14030	Optics
N	Science	N005	Physics	O1403025	Spectroscopy
N	Science	N005	Physics	O14035	Electromagnetism
N	Science	N005	Physics	O14045	Electron Physics
N	Science	N005	Physics	O14050	Condensed Matter Physics
N	Science	N005	Physics	O1405030	Crystallography
N	Science	N005	Physics	O14055	Plasma Physics
N	Science	N005	Physics	O14060	Atomic and Molecular Physics
N	Science	N005	Physics	O14065	Nuclear Physics
N	Science	N005	Physics	O14070	High Energy

Level-1 category code	Level-1 category	Level-2 category code	Level-2 category	Level-3 category code	Level-3 category
					Physics
N	Science	N005	Physics	O14080	Applied Physics
N	Science	N006	Chemistry	O150	Chemistry General
N	Science	N006	Chemistry	O15015	Inorganic Chemistry, Nuclear Chemistry
N	Science	N006	Chemistry	O15020	Organic Chemistry
N	Science	N006	Chemistry	O15025	Analytical Chemistry
N	Science	N006	Chemistry	O15030	Physical Chemistry, Chemical Physics
N	Science	N006	Chemistry	O1503035	Catalytic Chemistry
N	Science	N006	Chemistry	O1503050	Electrochemistry, Magnetochemistry
N	Science	N006	Chemistry	O15045	Polymer Science
N	Science	N006	Chemistry	O15055	Applied Chemistry
N	Science	N006	Chemistry	O15065	Materials Chemistry
N	Science	N007	Astronomy	P160	Astronomy General
N	Science	N007	Astronomy	P16020	Astrophysics
N	Science	N007	Astronomy	P16050	Galaxy and Cosmology
N	Science	N008	Earth Science	P170	Earth Science General
N	Science	N008	Earth Science	P17015	Atmospheric Science
N	Science	N008	Earth Science	P1701535	Climatology
N	Science	N008	Earth Science	P17020	Solid Earth Geophysics
N	Science	N008	Earth Science	P17025	Space Physics
N	Science	N008	Earth Science	P17030	Geochemistry
N	Science	N008	Earth Science	P17045	Physical Geography
N	Science	N008	Earth Science	P17050	Geology
N	Science	N008	Earth Science	P1705021	Mineralogy
N	Science	N008	Earth Science	P1705027	Petrology
N	Science	N008	Earth Science	P1705041	Paleontology
N	Science	N008	Earth Science	P1705044	Stratigraphy
N	Science	N008	Earth Science	P17055	Hydrological Science
N	Science	N008	Earth Science	P1705540	Limnology
N	Science	N008	Earth Science	P17060	Ocean Science

Level-1 category code	Level-1 category	Level-2 category code	Level-2 category	Level-3 category code	Level-3 category
N	Science	N009	Biology	Q180	Biology General
N	Science	N009	Biology	Q18011	Biomathematics, Computational Biology
N	Science	N009	Biology	Q18014	Biophysics
N	Science	N009	Biology	Q1801450	Structural Biology
N	Science	N009	Biology	Q18017	Biochemistry
N	Science	N009	Biology	Q18021	Cell Biology
N	Science	N009	Biology	Q18024	Physiology
N	Science	N009	Biology	Q1802421	Respiratory Physiology
N	Science	N009	Biology	Q1802437	Sensory Physiology
N	Science	N009	Biology	Q1802441	Reproductive Biology
N	Science	N009	Biology	Q1802467	Audiology and Speech-Language Pathology
N	Science	N009	Biology	Q18027	Developmental Biology
N	Science	N009	Biology	Q18031	Genetics
N	Science	N009	Biology	Q18037	Molecular Biology
N	Science	N009	Biology	Q1803910	Aquatic Biology
N	Science	N009	Biology	Q1803920	Conservation Biology
N	Science	N009	Biology	Q18041	Evolution Theory, Biological System Development
N	Science	N009	Biology	Q18044	Ecology
N	Science	N009	Biology	Q18047	Neuroscience
N	Science	N009	Biology	Q1804725	Cellular and Molecular Neuroscience
N	Science	N009	Biology	Q18051	Botany
N	Science	N009	Biology	Q1805140	Plant Physiology
N	Science	N009	Biology	Q1805185	Parasitology
N	Science	N009	Biology	Q18054	Entomology
N	Science	N009	Biology	Q18057	Zoology
N	Science	N009	Biology	Q1805744	Animal Ecology and Zoogeography
N	Science	N009	Biology	Q1805757	Animal Taxonomy

