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Bibliometrics: From "Bean Counting" to Academic Accountability

Ruth A. Pagell

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Bibliometrics

Co@nCERT

全國學術電子資訊資源共享聯盟
Consortium on Core Electronic Resources in Taiwan

**From “Bean Counting” to Academic Accountability
Taiwan**

Ruth A Pagell

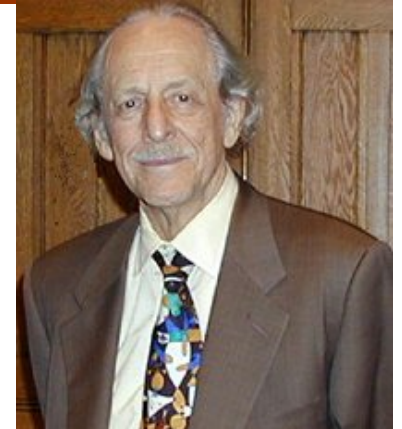
13 November 2008

Revised 24 November 2008 for Research Council

Applied Bibliometrics: Applications and Issues Outline

- History of bibliometrics
- **Publications and citations**
- **Providers of citations**
- Journal metrics
- **New measures**
- Applications
 - Ranking universities**
 - Ranking countries**
- **Other sources, other measures**
- Conclusion

<u>Early 19th Century</u>	<u>1926-46</u>	<u>1955</u>	<u>1961</u>
Origin in Law & Psychology	Early “laws” Lotka’s Law	Eugene Garfield (EG) is born	SSI
<u>1969</u>	<u>1978</u>	<u>1980s</u>	<u>1986</u>
Prichard coins term bibliometrics	<i>Scientometrics</i> launched	New technology (cite mapping)	EG wins 1 st DeSotta prize
<u>1993</u>	<u>Late 1990’s</u>	<u>2004</u>	<u>Present</u>
Intl Society for Scientometrics & Infometrics	ISI goes online directly	Scopus launched	Scientometrics used by governments and funding agencies; Google Scholar





In 1926, Alfred Lotka formulated his power law (known as Lotka's Law) describing the frequency of publication by authors in a given field. According to this bibliometric law of scientific productivity, **only a very small percentage (~6%) of authors in a field will produce more than 10 articles while the majority (perhaps 60%) will have but a single article published.**

(Lotka, 1926)

Pre-Digital Citation Indices

FREUD S

VOL PG YR

53 FREUD THERAPY TECHNI			
FINEMAN S MANAG LEARN	28	13	97
53 GENERAL INTRO PSYCHO			
WAITZKIN H SOCIAL SC M	45	811	97 R
WEINER S AM J PSYCHT	51	77	97
53 INTERPRETATION DREAM			
STOCKHOL.K DREAMING	7	29	97
53 INTERPRETATION DREAM	v4		
53 INTERPRETATION DREAM	v5		
EAGLE M BR J MED PS	70	217	97
53 NAISSANCE PSYCHANALY	p190		
DEURTUBE.L REV FR PSYC	60	1083	96
53 NEW INTRO LECT STAND	5 R 22		
MCHUGH K CULT STUD	11	17	97
53 PSYCHOANALYSIS OCCUL	p52		
BOYER LB PSYCHOAN Q	66	62	97
53 PLEASURE PRINCIPLE S	18	3	
53 PLEASURE PRINCIPLE S	18	24	
ALFORD CF THEOR SOC	26	719	97 B
53 STANDARD EDITION			
GINSBURG R WOMEN ST IN	20	631	97
GRUNBAUM A PHILOS SCI	63	622	96
HALMI N DREAMING	7	13	97
SUOMI SJ BR MED B	53	170	97
53 S FREUD COLLECTED PA	v1		
SNYDER CR PSYCHOL INQ	8	48	97
53 STANDARD EDITION	v3		
MCADAMS DP CONT PSYCHO	42	575	97 B
53 STANDARD EDITION	v4		
BUCCI W PSYCHOAN IN	17	151	97
DECHUMAC.CL ART PSYCH	23	423	96
KAHAN TL CONSCIOUS C	6	132	97
REIMER MS DEV REV	16	321	96 R
REYNES RL PSYCHOTHER	33	479	96
53 STANDARD EDITION	4		
KIRSCH I AM J CLIN H	39	271	97
LOMBARDI DN AM PSYCHOL	52	572	97 E
53 STANDARD EDITION	v5		
JACKSON I AUST J SOC	32	257	97
REIMER MS DEV REV	16	321	96 R
53 STANDARD EDITION	5	339	
GROTSTEIJS PSYCHOAN IN	17	204	97
KIRSCH I AM J CLIN H	39	271	97
53 STANDARD EDITION	v7		
MCADAMS DP CONT PSYCHO	42	575	97 B
WALKER SJ APPI PREV P	6	167	97

