



Effective use of journal citation data: Journal Citation Reports®

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Agenda

- Web of Science® - overview
 - Journal Selection Process
- Impact Factor
 - Data source
 - Calculation
 - Objectives
- Journal citation data - examples
 - Characteristics of citation data
 - Journal citation data – other than Impact Factor
 - 2 step maps
- Some cautions about using citation data for research evaluation

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50 years ago...



Garfield, E.


"Citation indexes for science: A new dimension in documentation through association of ideas." *Science*, 122 (3159), p.108-111, July 1955.

Science, Vol:122, No:3159, p.108-111, July 15, 1955

Citation Indexes for Science:

A New Dimension in Documentation through Association

Eugene Garfield, Ph.D.

"The uncritical citation of disputed data by a writer, whether it be deliberate or not, is a serious matter. Of course, knowingly propagandizing unsubstantiated claims is particularly abhorrent, but just as many naive students may be swayed by unfounded assertions presented by a writer who is unaware of the criticisms. Buried in scholarly journals, critical notes are increasingly likely to be overlooked with the passage of time, while the studies to which they pertain, having been reported more widely, are apt to be rediscovered." 

Cited References

association of ideas of its author

Citation Indexes

new approach to subject control of the literature of science

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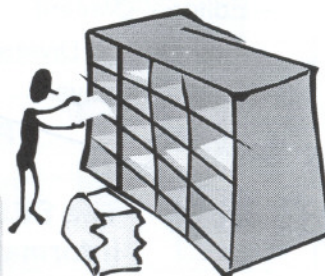
Limitation of human-indexing and classification scheme

- "A thorough scientist cannot be satisfied merely with searching the literature through indexes and bibliographies if he is going to establish the history of an idea... because it is impossible for any one person (the indexer) to anticipate all the thought processes of a user. Conventional subject indexes are thereby limited in their attempt to provide an ideal key to the literature. The same may be said of classification schemes."



Human-indexing
cannot anticipate all
possible keywords

Classification scheme
may lack the specificity or
multiplicity in the subject



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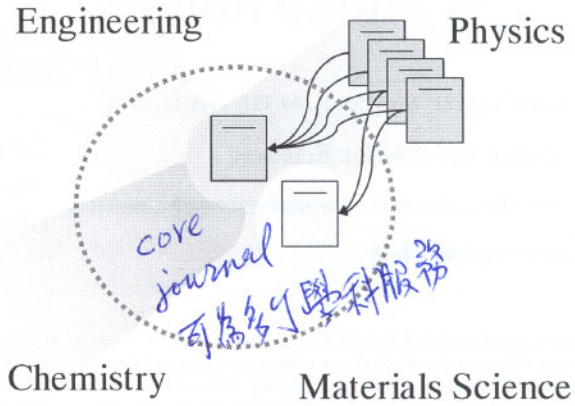
* citation index 可突破以上两个限制

How many journals to be covered?

- "Lack of complete coverage is not necessarily an argument against a citation index. It is in fact an argument in its favor."

Garfield's Law of Concentration

- There exists a large overlap between disciplines;
- a journal only tangentially related to a particular discipline often comprises the core of another discipline.



Web of Science®

- Covers more than 8,800 high quality journals
 - Science Citation Index Expanded (6,000 journals)
 - Social Sciences Citation Index (1,700 journals)
 - Arts & Humanity Citation Indexes (1,100 journals)
 - Covers 1900- by Century of Science file
- Consistent, rigorous selection process
 - Basic Journal Publishing Standards
 - Editorial Content
 - International Diversity
 - Citation Analysis

SCI → 3800 journals (受限於紙本與 CD ROM 的儲存空間)

→ web platform

10% ~ 20% 的接受率

98% → all English publications

Source Journal 的選擇標準

三本 sample issues 定期固定 為選擇標準

The SELECTIVITY enables effective information retrieval from the CORE of scientific literature

② evaluation process
editorial board
peer review
format & references

③ 決定期刊的種類，與其他學科之間的關係

Web of Science® record example

Web of Science®

WELCOME HELP GENERAL SEARCH CITED REF SEARCH SIMILAR SEARCH

Full Record

Record 1 of 90 (Set #6) SUMMARY

Title: Convenient synthesis of the main tridehydroper...
Author(s): Kayano T, Yoshizuka Y, Shin CG
Source: CHEMISTRY LETTERS 33 (1): 72-73 JAN 5 2004
Document Type: Article
Language: English

Times Cited: 4

References 1 -- 14

	Cited Author	Cited Work	Year	Volume	Page	Article ID	View Record
<input checked="" type="checkbox"/>	ABE H	TETRAHEDRON LETT	1988	29	1401		View record
<input checked="" type="checkbox"/>	APITZ G	TETRAHEDRON	1993	49	8223		View record
				45	1222		View record
				58	4452		View record
				33	7835		View record
<input checked="" type="checkbox"/>	DEBONO M	J ORG CHEM	1992	45	1809		View record
<input checked="" type="checkbox"/>	EGAWA Y	J ANTIBIOT	1969	22	12		View record
<input checked="" type="checkbox"/>	LIESCH JM	J AM CHEM SOC	1977	99	1645		View record
<input checked="" type="checkbox"/>	MASSAD SK	J ORG CHEM	1983	48	5180		View record
<input checked="" type="checkbox"/>	SAITO H	CHEM LETT 1105	2002		1098		View record
<input checked="" type="checkbox"/>	SHIN C	B CHEM SOC JPN	1982	55	2147		View record
<input checked="" type="checkbox"/>	SHIN CG	B CHEM SOC JPN	2002	75	1583		View record
<input checked="" type="checkbox"/>	UMEMURA K	CHEM LETT	1997		1203		View record
<input checked="" type="checkbox"/>	WIPF P	J ORG CHEM	1993	58	3604		View record

Go to Page: 1 of 90 [1] [2]

1. Jin Z
 Muscarine, imidazole, oxazole and thiazole alkaloids
 NATURAL PRODUCT REPORTS 22 (2): 196-229 2005
 Times Cited: 0

2. Bagley MC, Chrapaneri K, Dale JW, et al.
 One-pot multistep Bohlmann-Pfaltz heteroannulation reactions: Synthesis of dimethyl sulfonylacetate
 JOURNAL OF ORGANIC CHEMISTRY 70 (4): 1389-1399 FEB 18 2005
 Times Cited: 0
[LINKS](#) [VIEW FULL TEXT](#)

3. Bagley MC, Dale JW, Merritt EA, et al.
 Thiopeptide antibiotics
 CHEMICAL REVIEWS 105 (2): 685-714 FEB 2005

Abstract: A convenient synthesis of the main tridehydroper antibiotic, sulfomycin I, was first achieved.