Level-1 category code	Level-1 category	Level-2 category code	Level-2 category	Level-3 category code	Level-3 category
N	Science	N009	Biology	Q18057B	Ornithology
N	Science	N009	Biology	Q18061	Microbiology
N	Science	N009	Biology	Q1806140	Mycology
N	Science	N009	Biology	Q18064	Virology
N	Science	N009	Biology	Q18067	Anthropology
N	Science	N010	Psychology	QX190	Psychology General
N	Science	N010	Psychology	QX19015	Cognitive Psychology
N	Science	N010	Psychology	QX19020	Social Psychology, Legal Psychology
N	Science	N010	Psychology	QX19025	Experimental Psychology
N	Science	N010	Psychology	QX19030	Developmental Psychology
N	Science	N010	Psychology	QX19042	Clinical and Counseling Psychology, Medical Psychology
N	Science	N010	Psychology	QX19046	Mathematical Psychology, Psychological Statistics
N	Science	N010	Psychology	QX19050	Physiological Psychology
N	Science	N010	Psychology	QX19065	Applied Psychology
N	Science	N010	Psychology	QX19070	Educational Psychology
R	Medicine	R001	Medicine General	R300	Medicine General
R	Medicine	R002	Basic Medicine	R310	Basic Medicine General
R	Medicine	R002	Basic Medicine	R31010	Medical Ethics and Medical History
R	Medicine	R002	Basic Medicine	R31011	Biomedical Science
R	Medicine	R002	Basic Medicine	R31014	Anatomy
R	Medicine	R002	Basic Medicine	R31021	Medical Physiology
R	Medicine	R002	Basic Medicine	R31031	Radiology
R	Medicine	R002	Basic Medicine	R31034	Immunology
R	Medicine	R002	Basic Medicine	R31037	Pathogenic Biology
R	Medicine	R002	Basic Medicine	R31044	Pathology
R	Medicine	R002	Basic Medicine	R3104485	Molecular Medicine

Level-1 category code	Level-1 category	Level-2 category code	Level-2 category	Level-3 category code	Level-3 category
R	Medicine	R002	Basic Medicine	R31047	Pharmacology
R	Medicine	R002	Basic Medicine	R31051	Experimental Medicine, Medical Experiment
R	Medicine	R002	Basic Medicine	R31057	Medical Informatics
R	Medicine	R002	Basic Medicine	R31099	Translational Medicine
R	Medicine	R003	Clinical Medicine	R320	Clinical Medicine General
R	Medicine	R003	Clinical Medicine	R32011	Clinical Diagnostics
R	Medicine	R003	Clinical Medicine	R3201110	Pain Research
R	Medicine	R003	Clinical Medicine	R3201140	Medical Imaging, Medical Imaging Technology
R	Medicine	R003	Clinical Medicine	R32014	Health Medicine
R	Medicine	R003	Clinical Medicine	R3201410	Rehabilitation Medicine
R	Medicine	R003	Clinical Medicine	R3201420	Sports Science
R	Medicine	R003	Clinical Medicine	R3201430	Geriatrics
R	Medicine	R003	Clinical Medicine	R32021	Anesthesiology
R	Medicine	R003	Clinical Medicine	R32024	Internal Medicine General
R	Medicine	R003	Clinical Medicine	R3202410A	Cardiology
R	Medicine	R003	Clinical Medicine	R3202410B	Vascular Disease
R	Medicine	R003	Clinical Medicine	R3202415	Respiratory and Chest Diseases
R	Medicine	R003	Clinical Medicine	R3202425	Digestive System and Abdominal Diseases
R	Medicine	R003	Clinical Medicine	R3202430	Hematology
R	Medicine	R003	Clinical Medicine	R3202435	Nephrology
R	Medicine	R003	Clinical Medicine	R3202435B	Diabetes
R	Medicine	R003	Clinical Medicine	R3202440	Endocrinology and Metabolic Diseases
R	Medicine	R003	Clinical Medicine	R3202445	Rheumatology and Autoimmune Disease
R	Medicine	R003	Clinical Medicine	R3202450	Allergy
R	Medicine	R003	Clinical Medicine	R3202460	Lemology, Infectious Diseases