FREUD S

VOL PG YR

57 S FREUD STANDARD EDI	v14		
YNGVESSO.B LAW SOC REV	31	31	97
57 STANDARD EDITION	v14		
JOPLING DA PHILOS PSYC	9	525	96
ORBACH I BR J SOC P	35	459	96
SCHULZ R AGING MENT	1	269	97
57 STANDARD EDITION COM	14	15	
FLORIAN V DEATH STUD	21	1	97
57 STANDARD EDITION	14	73	
DELUCA RJ LEADERSH Q	8	49	97
GROTSTEIJS PSYCHOAN IN	17	204	97
HARTMAN DC PSYCHOTH PS	66	222	97
57 STANDARD EDITION COM	14	104	
MACRAE CN J PERS SOC	72	709	97
57 STANDARD EDITION COM	14	109	
NEWMAN LS J PERS SOC	72	980	97 R
57 STANDARD EDITION COM	14	141	
BOTTOMS BL J SOC CLIN	16	112	97
CRAMER P J PERSONAL	65	233	97

Freud S

Vol Pg YR

53 Interpretation Dream

Eagle M Br J Med PS 70 217 97

ORBACH I CL PSYCH-SC	4	208	97 R
PRIGERSO.HG AM J PSYCHI	154	1003	97
RAFMAN S INT J BEHAV	20	163	97
SMITH AM J CLIN PSYC	53	289	97
57 STANDARD EDITION COM	14	248	
DUBERSTE.PR CL PSYCH-SC	4	359	97 R
57 STANDARD EDITION COM	14	273	
STEWART C AM ETHNOL	24	877	97
STRAUCH G CURRIC INQ	27	233	97 B
57 S E	14	305	
GARNER J BR J MED PS	70	177	97
57 STANDARD EDITION	14	305	
FREEMAN M AGEING SOC	17	373	97

From Garfield's Vision to 21st century Capability

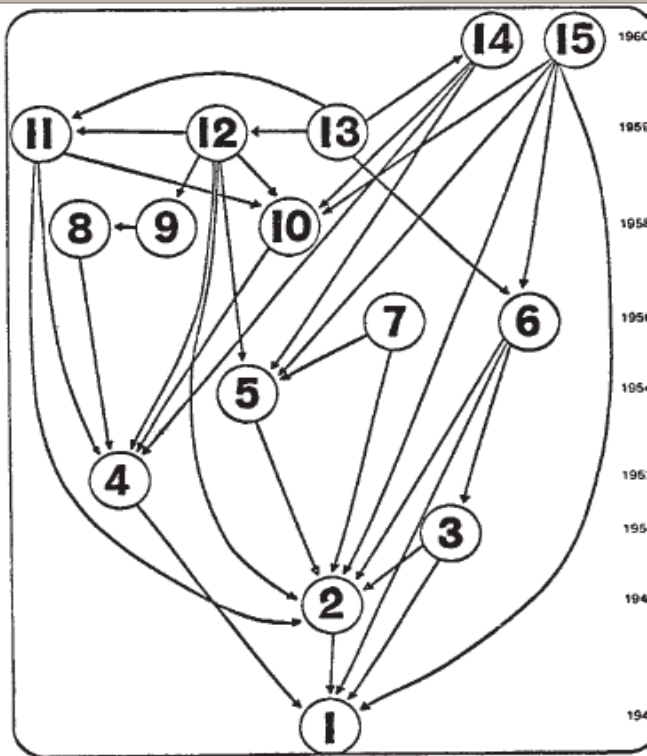


Fig. 1. Citation network of fifteen articles on nucleic acids.