KeyWords Plus: BERNINAMYCIN-A; OKAZOLES; SERIES; A

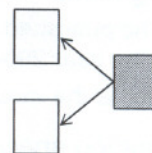
Addresses: Shin CG (reprint author), Kanagawa Univ, Kanagawa Univ, Fac Engrn, Organ Chem Lab, Kanagawa

Publisher: CHEMICAL SOC JAPAN, 1-5 KANDA-SURUGADAI

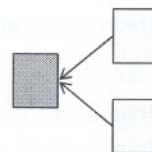
Subject Category: CHEMISTRY, MULTIDISCIPLINARY

By using Citation Indexes:

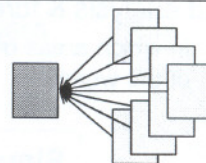
Trace citations back to the past to find relevant literature.



Trace citations forward to find how an article was used by others.



Observe concentration of citations to know which article had an impact on later research.



Web of Science® : STANDARD for bibliometrics

- “Multidisciplinary” coverage
 - enable to analyze the whole context of scientific research
- “Multiyear” coverage
 - enable to analyze the history and development of sciences
- ✦ “Cover to Cover” policy
 - enable to follow the flow of a topic regardless of communication type
- ✦ “ALL Authors, ALL Addresses”
 - enable to analyze by author name, by institution
- ✦ “ALL Cited References”
 - enable to perform analyses on literature that is not indexed

Web of Science®

WELCOME HELP GENERAL SEARCH CITED REF SEARCH STRUCTURE SEARCH SEARCH HISTORY ADVANCE SEARCH

Full Record

Record 1 of 1

Title: A gene map of the human genome

Author(s): Schuler GD, Boguski MS, Stewart EA, Stein LD, Gyapay G, Rice K, White RE, Birren BB, Butler A, Castle AB, Chiannikulchai N, Chu A, Clee C, Cowles S, Day PJR, Diblin Fan JB, Fang N, Fizames C, Garrett C, Green L, Hadley D, Harris M, Harrison P, Brady S, H MacGilvery A, Mader C, Maratukulam A, Matise TC, McKusick KB, Morissette J, Mungall A, Piercy M, Qin F, Quackenbush J, Ranby S, Reif T, Rozen S, Sanders C, She X, Silva J, Sld VagaCzamy N, Vollrath D, Voyticky S, Wilmer T, Wu X, Adams MD, Auffray C, Walter NAP, Hudson JR, Ide SE, Iorio KR, Lee WY, Seki N, Nagase T, Ishikawa K, Nomura N, Phillips C, Swanson K, Torres R, Venter JC, Sikela JM, Beckmann JS, Weissenbach J, Myers RM, Cox TJ

Source: SCIENCE 274 (5287): 540-546 OCT 25 1996

Document Type: Article

Language: English

Cited References: 55 Times Cited: 720 FIND RELATED RECORDS

Abstract: The human genome is thought to harbor 50,000 to 100,000 genes, of which expressed sequence tags. An international consortium was organized to develop and map two radiation hybrid panels and a yeast artificial chromosome library. More than 16,000 R map that contains about 1000 polymorphic genetic markers. The gene map unifies the es protein sequence databases in a fashion that should speed the discovery of genes under available through a site on the World Wide Web at <http://www.ncbi.nlm.nih.gov/SCIENCE>

KeyWords Plus: FAMILIAL ALZHEIMER-DISEASE; RET PROTOONCOGENE; COLON-CANCER CLONING; LINKAGE; BINDING

Addresses: Schuler GD (reprint author), NATL LIB MED, NATL CTR BIOTECHNOL INFORM GENOME, DEPT GENET, STANFORD, CA 94305 USA
 000 FRANCE
 D 15A ENGLAND
 IRMAN GENET, NUFFIELD DEPT CLIN MED, OXFOR
 EW YORK, NY 10021 USA
 H22 CANADA
 USA
 REAN BIOINFORMAT INST, CAMBRIDGE, CB10 15
 ANCE
 UNIV COLORADO, HLTH SCI CTR, DEPT PHARMACOL, DENVER, CO 80262 USA

The CONSISTENCY enables large-scale counting and reliable analyses

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What do you do in bibliometrics? - Examples

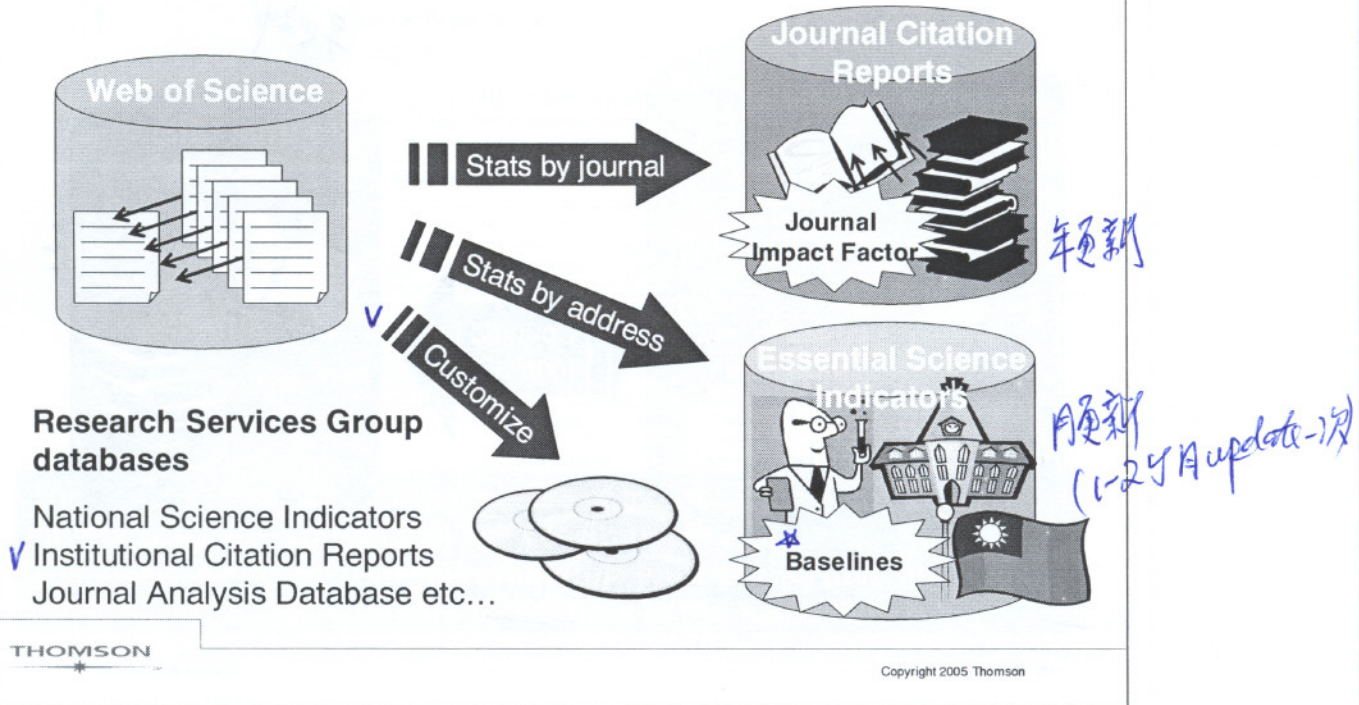
- Counting numbers (papers, citations)
 - Who published the most number of research papers in the field of photocatalysis in the year 2004?
 - Who is the most cited author in neutrino research in the last 5 years?
- Collaboration analysis (by country, author, institution)
 - With which countries does Taiwan most collaborate in semiconductor research?
 - Which corporations work with universities in Taiwan in fuel cell technology?
- Journal analysis
 - Which journal is most utilized in the field of neuropathology?
 - Which journal is most appropriate to submit my new article on diabetes research?
- Trend analysis & forecasting
 - In which areas of scientific research is Taiwan gaining more attention from the rest of the world?