Level-1 category code	Level-1 category	Level-2 category code	Level-2 category	Level-3 category code	Level-3 category
R	Medicine	R003	Clinical Medicine	R32027	Surgery General
R	Medicine	R003	Clinical Medicine	R3202720	Head and Neurosurgery
R	Medicine	R003	Clinical Medicine	R3202730	Thoracic Surgery, Cardiovascular Surgery
R	Medicine	R003	Clinical Medicine	R3202740	Urology
R	Medicine	R003	Clinical Medicine	R3202745	Orthopedics
R	Medicine	R003	Clinical Medicine	R3202755	Plastic Surgery
R	Medicine	R003	Clinical Medicine	R3202760	Organ Transplant Surgery
R	Medicine	R003	Clinical Medicine	R32027B	Operative Surgery
R	Medicine	R003	Clinical Medicine	R32027C	Trauma Surgery
R	Medicine	R003	Clinical Medicine	R32031	Obstetrics and Gynecology
R	Medicine	R003	Clinical Medicine	R32034	Pediatrics
R	Medicine	R003	Clinical Medicine	R32037	Ophthalmology
R	Medicine	R003	Clinical Medicine	R32041	Otorhinolaryngology
R	Medicine	R003	Clinical Medicine	R32044	Stomatology
R	Medicine	R003	Clinical Medicine	R32047	Dermatology
R	Medicine	R003	Clinical Medicine	R32051	Sexology, Andrology
R	Medicine	R003	Clinical Medicine	R32054	Neurology
R	Medicine	R003	Clinical Medicine	R32057	Psychology
R	Medicine	R003	Clinical Medicine	R32061	Emergency Medicine, Critical Care Medicine
R	Medicine	R003	Clinical Medicine	R32067	Oncology
R	Medicine	R003	Clinical Medicine	R32071	Nursing
R	Medicine	R003	Clinical Medicine	R32099	Medical Technology
R	Medicine	R003	Clinical Medicine	R32099B	Family Medicine, Community Medicine
R	Medicine	R004	Preventive Medicine and Public Health	R330	Preventive Medicine and Public Health
R	Medicine	R004	Preventive Medicine and Public Health	R33011	Nutrition

Level-1 category code	Level-1 category	Level-2 category code	Level-2 category	Level-3 category code	Level-3 category
R	Medicine	R004	Preventive Medicine and Public Health	R33014	Toxicology
R	Medicine	R004	Preventive Medicine and Public Health	R33021	Epidemiology
R	Medicine	R004	Preventive Medicine and Public Health	R33034	Occupational Health
R	Medicine	R004	Preventive Medicine and Public Health	R33035	Tropical Medicine
R	Medicine	R004	Preventive Medicine and Public Health	R33057	Environmental Hygiene
R	Medicine	R004	Preventive Medicine and Public Health	R33077	Health Promotion and Health Education
R	Medicine	R004	Preventive Medicine and Public Health	R33081	Health Management
R	Medicine	R005	Special Medicine and Forensic Medicine	R34020	Special Medicine
R	Medicine	R005	Special Medicine and Forensic Medicine	R3402040	Forensic Medicine
R	Medicine	R006	Pharmacy	R350	Pharmacy General
R	Medicine	R006	Pharmacy	R35010	Pharmaceutical Chemistry
R	Medicine	R006	Pharmacy	R35035	Pharmaceutics
R	Medicine	R006	Pharmacy	R35045	Drug Abuse
R	Medicine	R007	Traditional Chinese Medicine and Chinese Materia Medica	R360	Traditional Chinese Medicine and Chinese Materia Medica, Integrative and Complementary Medicine
S	Agriculture Science	S001	Agriculture	S210	Agriculture Science General
S	Agriculture Science	S001	Agriculture	S2102030	Agricultural Biology
S	Agriculture Science	S001	Agriculture	S21030	Agronomy
S	Agriculture Science	S001	Agriculture	S21040	Horticulture
S	Agriculture Science	S001	Agriculture	S21045	Agricultural Products Storage and Processing

Level-1 category code	Level-1 category	Level-2 category code	Level-2 category	Level-3 category code	Level-3 category
S	Agriculture Science	S001	Agriculture	S21050	Soil Science
S	Agriculture Science	S001	Agriculture	S21060	Plant Protection
S	Agriculture Science	S001	Agriculture	S2106020	Plant Pathology
S	Agriculture Science	S001	Agriculture	S210B	Organic and Sustainable Agriculture、Agricultural Economics
S	Agriculture Science	S002	Forestry	S220	Forestry General
S	Agriculture Science	S002	Forestry	S22050	Landscape Architecture
S	Agriculture Science	S002	Forestry	S2205540	Wood Science
S	Agriculture Science	S004	Animal Husbandry, Veterinary Science	S23020	Animal Husbandry
S	Agriculture Science	S004	Animal Husbandry, Veterinary Science	S2302050	Grass Science
S	Agriculture Science	S004	Animal Husbandry, Veterinary Science	S23030	Animal Medicine (Veterinary Medicine)
S	Agriculture Science	S003	Fisheries	S240	Fisheries
T	Engineering	T001	Engineering General	T400	Engineering General
T	Engineering	T002	Engineering General Technology and Basic Disciplines	T410	Fundamentals of Engineering and Technology Science
T	Engineering	T002	Engineering General Technology and Basic Disciplines	T41020	Engineering Mechanics
T	Engineering	T002	Engineering General Technology and Basic Disciplines	T41030	Engineering Geology
T	Engineering	T002	Engineering General Technology and Basic Disciplines	T41050	Metrology and Standardization