Garfield (1970) *Nature*

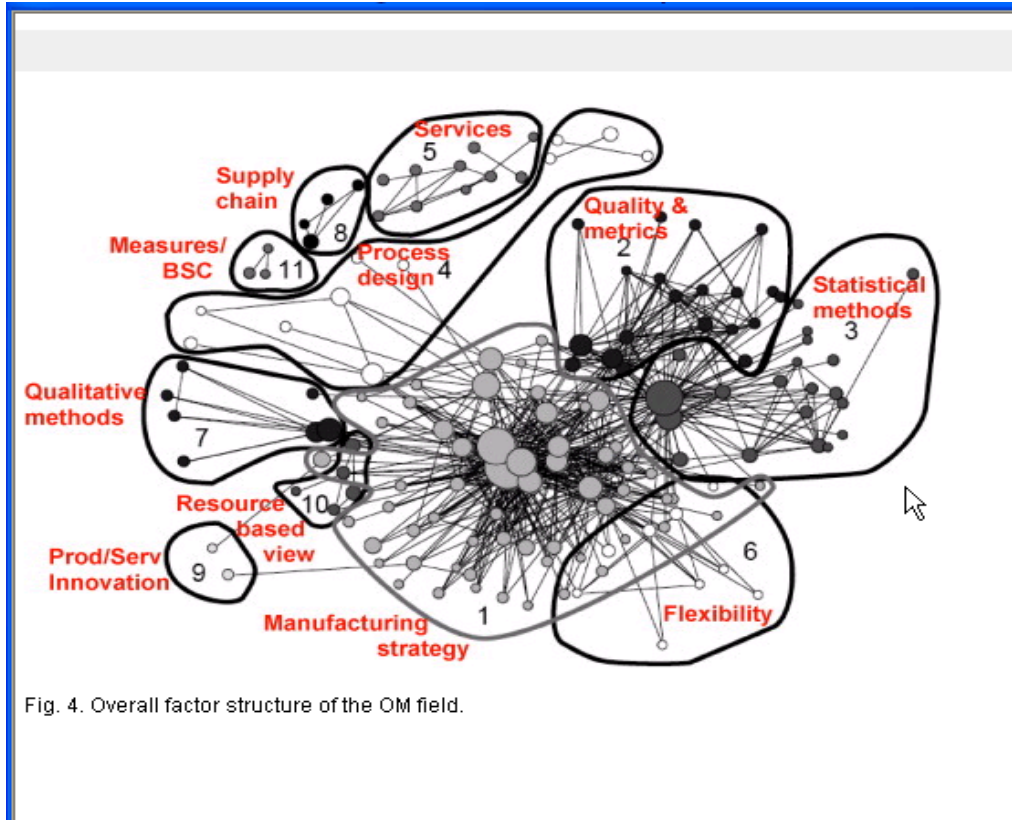
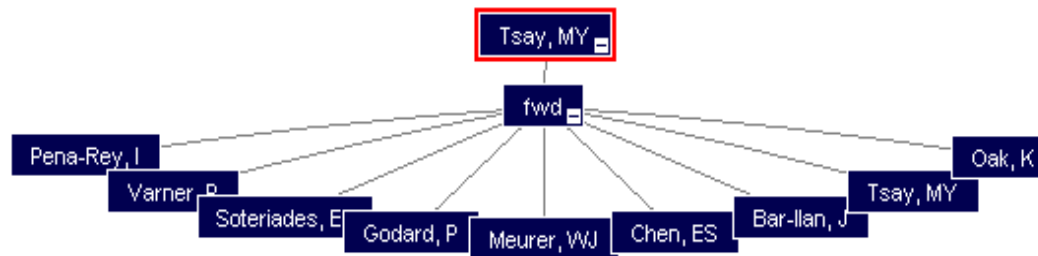


Fig. 4. Overall factor structure of the OM field.

Pilkington, A and Meredith, J (2008) *J of Op Mgmt* (in press)

Social Networking – ISI Mapping



Source: ISI Web of Knowledge™, www.thomsonscientific.com

Record details for the nodes are displayed below (double-click a node to show its details). Click a checkbox below to locate that node above.

Primary Author	Journal Name	Article title
Meurer, WJ	2007-ACADEMIC EMERGENCY MEDICINE	Qualitative data collection and analysis methods: The INSTINCT trial
Tsay, MY	2008-SCIENTOMETRICS	A bibliometric analysis of hydrogen energy literature, 1965-2005
Soteriades, ES	2006-BMC PUBLIC HEALTH	A bibliometric analysis in the fields of preventive medicine, occupational and environmental medicine, epidemiology, and public health
Varner, P	2006-OPTOMETRY AND VISION	Applying number-needed-to-treat (NNT) analysis to ophthalmic clinical trials

Displaying 1 - 10 of 10 Display Records per page

Bibliometric analysis of the literature of randomized controlled trials	
Number / Title	146857437 / Bibliometric analysis of the literature of randomized controlled trials
Journal Title	JOURNAL OF THE MEDICAL LIBRARY ASSOCIATION
Publication Year	2005
Author	Tsay, MY
Group Author	
Source	J MED LIBR ASSOC

WOS, 4 November, 2008

The Government
The Organization
The Faculty
The Librarian
The Researcher
The Providers

Higher Education Evaluation & Accreditation Council of
Taiwan (HEEACT)

UK Research Assessment Exercise (RAE) and Higher
Education Funding Council for England (HEFCE)

Australia Research Quality Framework (RQF)

New Zealand Performance-Based Research Fund (PBRF)

Striving for Excellence with
Fairness and Professionalism



- about Heeact ▶
- Program Evaluation ▶
- Performance Statistics
- Publications ▶
- News
- University Ranking Worldwide
- Contact Us

Performance Statistics

- WOS(04)-2007&2008 Performance Ranking of Scientific Papers for Taiwan's Universities NEW
- Worldwide university ranking by scientific papers NEW
- Introduction on Performance Statistics
- Statistical Analysis on Journal Papers

SMU's Research Strategy

Vision

To be a premier university, internationally recognised for its world class research and distinguished teaching.

Mission

To create and disseminate knowledge. SMU aspires to generate leading edge research with global impact...

Effect of Strategy on Implementation

The University has a mandate to report faculty output to the Ministry of Education

The Faculty have a mandate from administration to publish in “A” journals

The Library works with administration to advise, coordinate and train staff on measuring faculty output.

Know your Organization's Research Strategy

National Taiwan University's Mission and Vision



.... Broadly embracing top professionals from around the world, and dedicated to our core philosophy of excellence in education, **excellence in research**, and social concern, we aim to make NTU into a renowned bastion of education and research in fulfilling our vision to be ranked "the pinnacle of the Chinese and the first-rate in the world."

Vision for a Teaching University

To be the Centre of Leadership and Management Excellence; and the embodiment of Lifelong Learning.