Simply put, bibliometrics is counting numbers!

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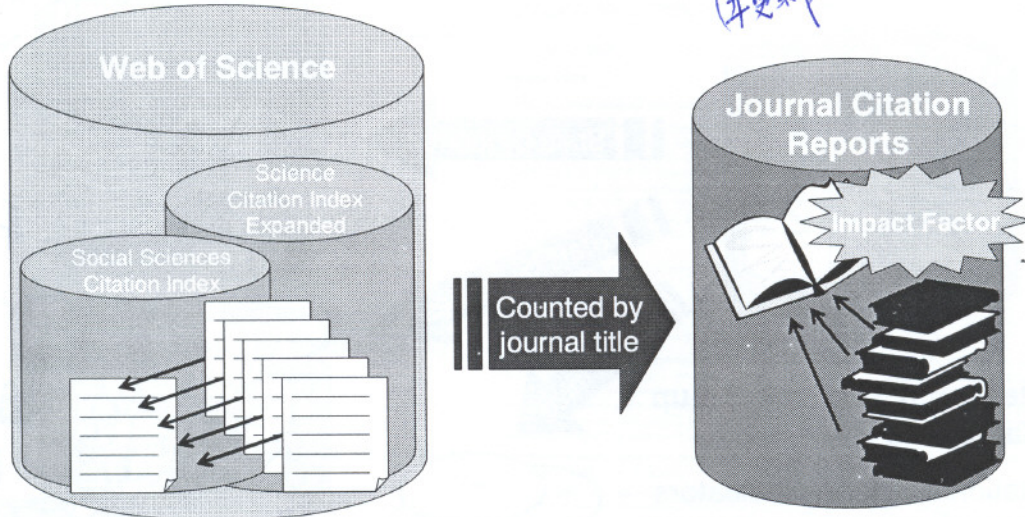
Web of Science® and its offspring



Impact Factor

- Average citation count in a particular year
- Assigned at "journal level"
- Assigned to journals indexed in Citation Indexes
 - SCIE (Science Citation Index Expanded)
 - SSCI (Social Sciences Citation Index)
- Included in Journal Citation Reports® database
- ✓ • Updated annually
- ✓ • Helpful when evaluating a journal's relative importance *(分科排名的重要性)*
- Not intended to evaluate individual papers/researchers

Citation Indexes – source data of JCR



Article-level vs. Journal-level data

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Web of Science®の論文データ

Web of Science®

WELCOME HELP GENERAL SEARCH CITED REF SEARCH STRUCTURE SEARCH SEARCH HISTORY ADVANCED SEARCH

Full Record

Record 1 of 1,818 (Set #9) SUMMARY

Title: Activating mutations in the epidermal growth factor receptor underlying responsiveness of non-small-cell lung cancer to gefitinib

Author(s): Lynch TJ, Bell DW, Sordella P, Gurubhagavatale S, Ojimoto T, Brannigan BW, Harris PL, Hasariat SM, Supko JG, Haluska FG, Louis DN, Christiani DC, Settleman J, Haber DA

Source: NEW ENGLAND JOURNAL OF MEDICINE 350 (21): 2129-2139 MAY 20 2004

Document Type: Article

Language: English

Cited References: 29 **Times Cited:** 350

Abstract: BACKGROUND: Most patients with non-small-cell lung cancer have no response to the tyrosine kinase inhibitor gefitinib, which targets the epidermal growth factor receptor (EGFR). However, about 10% of patients have a

Additional Links: VIEW FULL TEXT LINKS Holdings 60 View record in BIOSIS Previews Current Contents Connect ScienceDirect Journal Citation Reports

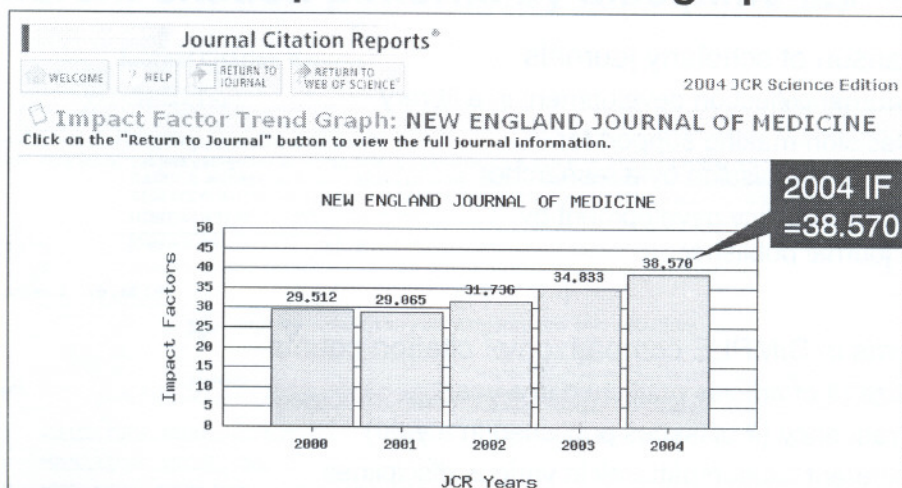
Records are counted at journal-level, then included in Journal Citation Reports®

Cited References: Items cited by this article (29 items)

Times Cited: How many articles are citing this article (350 articles)

Look up journal info in JCR

WoS to JCR: Impact Factor trend graph



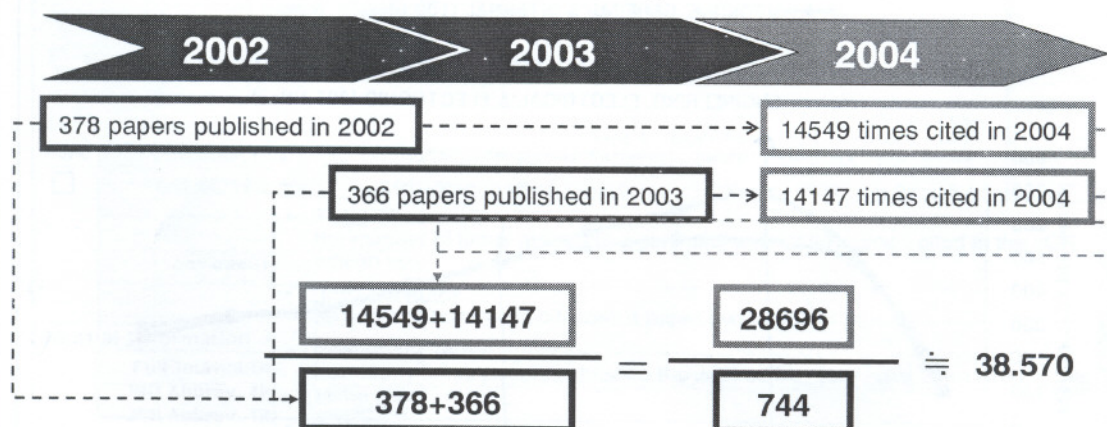
The journal impact factor is a measure of the **frequency** with which the "average article" in a journal has been cited in a particular year. The impact factor will help you **evaluate a journal's relative importance**, especially when you **compare it to others in the same field**.