Level-1 category code	Level-1 category	Level-2 category code	Level-2 category	Level-3 category code	Level-3 category
T	Engineering	T002	Engineering General Technology and Basic Disciplines	T41070	Engineering General Technology
T	Engineering	T002	Engineering General Technology and Basic Disciplines	T41075	Industrial Engineering
T	Engineering	T003	Information and System Science Related Engineering and Technology	T41310	Control Science and Technology
T	Engineering	T003	Information and System Science Related Engineering and Technology	T4131050	Robotics
T	Engineering	T003	Information and System Science Related Engineering and Technology	T41310B	Automation and Control System
T	Engineering	T003	Information and System Science Related Engineering and Technology	T41315	Simulation Science and Technology
T	Engineering	T004	Natural Science Related Engineering and Technology	T41620	Optical Engineering
T	Engineering	T004	Natural Science Related Engineering and Technology	T41630	Ocean Engineering and Technology
T	Engineering	T004	Natural Science Related Engineering and Technology	T41640	Modern Biotechnology (Bioengineering)
T	Engineering	T004	Natural Science Related Engineering and Technology	T4164015	Cell Engineering
T	Engineering	T004	Natural Science Related Engineering and Technology	T41650	Agricultural Engineering
T	Engineering	T004	Natural Science Related Engineering and Technology	T41660	Biomedical Engineering

Level-1 category code	Level-1 category	Level-2 category code	Level-2 category	Level-3 category code	Level-3 category
T	Engineering	T005	Surveying and Mapping Science and Technology	T420	Surveying and Mapping Science and Technology
T	Engineering	T006	Material Science	T430	Materials Science General
T	Engineering	T006	Material Science	T4301010	Material Mechanics
T	Engineering	T006	Material Science	T4301040	Metallography
T	Engineering	T006	Material Science	T4301050	Ceramics
T	Engineering	T006	Material Science	T43015	Material Surface and Interface
T	Engineering	T006	Material Science	T43020	Material Failure and Protection
T	Engineering	T006	Material Science	T43025	Material Testing and Analysis Technology
T	Engineering	T006	Material Science	T43035	Material Synthesis and Processing Technology
T	Engineering	T006	Material Science	T43045	Inorganic Non-Metallic Materials
T	Engineering	T006	Material Science	T43050	Organic Polymer Materials, Polymers
T	Engineering	T006	Material Science	T43055	Composite Material
T	Engineering	T006	Material Science	T43060	Biomaterials
T	Engineering	T006	Material Science	T43070	Nanoscience and Nanotechnology
T	Engineering	T007	Mining Engineering and Technology	T440	Mining Engineering and Technology
T	Engineering	T007	Mining Engineering and Technology	T44045	Oil and Gas Industry
T	Engineering	T008	Metallurgical Engineering Technology	T450	Metallurgical Engineering Technology
T	Engineering	T009	Mechanical Engineering	T460	Mechanical Engineering
T	Engineering	T009	Mechanical Engineering	T46025	Mechanical Manufacturing Process and Equipment

Level-1 category code	Level-1 category	Level-2 category code	Level-2 category	Level-3 category code	Level-3 category
T	Engineering	T010	Power and Electrical Engineering	T47010	Engineering Thermophysics
T	Engineering	T010	Power and Electrical Engineering	T47030	Power Mechanical Engineering
T	Engineering	T010	Power and Electrical Engineering	T47040	Electrical Engineering
T	Engineering	T011	Energy Science and Technology	T480	Energy Science and Technology General
T	Engineering	T011	Energy Science and Technology	T48060	Primary Energy
T	Engineering	T011	Energy Science and Technology	T48070	Electric Energy
T	Engineering	T011	Energy Science and Technology	T48080	Energy System Engineering
T	Engineering	T012	Nuclear Science and Technology	T490	Nuclear Science and Technology
T	Engineering	T012	Nuclear Science and Technology	T49075	Radiation Protection Technology
T	Engineering	T013	Electronics and Communication Technology	T51010	Electronic Technology
T	Engineering	T013	Electronics and Communication Technology	T51030	Semiconductor Technology, Microelectronics, Integrated Circuits
T	Engineering	T013	Electronics and Communication Technology	T51050	Communication Technology
T	Engineering	T013	Electronics and Communication Technology	T5105040	Telecommunications
T	Engineering	T014	Computer Science and Technology	T520	Computer Science and Technology General
T	Engineering	T014	Computer Science and Technology	T5201060	Data Security and Computer Security
T	Engineering	T014	Computer Science and Technology	T52010B	Computer Theories and Methods
T	Engineering	T014	Computer Science and Technology	T52020	Artificial Intelligence