Mission

- Spearhead management thought leadership
- Be the preferred strategic partner of corporations in maximising return on human capital
- Be the choice provider of continuing education to individuals
- Transform *Teaching U* into a regional brand

The Players Your Faculty

“There is now mounting pressure all over the world for academics to publish in the most-cited journals and rake in as many citations to their work as possible” (from article, Leung & Kwok, 2007)

“I need to publish in an international A journal but I would like to write for local practitioners” (conversation, September 2007)

“I want my articles to be read; being on a teaching syllabus is as important as being cited. I would like to know how many times my articles have been downloaded” (conversation, 10 August 2008)

“Even a citation in student handbooks, library guides, textbooks or editorial notes shows that an academic has an impact on the field” (article, Harzing 2005, p.65)

The Players Librarians

Librarians want:

Standardization of measures across faculty and departments

Authoritative, replicable metrics from a respected source

Disambiguation of names and institutions to identify the right author

List of “quality” publications?

Free tools

Our administration wants from the library:

A list of high impact journals in each field – just numbers is not enough

Peer analysis showing how we compare to top tier institutions.

Coordination of the counting process; training and checking

Concentration of bibliometrics and citation analysis articles across journals and disciplines

Research methodology applied to new citation tools

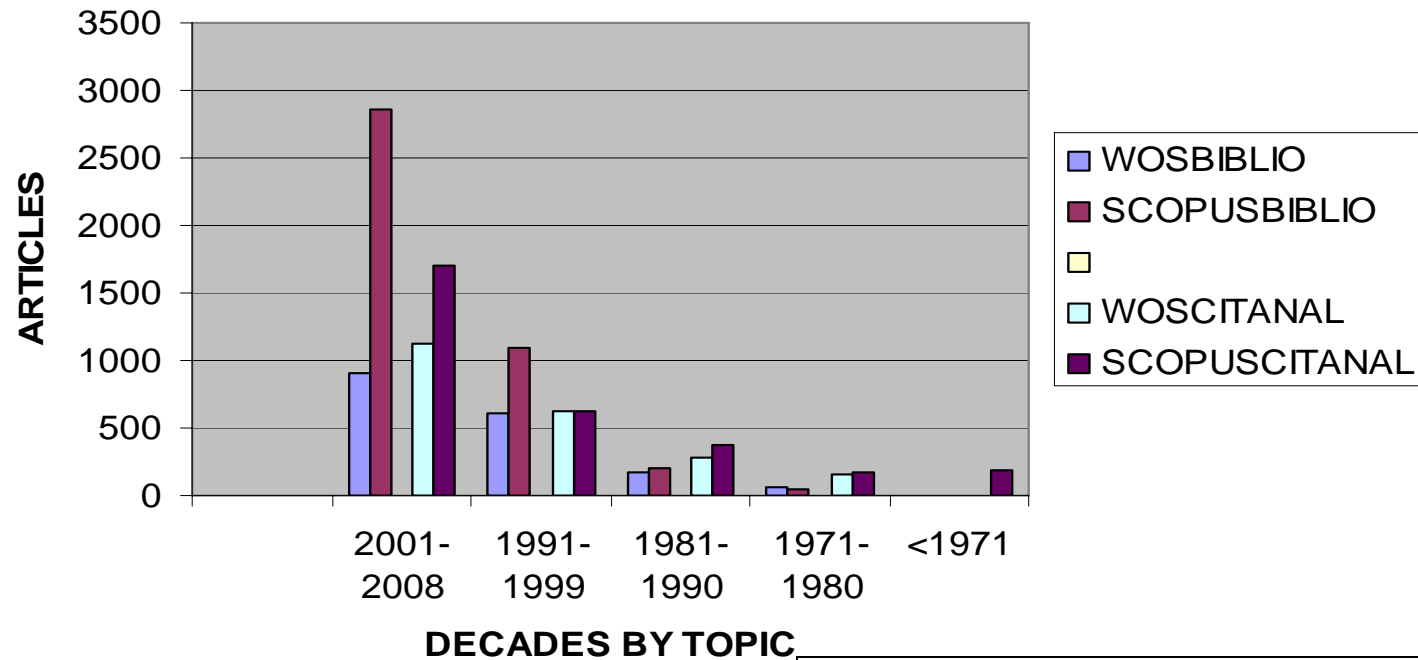
New measurements being introduced

% of articles

	<91	91-00	2001--
Top 6 Journals	50	31	15
Social Science *	56	31	26
Computer Science *	46	22	33
Medicine	12	48	54

* Includes . LIS articles
from SCOPUS 22/09/2008

GROWTH OF BIBLIOMETRICS AND CITATION ANALYSIS RESEARCH



	WOS	SCOPUS
1 st year bibliometrics	1969	1972
1 st year citation analysis	1965	1935

Country for benchmarking and comparisons

University for government and stakeholder reporting

Department for group performance *

Individual faculty for tenure and promotion *

* **Note:** Requires manual checking from departmental input data

UNIVERSITY LEVEL REPORTING

For MOE

For aggregate SMU data

For year-on-year changes

For comparisons across
internal categories

SCHOOL LEVEL REPORTING

For Disciplines

For Faculty

Co@CERT

全國學術電子資訊資源共享聯盟
Consortium on Core Electronic Resources in Taiwan

Commercial Citation Indexes

Web of Science (WOS)

SCI-e , SSCI, A&HI

Scopus

Web Tools

Google Scholar

Commercial Databases

Science Direct, EBSCO, Proquest,
JStor, Hein Online

Scholarly Websites

Repec, ACM Portal, Citeseer

Publications (how many and where)

Citations (how many)

Journal Impact Factor (how “good”)

H-Index

G-Index

Eigenfactor

Other tools

Other measures

Weighted averages

Output per faculty

Output per capita (100,000)

Changes over time

Output by subject norm –
differences among disciplines
among countries

Benchmarking by institution

How do you Count?