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Calculation of Journal Impact Factor

Example: 2004 Impact Factor for *New England Journal of Medicine*



Ⓠ Impact Factors only take the recent 3 years into consideration. What about the fields with a longer citation span?

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Journal Citation Reports 2004 Science Edition

當 e-Journal 盛行
對期刊館藏選擇與採訪時會有變化。

Why Impact Factor?

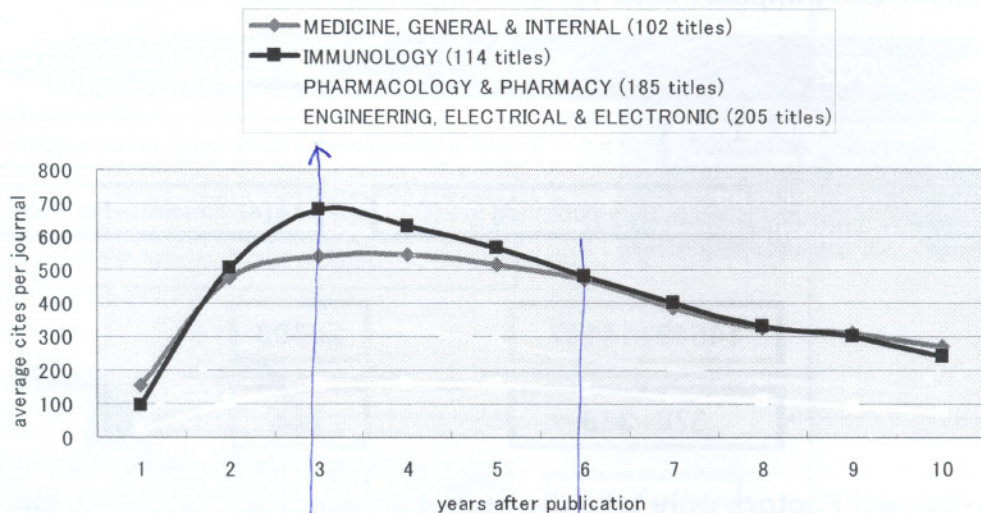
- Comparison of scholarly journals
 - ☆ - Journal collection development in a library
 - Decision-making support for article submission by a researcher
 - Editorial policy development by a journal publisher

- Problems in SIMPLE comparison of citation counts
 - Size (# of articles published in a year)
 - Frequency (# of issues published in a year)
 - ☆ - Different citation patterns in various disciplines



**Impact Factor:
AVERAGE
citation count**

Different citation patterns by discipline (1)



data source: Journal Citation Reports 2003, Science Edition

peak of
citation
出版後第3年 (以計算方式的依據)

Different citation patterns by discipline (2)

Journal Citation Reports®

WELCOME ? HELP RETURN TO WEB OF SCIENCE®

2004 JCR Science Edition

Subject Category Summary List

[Journal Title Changes](#)

Category data from: **subject categories** AGRICULTURAL ECONOMICS & POLICY; AGRICULTURAL ENGINEERING; AGRICULTURE, DAIRY & ANIMAL SCIENCE; AGRICULTURE, MULTIDISCIPLINARY; AGRICULTURE, SOIL SCIENCE; BIOLOGY; BIOTECHNOLOGY & APPLIED MICROBIOLOGY; CELL BIOLOGY; DEVELOPMENTAL BIOLOGY; HORTICULTURE [VIEW JOURNAL SUMMARY LIST](#)

Sorted by:

Category Title SORT AGAIN

Categories 1 - 10 (of 10)

[1]

Page 1 of 1

★ Ranking is based on your category and sort selections.

Rank	Category <i>(linked to category information)</i>	Total Cites	Median Impact Factor	Aggregate Impact Factor	Aggregate Immediacy Index	Aggregate Cited Half-Life	# Journals	Articles
1	AGRICULTURAL ECONOMICS & POLICY	3866	0.484	0.513	0.137	8.00	8	263
2	AGRICULTURAL ENGINEERING	11706	0.733	0.888	0.119	7.80	9	1017
3	AGRICULTURE, DAIRY & ANIMAL SCIENCE	72642	0.676	0.972	0.188	8.70	41	4170
4	AGRICULTURE, MULTIDISCIPLINARY	52735	0.438	1.320	0.190	7.40	29	2813
5	AGRICULTURE, SOIL SCIENCE	64420	0.960	1.078	0.141	9.50	27	2593
6	BIOLOGY	164037	1.105	2.254	0.607	7.60	64	5577
7	BIOTECHNOLOGY & APPLIED MICROBIOLOGY	331869	1.376	2.558	0.420	5.40	133	14944
8	CELL BIOLOGY	1008056	2.545	5.728	1.056	5.60	155	19007
9	DEVELOPMENTAL BIOLOGY	182352	2.181	4.766	0.991	5.70	33	3640
10	HORTICULTURE	39965	0.564	1.143	0.148	7.90	22	2190

T

Journal data in JCR

Journal Citation Reports®

WELCOME ? HELP RETURN TO LIST PREVIOUS JOURNAL NEXT JOURNAL RETURN TO WEB OF SCIENCE®

2004 JCR Science Edition

Journal: NATURE BIOTECHNOLOGY

[Return to Web of Science](#)

Mark	Journal Title	ISSN	Total Cites	Impact Factor	Immediacy Index	Articles	Cited Half-life	Citing Half-life
<input type="checkbox"/>	NAT BIOTECHNOL	1087-0156	18169	22.355	4.942	138	4.0	3.7

[CITED JOURNAL DATA](#)