Level-1 category code	Level-1 category	Level-2 category code	Level-2 category	Level-3 category code	Level-3 category
T	Engineering	T014	Computer Science and Technology	T5202040	Pattern Recognition
T	Engineering	T014	Computer Science and Technology	T5202040B	Human-Computer Interaction
T	Engineering	T014	Computer Science and Technology	T52030	Computer Architecture
T	Engineering	T014	Computer Science and Technology	T5203040	Computer Network
T	Engineering	T014	Computer Science and Technology	T52040	Computer Software
T	Engineering	T014	Computer Science and Technology	T52050	Computer Hardware and Architecture
T	Engineering	T014	Computer Science and Technology	T52060	Computer Interdisciplinary
T	Engineering	T014	Computer Science and Technology	T5206030	Computer Graphics
T	Engineering	T014	Computer Science and Technology	T5206050	Computer Aided Design
T	Engineering	T014	Computer Science and Technology	T5206070	Information Processing
T	Engineering	T015	Chemical Engineering	T530	Chemical Engineering General
T	Engineering	T015	Chemical Engineering	T53011	General Issues of Chemical Industry
T	Engineering	T015	Chemical Engineering	T53047	Fuel and Coal Chemistry and Chemical Engineering
T	Engineering	T016	Instrumentation Technology	T53510	Instrumentation Technology
T	Engineering	T017	Textile Science and Technology	T540	Textile Science and Technology
T	Engineering	T018	Food Science and Technology	T550	Food Science General
T	Engineering	T018	Food Science and Technology	T55020	Food Processing Technology
T	Engineering	T018	Food Science and Technology	T5502015	Sugar, Food Fermentation, and Brewing Technology

Level-1 category code	Level-1 category	Level-2 category code	Level-2 category	Level-3 category code	Level-3 category
T	Engineering	T019	Civil and Architectural Engineering	T560	Architecture
T	Engineering	T019	Civil and Architectural Engineering	T5604020	Regional Planning, Urban and Rural Planning
T	Engineering	T019	Civil and Architectural Engineering	T56045	Civil Engineering
T	Engineering	T019	Civil and Architectural Engineering	T56055	Municipal Engineering
T	Engineering	T020	Hydraulic Engineering	T570	Hydraulic engineering
T	Engineering	T020	Hydraulic Engineering	T5705530	Water Resources Protection
T	Engineering	T021	Transport Engineering	T580	Transportation Engineering General
T	Engineering	T021	Transport Engineering	T58010	Road engineering
T	Engineering	T021	Transport Engineering	T5802010	Automobile, Locomotive, Vehicle Engineering
T	Engineering	T021	Transport Engineering	T58050	Ship and Ship Engineering
T	Engineering	T022	Aviation and Aerospace Science and Technology	T590	Aviation and Aerospace Science and Technology
T	Engineering	T023	Environmental and Resource Science and Technology	T61010	Environmental Science and Technology General
T	Engineering	T023	Environmental and Resource Science and Technology	T61010B	Sustainability Science
T	Engineering	T023	Environmental and Resource Science and Technology	T6101015	Environmental Chemistry
T	Engineering	T023	Environmental and Resource Science and Technology	T6101020	Environmental Biology
T	Engineering	T023	Environmental and Resource Science and Technology	T6101035	Environmental Ecology

Level-1 category code	Level-1 category	Level-2 category code	Level-2 category	Level-3 category code	Level-3 category
T	Engineering	T023	Environmental and Resource Science and Technology	T6101045	Natural Environmental Protection
T	Engineering	T023	Environmental and Resource Science and Technology	T6101050	Environmental Management, Environmental Law
T	Engineering	T023	Environmental and Resource Science and Technology	T61030	Environmental Engineering
T	Engineering	T023	Environmental and Resource Science and Technology	T61050	Resource Science and Technology
T	Engineering	T024	Safety Science and Technology	T620	Safety Science and Technology, Disasters and Their Prevention

2.4 World Citation Database

The objective and rational evaluation of STM journals based on citation data is guaranteed under the premise of high-quality statistical source literature and citation database. At present, international citation databases WOS and SCOPUS are developed for retrieval services, mainly including English journals, European and American journals, and there are few non-English journals. Database providers such as Crossref and Digital Science aim at building big data platforms and pay less attention to the quality of journals, which causes varying quality. The above two types of databases offer some reference for our research, but they are inappropriate to be directly used to calculate the academic impact.