COMMON COUNTING

- Number of articles published per author
- Number of citations per article
- Number of self-citations

UNCOMMON COUNTING

- Number of joint articles
- Number of articles that are not cited
- Number of articles or citations based on size of faculty; size of population

Publications and Citations from Standard Sources

“Citations are part of the formal accounting process of science, documenting the origin of research streams over time”

(Judge, et.al. (2007) *Acad Mgmt J.* 491)

Web Of Science (WOS) – Sept 2008 >10,000 journals (years of coverage depends on subscription); in Cited reference search, references from ALL indexed items are extracted and listed regardless of whether the items are indexed by WOS. Errors are included

SCOPUS – Sept 2008 > 15,000 journals, proceedings with citations from 1996; Cited references are only for items indexed by Scopus

Both tools include affiliation and are adding name authority; both have standard fields and analysis tools

Impact on Citations

What and Where You Publish

Discipline – Hard sciences are better covered in standard
CIs than computer and social sciences and humanities

Source of publication – Journals indexed by WOS or
SCOPUS

Format – Article, proceedings, book, chapter

Location – Is there an East Asian effect?

Language – English is the language of science but not
social sciences and humanities

Average Citation Rates for papers published by field, 1998-2008

Essential Science Indicators

Fields	1998	2001	2004	2007	All Years
All Fields	17.27	14.43	8.94	1.60	9.56
Computer Science	6.97	5.75	2.44	.53	3.00
Econ & business	9.98	7.21	4.33	.55	4.91
Psychiatry/Psychology	17.75	14.80	8.73	1.22	9.52
Social Science, general	7.37	5.98	3.89	.58	3.99
<i>Clinical Medicine</i>	<i>20.10</i>	<i>17.16</i>	<i>11.15</i>	<i>1.97</i>	<i>11.61</i>
<i>Molecular Biology/Genetics</i>	<i>45.63</i>	<i>37.09</i>	<i>21.95</i>	<i>3.90</i>	<i>24.54</i>
<i>Mathematics</i>	<i>5.65</i>	<i>4.29</i>	<i>2.72</i>	<i>.47</i>	<i>2.95</i>

Impact on Citations Language

CI publications are primarily in English

Non-English CI publications have low impact

Social Sciences and Humanities are often published in local language publications which are not indexed

English is the language of science

<http://www.sinoss.com> - Statistics Datasheet - Sinoss.com - Micr...

Ordered By Number of Articles(Papers)		
University	Articles	Articles Pulished Aborad
Renmin University Of China	3726	58
Wuhan University	2411	63
East China Normal University	2295	31
Fudan University	1982	26
Zhejiang University	1754	27
Nanjing Normal University	1696	34
Peking University	1605	13
Zhongnan University Of Economics and Law	1575	7
Jiangxi University Of Economics and Finance	1488	9
Xiamen University	1471	15

From Information Network of Humanities and Social Sciences in Chinese Universities, searched 4 Nov 2008

Impact on Citations

What and Where You Publish

Discipline – Hard sciences are better covered in standard CIs than computer and social sciences and humanities

Source of publication – Journals indexed by WOS or SCOPUS

Format – Article, proceeding, book, chapter

Location – Is there an East Asian effect?

Language – English is the language of science but not social sciences and humanities

Type of publications – Review articles are highly cited; editorials, letters, news may not be included

CAVEAT: Today's scientific communications come in many formats; journals, proceedings, books, open access, websites

WOS

General Search – add address, if known; topic; date

Limit by detailed subject, institution, country, document type, source

Use **Name** Lookup – not useful

Try <http://www.reacherid.com>

Requires self registration

Caveat: Very few have registered

Cited Reference Search

Need to know articles

At author level, need CV

Co@CERT

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Consortium on Core Electronic Resources in Taiwan

SCOPUS

One search interface – author and affiliation

Limit by country, institution, subject

Have to do basic search to include year

Scopus tries to match **names** to create an authority file; check names you know and let SCOPUS know the problems

At author level, the exact affiliation, school and department will help as will

CV

Comparison of WOS and SCOPUS by Numbers

	WOS	SCOPUS
Date range	Depends on subscription	Cited references from 1996; adding back
Cited references	700 million	350 million
Unique articles	40.5 million	34.6 million
% non-Science (J)	21%	3%
Number of journals (RAP) [32000 journals]	Over 10,000	Appx 17000
Asia-Pacific Journals (WOS)	Just added >600	