Journal Information

Full Journal Title

ISO Abbrev. Title

JCR Abbrev. Title

ISSN

Issues/Year

Language

Journal Country/Territory

Publisher

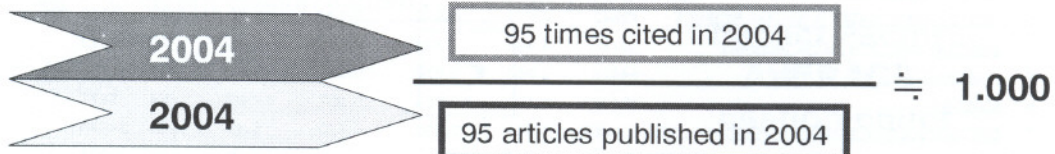
Publisher Address

Subject Categories

- **Total Cites**
the number of times articles in a particular journal have been cited in the JCR edition year
- **Impact Factor**
an average number of citations a paper over a 3 year period
- **Immediacy Index**
how many times papers published the JCR edition year have been cited in that same year
- **Articles**
the number of articles published in the JCR edition year for that journal
- **Cited Half-Life**
the number years until the journal accumulates 50% of Total Cites received in the JCR edition year; indicates how long the journal is being cited after publication
- **Citing Half-Life**
the number of years until the journal accumulates 50% of its cited items in the JCR edition year; indicates how far back the journal is citing older items

Immediacy Index

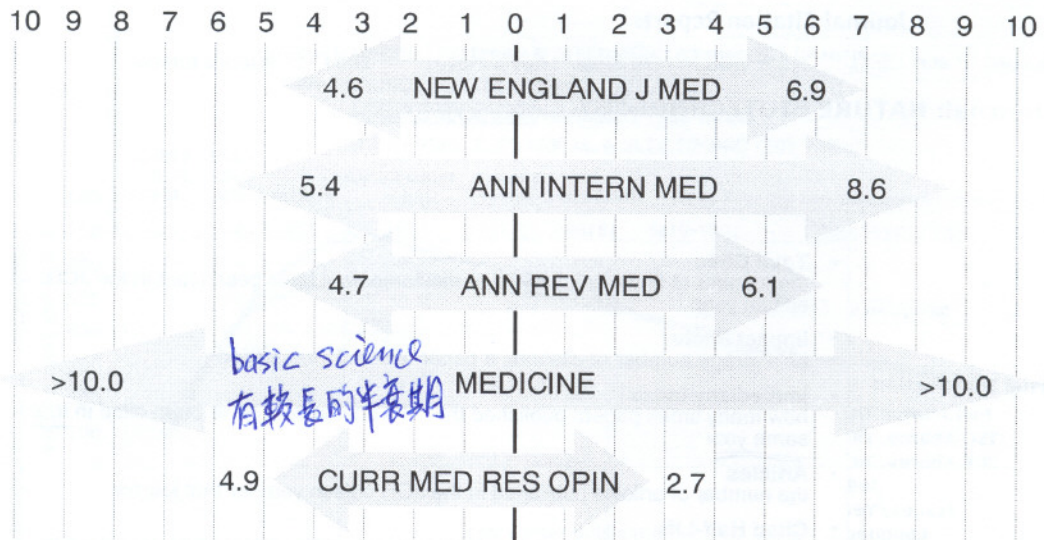
Mark	Rank	Abbreviated Journal Title <small>(linked to journal information)</small>	ISSN	Total Cites	Impact Factor	Immediacy Index	Articles	Cited Half-life
Γ	1	NAT BIOTECHNOL	1087-0156	18169	22.355	4.942	138	4.0
Γ	2	NAT REV DRUG DISCOV	1474-1776	3066	19.583	3.449	69	2.1
Γ	3	GENOME RES	1088-9051	13455	10.382	2.343	274	3.5
Γ	4	TRENDS BIOTECHNOL	0167-7799	4923	8.606	0.990	98	5.4
Γ	5	CURR OPIN BIOTECH	0958-1669	4643	8.080	0.919	86	4.2
Γ	6	PHARM&COGENETICS	0960-314X	4497	6.406	1.000	95	4.7
Γ	7	BIOINFORMATICS	1367-4803	11390	5.742	0.715	564	3.4
Γ	8	STEM CELLS	1066-5099	2384	5.500	0.759	112	3.8
Γ	9	ANTISENSE NUCLEIC A	1087-2906	1194	5.473		0	5.5
Γ	10	BMC BIOINFORMATICS	1471-2105	728	5.423	0.477	199	1.9



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Citing & Cited Half-Life



Citing Half-Life: how far back the journal is citing older items

Cited Half-Life: how long the journal is being cited after publication

Copyright 2005 Thomson

Handwritten note: indicate the nature of the journal (沒有一定的好壞)

Cited Journal Listing

Journal Citation Reports®

WELCOME HELP MARKED LIST RETURN TO JOURNAL RETURN TO WEB OF SCIENCE

2004 JCR Science Edition

Cited Journal: NEW ENGLAND JOURNAL OF MEDICINE

Number of times articles published in 2004 (in journals below) cited articles published in NEW ENGL J MED (in years below). (How to read this table)