On this basis, we independently establish the World Citation Database for project research to extract citation data in the scope of statistical source journals previously mentioned, and count the citation indexes of the optimized source journals, thereby ensuring the authority of WJCI. The research group needs to process the references of statistical source journals accurately and completely. The World Citation Database is the basis for the quantitative evaluation and analysis of STM journals.

The data sources used by the research group include:

（1）CNKI-Scholar data

CNKI has signed bibliographical cooperation agreements with more than 940 international institutions (publisher, academic society, university, etc). At present, 15.4

million bibliographies from 2018 to 2020 and 18 million citations in 2020 have been obtained.

（2）CrossRef data

By the end of August 2020, the project team has obtained 18 million bibliographies from 2018 to 2020 and 124 million citations in 2020 from online open data with permission.

（3）Dimensions data

The project team supplements the data needed in the scope of statistical source journals but unavailable in CNKI-Scholar and CrossRef from Dimensions through the cooperation agreement.

（4）Chinese journal data

The data are derived from CNKI journal database, Wanfang data and Chinese Medical Journal Full-text Database.

The World Citation Database is preliminarily formed for internal use in the research after data duplication removal, cleaning, citation linking and journal title standardization. This database contains 138 million citation data from 30,650 international journals (journals with references) in 2020, covering 15,412 WOS journals and 18,412 SCOPUS journals.

3 Evaluation result and data statistics

3.1 Global academic contribution: based on TC

On the basis of this report, the TC of STM journals in 2020 included in statistical sources amount to 74,684,200, of which 6,166,400 are from Chinese journals, contributing to 8.26% of the total. The TC of Chinese journals is 2,851,900, of which 763,500 are from international journals, accounting for 26.77%. The average citation rate of journals cited by other countries/regions is 70.47%, which indicates that the international impact of Chinese journals still needs to be strengthened.

3.2 WJCI analysis

3.2.1 Overall analysis

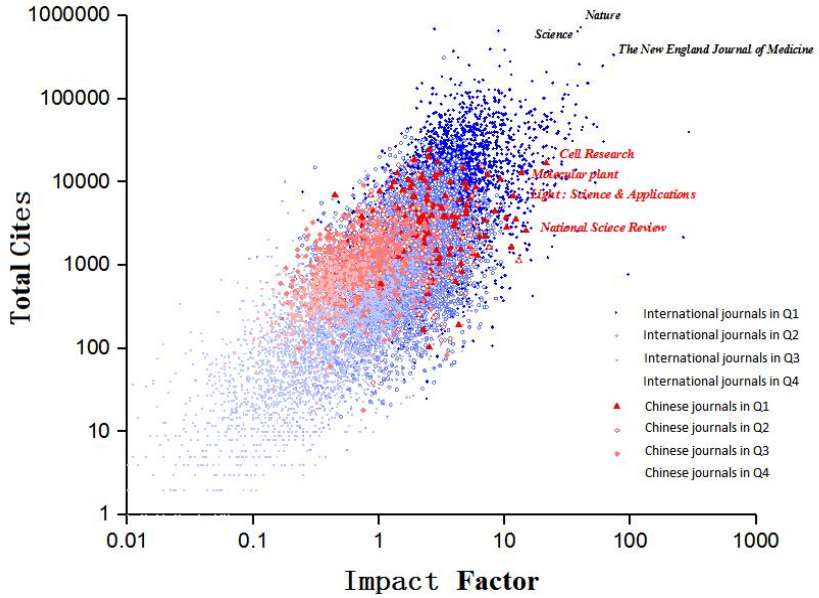

Figure2 Log–log plot of impact factor and total cites of WJCI journals

In the above figure, the abscissa is the journal IF, and the ordinate is the TC of journals. Each point in the figure represents a journal. Red represents Chinese journals, while blue represents international journals. Obviously, Chinese journals have been well integrated into international journals, indicating that the selected Chinese journals have reached the equivalent level as international STM journals in terms of IF and TC.

3.2.2 Q1 and Q2 journals analysis by country

Table 6 shows the number of journals in Q1 and Q2 from different countries, as calculated by WJCI of statistical source journals. The countries with the most Q1 journals are the USA, the UK and the Netherlands. Other countries with Q1 and Q2 journals accounting for more than 50% of their source journals include Germany, Switzerland and Australia. These countries are not only big countries of sci-tech journals, but also powerful countries of sci-tech journals.