From Peter Jacso talk at WOS users group meeting 8/2008

GENERAL SEARCH

CONTENT

Science Citation Index-e (1900) SMU
from 2000

Social Science Citation Index (1956)
SMU from 1980 (27% articles)

Arts & Humanities Citation Index
(1975) SMU from 1998

Citation network mapping

Trialing Conference Proceedings
(1990)

ANALYSIS (in rank order)

Subject Area

Document Type

Authors

Source Titles

Institutions (Co-authors)

Countries

Cited Reference Search

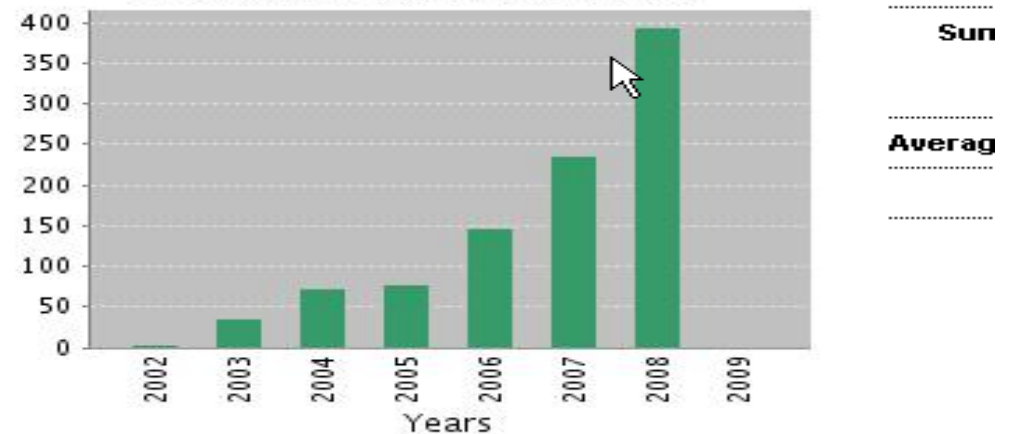
CONTENT : Any work cited by a General Search article

Web Of Science Analysis of SMU

CATEGORY	Count
Subject	24-11/2008
Economics	90
Management	60
Ops Research/Mgt Sci	53
Comp Sci/Info Sys	46
Source Title	
Lecture Notes in Comp	28
Econ Letters	8
J Applied Psych	8
J of Banking & Finance	7

DB	Yr	Articles	Cites	Cites/ Article	H Index
SCI	'00	210	595	2.8	11
SSCI	'80	278	575	2.07	11
A&H	'98	12	7	.58	1
ALL		417	964	2.3	13

Citations in Each Year



Includes more journals and proceedings than WOS, pre-pub Elsevier articles

Inclusion based on:

- Peer reviewed

- Strength of editorial board and reviewers

- Published at least one time a year

- English language abstracts and references

Includes 4 databases:

- Health Science, Physical Sciences, Life Sciences, Social Sciences

Citations added from 1996

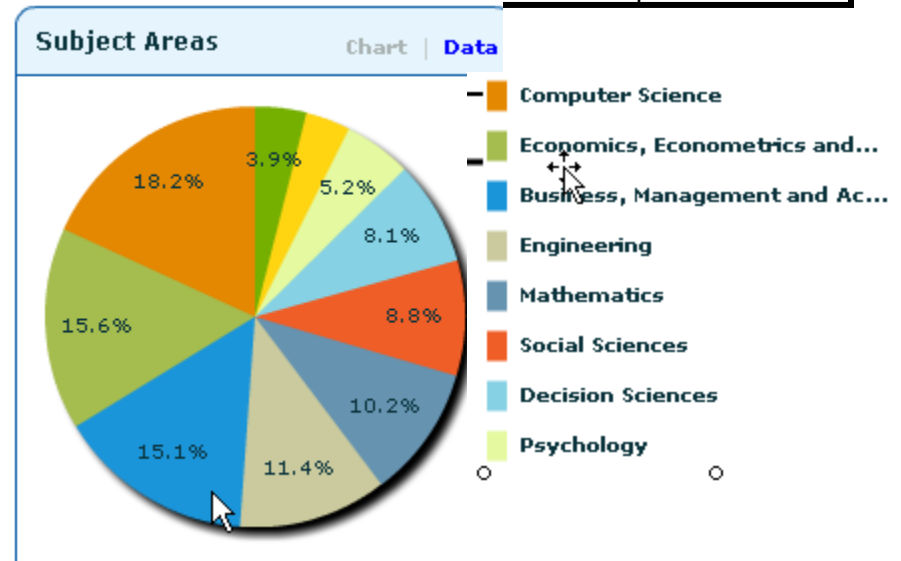
Author and affiliation searches

Analysis of citing journals

SCOPUS Affiliation SMU

CATEGORY	
Subject	24/11/08
Computer Science	189
Economics and Finance	162
Bus, Mgmt, Acctg	157
Source Title	
Lecture Notes in Comp	38
Human Systems Mgmt	10
J of Banking & Finance	9
Economic Letters	8
J of Applied Finance	8

Category	Articles	Cites	H Index
All Science	323	702	12
Social Sci	390	950	12
A & H	4	2	1
ALL	690	1349	15



The Pull of Google Scholar

A Dutch academic just introduced me to this impact factor calculating website. I think he uses it to gauge the overall impact his research institute is having. You have to download the software.