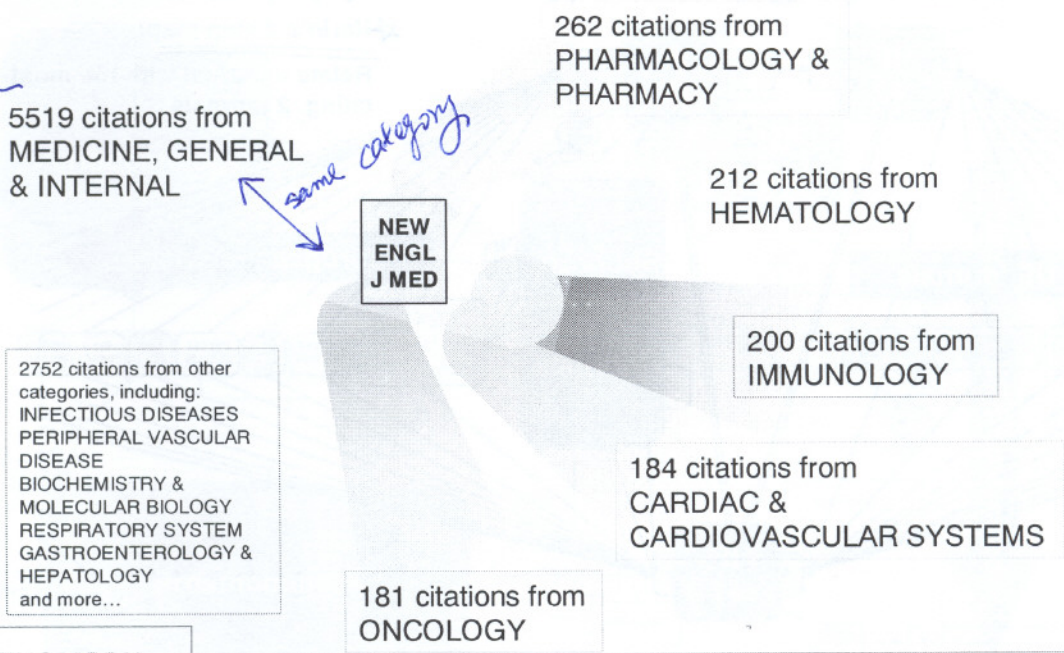
Journals 1 - 20 (of 2965) Page 1 of 149

Impact	Citing Journal	All Yrs	Cited Year											Rest
			2004	2003	2002	2001	2000	1999	1998	1997	1996	1995		
	All Journals	159498	3311	14147	14549	14525	12105	11761	10279	8346	7989	7646	54840	
38.570	NEW ENGL J MED	2202	544	334	208	174	134	116	92	94	76	61	369	
12.563	CIRCULATION	2083	59	222	272	236	226	164	113	123	101	77	490	
9.133	J AM COLL CARDIOL	1429	47	122	169	170	123	104	88	77	77	44	408	
3.118	CHEST	1160	6	78	90	116	106	70	65	89	69	57	414	
24.831	JAMA-J AM MED ASSOC	1024	63	146									47	
9.782	BLOOD	1014	17	125									1	
3.140	AM J CARDIOL	874	13	70									7	
21.713	LANCET	850	35	113									6	
5.778	J CLIN ENDOCR METAB	844	13	101									6	
9.835	J CLIN ONCOL	831	19	76									50	
3.681	AM HEART J	813	9	40	62	89	63	68	68	50	71	45	248	
4.182	CPT CARE MED	777	14	62	83	172	88	59	44	33	32	26	164	
4.179	AM J MED	734	11	56	86	64	70	67	57	31	57	37	198	
7.508	ARCH INTERN MED	717	2	39	66	89	50	71	51	36	46	43	224	
5.594	CLIN INFECT DIS	696	9	94	90	54	52	63	62	38	19	24	191	
5.623	CLIN CANCER RES	680	20	86	95	106	56	28	32	16	39	30	172	

(25130/10)
self citation
20% 13
E学

Which journals are citing NEW ENGL J MED? When they are citing it?

New England Journal of Medicine



subject discipline

same category

Garfield's Law of concentration

Citing Journal Listing

Journal Citation Reports®

WELCOME HELP MARKED LIST RETURN TO JOURNAL RETURN TO WEB OF SCIENCE®

2004 JCR Science Edition

Citing Journal: **NEW ENGLAND JOURNAL OF MEDICINE**
 Number of times articles published in journals below (in years below) where cited in NEW ENGL J MED in 2004. (How to read this table)

Journals 1 - 20 (of 1187) [1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10] Page 1 of 60

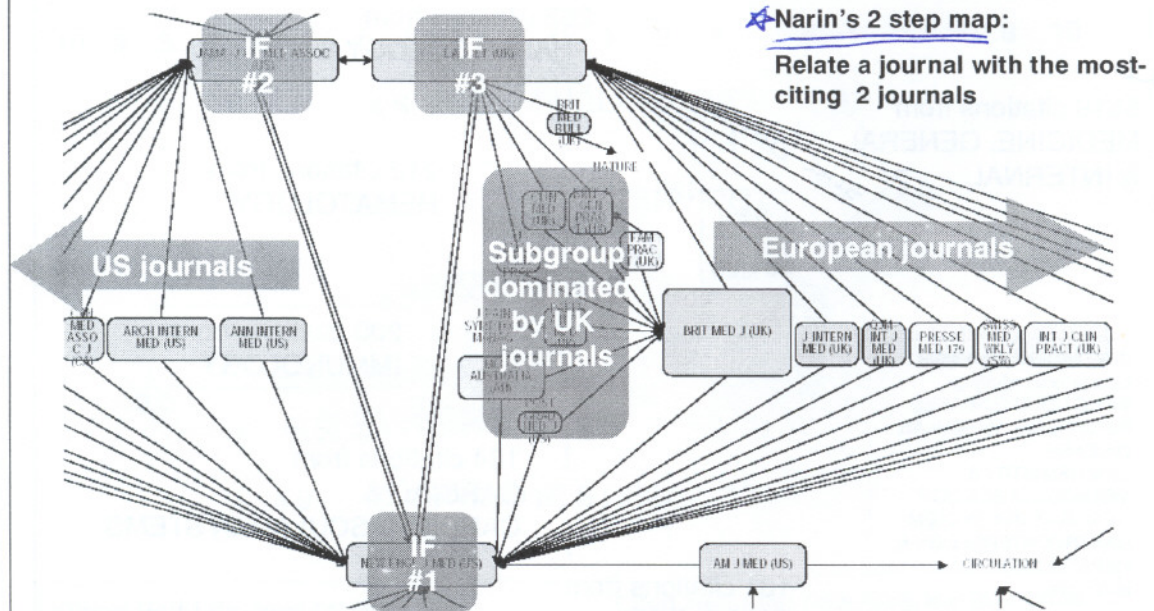
Impact	Cited Journal	All Yrs	Cited Year										
			2004	2003	2002	2001	2000	1999	1998	1997	1996	1995	Rest
	All Journals	20184	1496	2921	2637	2004	1625	1281	1132	999	781	659	4649
38.570	NEW ENGL J MED	2202	544	334	208	174	134	116	92	94	76	61	369
	ALL OTHERS (1996)	1996	170	346	230	169	145	99	79	76	62	60	560
24.831	JAMA-J AM MED ASSOC	636	27	116	98	52	58	30	38	21	20	22	154
21.713	LANCET	633	39	81	77	56	61	55	58	29	18	12	147
12.563	CIRCULATION	441	30	69	65	54	31	33	32	22	18	9	78
9.835	J CLIN ONCOL	376	33										
9.782	BLOOD	362	9										
13.114	ANN INTERN MED	293	8										
10.452	P NATL ACAD SCI USA	248	11										
31.853	SCIENCE	229	13										
5.778	J CLIN ENDOCR METAB	216	12	35	45	24	16	17	10	11	9	2	35
32.182	NATURE	200	15	28	23	18	17	11	7	14	8	5	54
9.133	J AM COLL CARDIOL	195	11	37	31	26	13	12	12	13	10	4	26
8.123	AM J RESP CRIT CARE	179	5	13	22	25	23	22	15	14	12	16	12
7.038	BRIT MED J	166	6	28	19	5	19	12	18	8	5	6	40
14.204	J CLIN INVEST	158	7	24	11	9	5	9	13	15	19	10	36

Which journals is NEW ENGL J MED citing?
 When is it citing them?

Journal map (1) Medicine, General & Internal

Narin's 2 step map:

Relate a journal with the most-citing 2 journals





2 step map tells us...