Table7 WJCI-indexed Q1Q2 journals by country

No.	Country	*n* of journals in Q1	*n* of journals in Q2	*n* of Q1Q2 journals	% of global Q1Q2 journals	*n* of source journals	% (Q1Q2) of national total source journals
1	USA	1330	1271	2389	31.53%	3811	62.69%

2	UK	1151	1069	2021	26.67%	2819	71.69%
3	Netherlands	459	440	796	10.50%	1071	74.32%
4	China	229	395	585	7.72%	1584	36.93%
5	Germany	230	299	483	6.37%	800	60.38%
6	Switzerland	148	166	282	3.72%	462	61.04%
7	Japan	26	81	100	1.32%	330	30.30%
8	Korea (Republic of)	21	64	80	1.06%	257	31.13%
9	Australia	23	60	78	1.03%	147	53.06%
10	France	34	52	76	1.00%	185	41.08%

3.2.3 Chinese journals with high impact——based on WJCI

From the perspective of WJCI, top-ranked journals in each discipline have high academic impact. It is assumed in this study that Top 5% journals have the impact of "world-class journals" for the convenience of further comparative studies in the following analysis. There are 740 WJCI-TOP5% journals in different disciplines, where 323 are from the USA, 229 from the UK, and only 15 from China. This indicates that China still needs to strengthen its efforts to catch up with world-class journals.

Table 8 WJCI-TOP5% journals in China

No.	Journal title	Discipline classification	TC	IF	WJCI	WJCI rank
1	*National Science Review*	Science and Technology General	5155	15.687	25.333	6/246
2	*Science Bulletin*	Science and Technology General	11034	10.059	17.899	8/246
3	*Science China Physics,Mechanics & Astronomy*	Mechanics General	3602	4.544	3.289	3/63
4	*Light: Science & Applications*	Optics	9558	15.373	7.242	4/92
5	*Cell Research*	Cell Biology	20815	22.164	6.126	7/152
		Cell Engineering	20815	22.164	12.029	2/44
6	*Molecular Plant*	Botany	14296	12.178	8.353	8/197
7	*Fungal Diversity*	Mycology	5316	20.930	5.630	1/38
8	*Signal transduction and targeted therapy*	Medical Imaging, Medical Imaging Technology	3067	14.187	5.392	5/143

9	中国中药杂志	Traditional Chinese Medicine and Chinese Materia Medica, Integrative and Complementary Medicine	12386	1.902	3.270	2/43
10	*Journal of Integrative Agriculture*	Agriculture Science General	7095	3.024	6.751	4/134
11	中国农业科学	Agriculture Science General	11197	1.959	6.510	6/134
12	*Engineering*	Engineering General	4013	7.000	9.538	4/149
13	*npj Computational Materials*	Simulation Science and Technology	3625	10.192	7.328	4/104
		Material Mechanics	3625	10.192	5.846	4/99
14	*Transactions of Nonferrous Metals Society of China*	Metallurgical Engineering Technology	11717	2.701	6.223	3/78
15	*InfoMat*	Computer Interdisciplinary	1140	20.378	8.667	3/100

Table 9 WJCI-TOP20 Journals in China

No.	Journal title	Discipline classification	WJCI
1	*National Science Review*	Science and Technology General	25.333
2	*Science Bulletin*	Science and Technology General	17.899
3	*Cell Research*	Cell Engineering	12.029
4	*Engineering*	Engineering General	9.538
5	*InfoMat*	Computer Interdisciplinary	8.667
6	*Molecular Plant*	Botany	8.353
7	*Chinese Journal of Rock Mechanics and Engineering*	Engineering Mechanics	7.541
8	*npj Computational Materials*	Simulation Science and Technology	7.328
9	*Light: Science & Applications*	Optics	7.242
10	*Proceedings of the CSEE*	Electrical Engineering	6.942
11	*Science China Life Sciences*	Biology General	6.785
12	*Journal of Integrative Agriculture*	Agriculture Science General	6.751
13	*Science China Physics,Mechanics & Astronomy*	Astronomy General	6.642

No.	Journal title	Discipline classification	WJCI
14	*Research*	Science and Technology General	6.629
15	*Journal of China Coal Society*	Mining Engineering and Technology	6.596
16	*Scientia Agricultura Sinica*	Agriculture Science General	6.510
17	*Transactions of Nonferrous Metals Society of China*	Metallurgical Engineering Technology	6.223
18	*Science China Chemistry*	Chemistry General	6.203
19	*Carbon Energy*	Energy Science and Technology General	6.167
20	*Journal of Magnesium and Alloys*	Metallurgical Engineering Technology	6.083

3.2.4 WJCI statistics by country/region

The statistics of WJCI index by country/region can suggest the overall level of journals in a country/region. There are 1,584 journals in China, with an average WJCI of 1.331, which is lower than that of the Netherlands, the UK, the USA, Switzerland, Germany, Australia, France and Canada, and higher than that of Japan, Republic of Korea and other BRICS countries——Russia, India and Brazil.