<http://www.harzing.com/resources.htm#/pop.htm>

Discussion of the H-index explains why wider coverage than current citation indices matters:

<http://en.wikipedia.org/wiki/H-index>

It probably covers more broadly than some of the other impact factors, as it uses Google Scholar to get citations of not just journal papers, but books, conference and working papers. Then it calculates using some mathematical factors (in addition to absolute numbers of citations). Thus, I believe it may be best used not as a "screening out" tool but rather as a "screening in" tool, i.e., those whose works are covered in the broader sphere of academia.?(faculty email, Sept 2008)

All the pitfalls of a google search

Can do author name search in advanced search

Includes books

PLUS

No authority control on name

Includes websites, syllabi, multiple entries, false hits

No analysis tools

Manually check each entry and count citations

Title: Estimating Standard Errors in Finance...

Author: M A Petersen

Review of Financial Studies

Affiliation: Northwestern University

Pub Date: GS 2008 (actual date June 2008)

Number of Citations: **381**

(searched 26 Sept 2008)

GOOGLE SCHOLAR Author Analysis

Author's name:

Exclude these names:

Year of publication between: and:

Biology, Life Sciences, Environmental Science
 Business, Administration, Finance, Economics
 Chemistry and Materials Science
 Engineering, Computer Science, Mathematics
 Medicine, Pharmacology, Veterinary Science
 Physics, Astronomy, Planetary Science
 Social Sciences, Arts, Humanities

Results

Papers:	36	Cites/paper:	1.67	h-index:	3	AWCR:	2.63
Citations:	60	Cites/author:	20.34	g-index:	7	AW-index:	1.62
Years:	36	Papers/author:	29.25	hc-index:	2	AWCRpA:	0.71
Cites/year:	1.67	Authors/paper:	1.64	hI-index:	0.82		
				hI.nrm:	?		

Scholars' Evaluation of Google Scholar (GS)

“The use of **Scopus** and GS, in addition to WoS, helps reveal a more accurate and comprehensive picture of the scholarly impact of authors. BUT ... The WoS data took about 100 hours of collecting and processing time, *Scopus* consumed 200 hours, and GS a grueling **3,000** hours”

Meho, L. & Yang, K. 2007. Impact of data sources on citation counts and rankings of LIS faculty: Web of science versus Scopus and Google Scholar. JASIST 58(13), 2105 – 2125

Ruth's Caveat: Do the math

Ruth's Evaluation of Google Scholar

	WOS	ELSEVIER SCOPUS	GOOGLE SCHOLAR
Access	Subscription	Subscription	Free
Coverage	>10000 selected scholarly journals	17000 selected scholarly journals, conference proceedings	Generally articles
Time	Varies by subscription (1900-)	1996 for citations	Not stated
Who uses	Top Tier institutions	Scientific institutions;	Anyone
Quality'	The standard source; Governments, Research Institutions	Times Higher Education	No authority
Citations	Citations included from non-WOS journals in cited references	Only SCOPUS citations	Not stated; web harvesting
Name Identity	Building Name Authority Self Register	Building Name Authority Automatically- needs clean-up	No authority; no way to deal with common names
Add-ons	Analysis tools; ESI, JCR	Analysis tools	Harzing's Publish or Perish
Notes:	EXCLUDES in General Search: Books, book chapters, theses, working papers, conference papers, reports INCLUDES Analysis for article, author, journal, etc	EXCLUDES cites from publications not covered within SCOPUS content INCLUDES Analysis for author, article, journal, institution	INCLUDES: Guides, Notes, Syllabi, non-reviewed articles; best for young authors; individual use with extensive data cleansing No affiliation searching

Identity Crisis Asian Names

SCOPUS and SSCI

Example 1:

I am looking for the articles and citations for Li Y from Taiwan. I think he publishes in the area of computer sciences

Identity Crisis Too Many Names

Example1 : Author Li Y*

ISI Total	28805
Limit address toTaiwan	560
Limit by subject(?)	62
Add institution (Ntl Chiao Tung)	104
Find middle initial Li YM	45

Check CV

Li YM Ntl Chiao Tung Univ, Mgmt 2

CITED REFERENCES: 0

SOLUTION: Manually check website

Identity Crisis - Asian Names Too Many Variations

SSCI	Articles	Cites	SCOPUS	Articles	Cites
Name AB	3	3	Name AB	3	2
Boh NA	17	30	Boh, N	1	0
			Boh, NA	1	23
In cited reference					
Name AB		70			
BOh NA		83			

General: H Index =3

Cited Ref: H Index =5

Identity Crisis Asian Names

GOOGLE SCHOLAR Author Analysis (made up author:

NAME Aik Boh)

Variations:

AB Name

NA Boh

Neme Boh

AikB Name

Results

Papers:	112	Cites/paper:	4.42	h-index:	11
Citations:	495	Cites/author:	275.47	g-index:	19
Years:	40	Papers/author:	75.54	hc-index:	4
Cites/year:	12.38	Authors/paper:	1.93	hI-index:	5.26
				hI,norm:	8