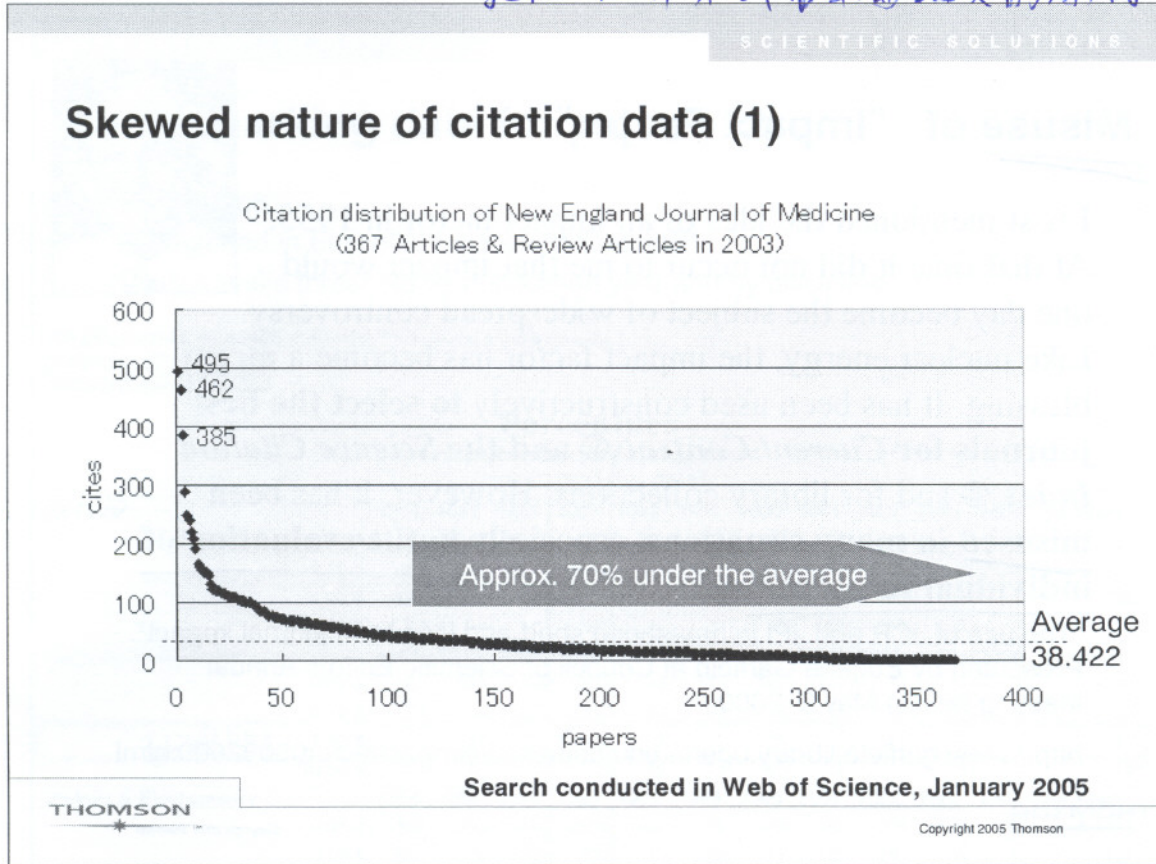
- High impact factor journals will NOT ALWAYS appear in the center of the map.
- The concentration of citations, NOT how many, thereby core journals are identified
- Relationship between fields
- Specialized journals that form a cluster
- Geological/regional group of journals
- A journal's ROLE in that field

What you can tell in Journal Citation Reports®

- Which journals publish most number of articles?
- Which journals are most cited in particular disciplines?
- Which journals have "high impact" in particular disciplines?
- Which journals publish "hot" topics? (II)
- Journal's self-citations
- Review article rates (12/1)
- Cited-citing relationships of journals

× JCR is not for evaluating individuals/papers

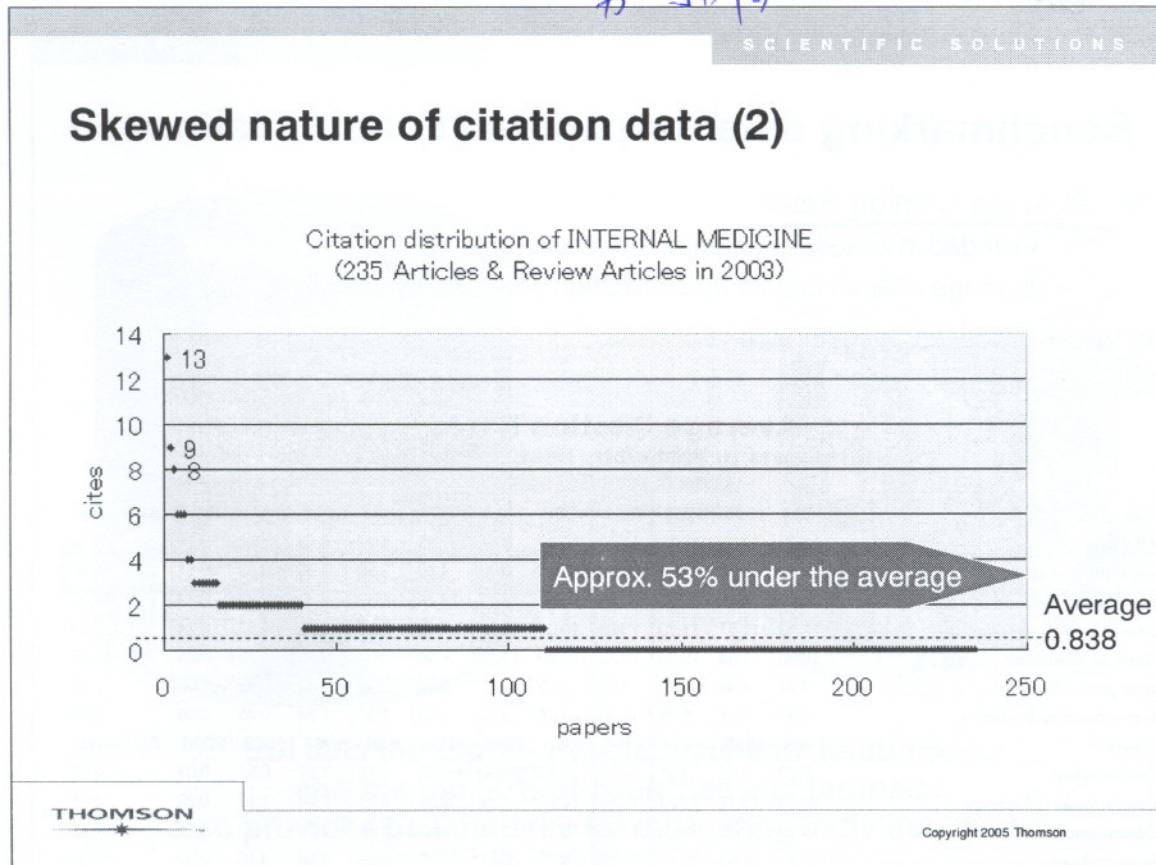
ICR 不應用來評估單篇論文的原因



(後) 高估 70% 的 articles, 低 (前) 估 30% 的 articles

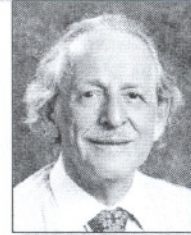
↓
以文章被引用次數來看, 比較公允

另一例子



後 53% 高估, 前 47% 高估

Misuse of "Impact Factor"



I first mentioned the idea of an impact factor in 1955. At that time it did not occur to me that impact would one day become the subject of widespread controversy. Like nuclear energy, the impact factor has become a mixed blessing. It has been used constructively **to select the best journals for *Current Contents*[®] and the *Science Citation Index*[®]** and for library collections. However, it has been **misused in many situations, especially in the evaluation of individual researchers.**

"The use of JCR and JPI in measuring short and long term journal impact". Presented by Eugene Garfield at Council of Scientific Editors Annual Meeting held in May 9, 2000.