Table 10 WJCI statistics by country/region (number of journals > 50)

No.	Country/Region	*n* of journals	Average WJCI	Average WAJCI	Average WI
1	Netherlands	1071	2.915	2.461	0.454
2	UK	2819	2.863	2.363	0.500
3	USA	3811	2.704	2.310	0.394
4	Switzerland	462	2.234	1.791	0.444
5	Germany	800	2.054	1.722	0.332
6	Australia	147	1.513	1.206	0.307
7	France	185	1.408	1.195	0.213
8	Canada	157	1.404	1.145	0.259
9	China	1584	1.331	1.155	0.176
10	New Zealand	94	1.296	1.121	0.175
11	Singapore	257	1.071	0.970	0.101
12	Korea (Republic of)	100	1.054	0.965	0.090
13	Italy	208	1.014	0.856	0.158
14	Japan	330	0.990	0.835	0.156
15	Spain	142	0.909	0.744	0.165
16	South Africa	51	0.893	0.764	0.128

No.	Country/Region	*n* of journals	Average WJCI	Average WAJCI	Average WI
17	India	285	0.802	0.702	0.100
18	Iran (the Islamic Republic of)	107	0.796	0.744	0.052
19	Poland	201	0.784	0.712	0.072
20	Brazil	218	0.764	0.696	0.068
21	Czech Republic	63	0.706	0.645	0.061
22	Turkey	88	0.575	0.527	0.048
23	Indonesia	59	0.324	0.315	0.009
24	Russia	433	0.285	0.268	0.017

Note: The number of journals in the above table is the accumulation of journals of different disciplines, and the WJCI value of interdisciplinary journals takes the maximum value.

4 Release and access

The project team completed the “World Journal Clout Index Report (2021 STM)” by thorough evaluation of world STM journals, which is based on source journal selection, comprehensive evaluation index system, journal discipline classification, and the research results of World Citation Database. The research results were released at the "2021 Forum on the Future of Chinese Academic Journals" on December 6, 2021.

The research description of this report and the final WJCI Journal Directory are now available for free access at http://wjci.cnki.net.

5 Summary of project

(1) Optimized statistical source journals

The WJCI report (2021 STM) adds a number of outstanding sci-tech journals worldwide based on the scope of the statistical source journals in 2020. And based on big data, the project team refers to the excellent selected journals of other evaluation institutions at home and abroad, deals with countries/regions with special circumstances separately and further optimizes the structure of statistical source journals, which is conducive to objectively presenting the real scenario of global scientific and technological innovation. Through quantitative screening and qualitative evaluation, the scope of statistical sources has been dynamically adjusted to ensure that the selected journals are high-level sci-tech academic journals being published in various countries/regions around the world.

(2) Improved classification system

In order to reflect the journal's publication performance in interdisciplinary and emerging disciplines, the system has been optimized based on the 279 disciplines in the WJCI-2020 edition, finally adding 12 new disciplines and obtaining a total of 291 disciplines. It well

reflects the role and contribution of journals to the development of disciplines and refines the impact evaluation of sub-disciplines.

(3) Improved evaluation model

In terms of evaluation indexes, the WJCI fully considers the “academic impact” by integrating TC and IF. Besides, the JMI and other alternative indexes are introduced as supplementary quantitative indexes. This avoids the limitation of journal evaluation based on single index such as IF. WJCI-2021 takes into account the different characteristics of WAJCI and WI in different disciplines and sets different weights for different disciplines after expert questionnaire surveys.

(4) Promoted result of project

The project team pays attention to the publicity and promotion results domestically and internationally, and the main promotion form is mail. The main targets in China are the editorial departments of the selected periodicals, and in international are major publishers and the editorial departments of the selected periodicals. In the process of promotion, the project results have been recognized by domestic and foreign journals.

(5) Benefit to the quality enhancement of academic evaluation

The high-quality development of sci-tech journals is inseparable from scientific and reasonable evaluation. Only scientific and reasonable evaluation can help academic journals formulate scientific and reasonable strategic positioning, journal planning, brand building and market development strategies. The WJCI comprehensive evaluation method based on literature big data and web big data is a reliable and objective evaluation method of journal influence, which provides a scientific basis for evidence-based decision-making for academic evaluation.