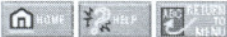
<http://www.garfield.library.upenn.edu/papers/cseimpactfactor05092000.html>

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Benchmarking data for papers (1)

- Average Citation Rates
 - Included in Essential Science IndicatorsSM
 - Average citation counts by publication year and by discipline

ISI ESSENTIAL SCIENCE IndicatorsSM Powered by ISI Web of KnowledgeSM

Average Citation Rates
for papers published by field, 1994 - 2004
(How to read this data)

Fields	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	All Years
All Fields	15.32	14.38	13.10	12.25	10.90	9.60	7.95	5.97	3.83	1.61	0.24	8.46
Agricultural Sciences	7.87	7.53	7.22	6.55	6.10	5.41	4.60	3.28	1.96	0.83	0.11	4.56
Biology & Biochemistry	26.87	24.41	22.25	21.51	18.66	16.27	13.78	10.30	6.56	2.83	0.39	14.97
Chemistry	13.49	12.51	11.70	10.86	10.04	8.78	7.45	5.50	3.81	1.63	0.24	7.64
Clinical Medicine	18.00	17.54	15.63	14.38	12.80	11.27	9.40	7.07	4.59	1.95	0.28	10.09
Computer Science	4.47	4.48	4.09	4.03	3.80	3.20	2.38	2.02	1.44	0.45	0.08	2.35
Economics & Business	8.95	8.11	6.49	5.99	4.96	3.96	3.05	2.07	1.28	0.45	0.09	3.99
Fields	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	All Years
Engineering	5.30	4.93	4.61	4.52	3.87	3.40	2.83	2.18	1.29	0.52	0.08	2.97
Environment/Ecology	14.33	13.11	12.23	10.94	10.20	8.46	7.07	4.82	2.94	1.12	0.20	7.29
Geosciences	14.78	13.69	12.59	11.43	10.33	8.39	6.61	4.89	2.75	1.23	0.22	7.45
Immunology	33.62	31.65	28.71	25.85	24.25	20.61	17.76	13.58	8.58	4.10	0.52	19.06

平均被引用
次数
用来与自己的
paper
做比较

Benchmarking data for papers (2)

- Percentiles
 - Included in Essential Science IndicatorsSM
 - Percentile threshold by publication year and by discipline

ISI ESSENTIAL SCIENCE IndicatorsSM Powered by ISI Web of KnowledgeSM

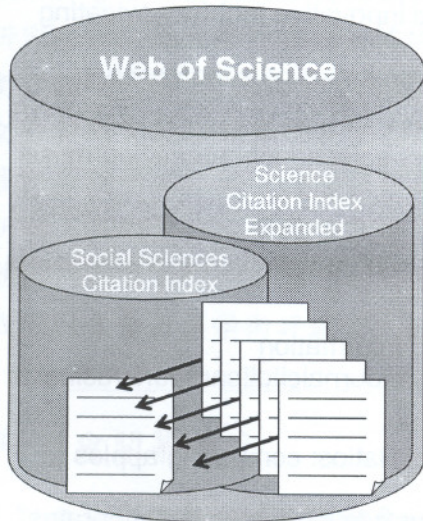


Percentiles for papers published by field, 1994 - 2004 (How to read this data)

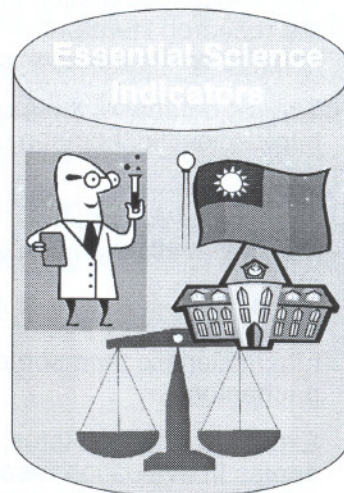
All Fields		1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	All Years
	0.01 %	1180	1219	1047	909	852	618	499	386	263	123	25	757
	0.10 %	451	423	378	338	302	252	201	150	97	48	10	277
	1.00 %	147	137	125	114	101	87	71	54	35	16	4	89
	10.00 %	37	34	31	29	26	23	19	15	10	5	1	21
Agricultural Sciences		1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	All Years
	0.01 %	281	594	288	223	274	171	161	127	79	47	6	210
	0.10 %	174	128	128	98	114	97	73	57	27	20	4	99
	1.00 %	62	57	51	48	47	42	35	24	14	8	2	41
	10.00 %	20	19	19	17	16	14	12	9	6	3	1	13
Biology & Biochemistry		1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	All Years
	0.01 %	1589	2053	1341	2224	1037	709	811	562	308	136	25	1151
	0.10 %	660	726	555	600	419	356	257	195	142	58	12	429

百份比(%)

Essential Science IndicatorsSM



Counted by
scientist, country,
institution, journal



ESI lists the top 1% of scientists and institutions,
and the top 50% of countries and journals;

THOMSON

also provides benchmarks for evaluating individual papers

Q: 台灣哪了
學校有
subscribe?

Q: 目前台灣各
大學申署
標準?

Summary

- Citation Indexes
 - Web of Science®
 - Journal selection process
- Impact Factor
 - Included in JCR
 - Average citation count in a particular year for a journal
 - Only account for recent years
 - Helpful in evaluating a journal's relative importance
 - Not intended to evaluate individual papers/researchers
- Characteristics of citation data
 - Different citation patterns by disciplines
 - Skewed distribution
- Benchmarks for research evaluation
 - Included in ESI
 - Average citation rates
 - Percentiles
 - ✓ – Match against with the actual citation counts
 - No simplistic ways for research evaluation by citation analysis
 - ✓ – Use citation data to **COMPLEMENT** peer review process



Essays available on Thomson Scientific website

- The concept of citation indexing: a unique and innovative tool for navigating the research literature
<http://scientific.thomson.com/knowtrend/essays/citationindexing/concept/>
- The ISI database: the journal selection process
<http://scientific.thomson.com/knowtrend/essays/selectionofmaterial/journalselection/>
- The Impact Factor: ISI
<http://scientific.thomson.com/knowtrend/essays/journalcitationreports/impactfactor/>
- Using the Impact Factor: Institute for Scientific Information
<http://scientific.thomson.com/knowtrend/essays/journalcitationreports/usingimpactfactor/>
- Expected Citation Rates, Half-Life, and Impact Ratios: comparing apples to apples in evaluation research
<http://scientific.thomson.com/knowtrend/essays/citationanalysis/citationrates/>