ISIHighlyCited.comSM



★ Lin, Yi-Bing

[Home](#) > [Browse](#) > [Results](#) > Biography

ISI Author Publication Number:	A0096-2006-L
ISI Rating:	Highly Cited
ISI Assigned Category:	Computer Science
ISI Indexed Name:	LIN YB LIN

ISI Notes:

Contact Information

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National Chiao Tung University
1001 Ta Hsueh Road
Hsinchu, Taiwan, 30050, Taiwan
Telephone:  +886-930067071 
Fax Number:
E-mail: liny@csie.nctu.edu.tw
URL: <http://liny.csie.nctu.edu.tw>

Personal Information

Date of Birth:	10/26/1961
City, State/Province, Country of Birth:	Taichung, Taiwan
Citizenship(s):	Taiwan
Language(s):	Chinese, English, Taiwanese

Disambiguation of author names ...

**ACM Launches Beta Version
of Author Profile Pages in
Digital Library**



New feature includes bibliometrics and offers quick view of authors' contributions to the field.

[Learn more](#), [read press release](#).

www.acm.org

How to Measure Quality of Research

It was suggested that the library identify top-tier journals in each discipline, reporting on % publications in top-tier journals, benchmarking our research productivity/quality against other universities.

Could we generate a "top 20" list in each discipline by the impact factor of each journal and validate with the Schools to create a "final" list to use to deriving the % top-tier publications indicator?

How do we to gather the benchmark data from other universities -- could we use the SCI databases, and count publicly available faculty listings?

Journal Impact Facts and Questions

Computed annually in JCR

Journal list and scores may vary year on year

Impact score depends on category

Impact rank depends on number of journals in category

Are we interested in the impact at the time the article was published? Over a variable time period?

What about the impact of the citing journals?

Do we care about the reputation of the citing institutions?

Calculating the Impact Factor in JCR (Current)

Number of citations received in current year (Y)
to articles published in years (Y-1 + Y-2)
Number of citable documents published in years Y-1 + Y-2

Example: *Journal of Biomedical Science (JCR 2007)*

Cites in 2007 to articles from: Articles published in:

2006 = 151

2006 = 78

2005 = 181

2005 = 86

Sum = 332

Sum = 164

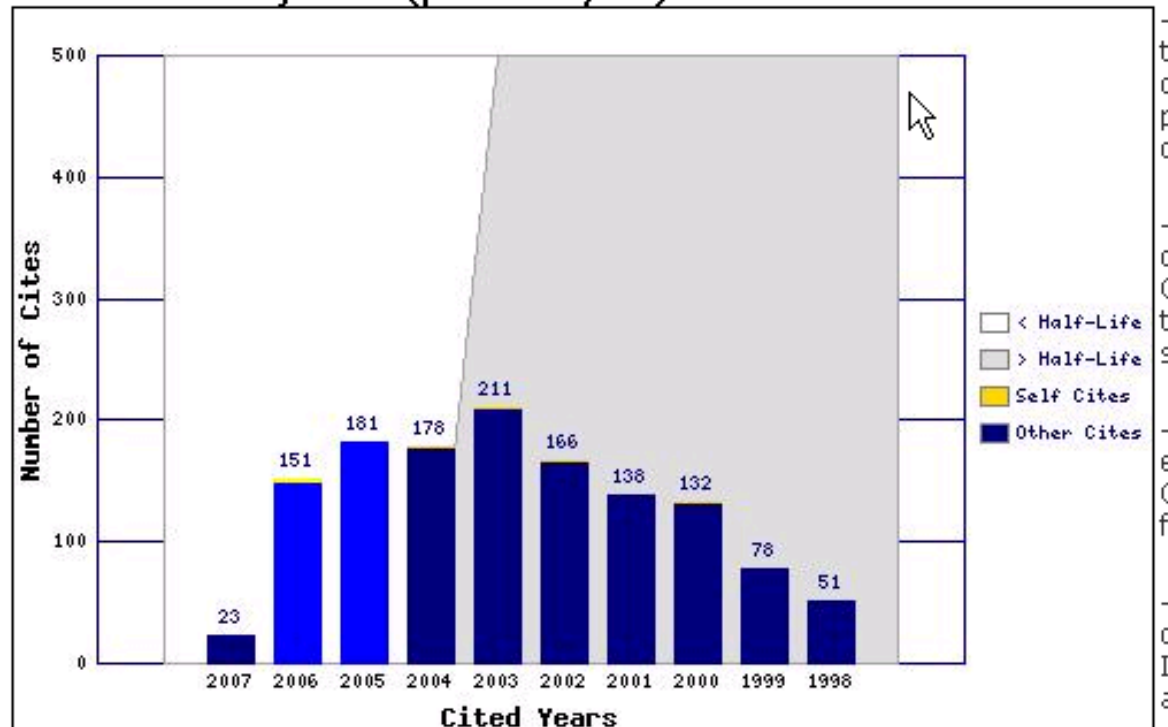
Calculation : Cites $\frac{332}{164} = 2.024$

Articles 164

Journal Impact Factor *J Biomed Sci* 2007

Journal Title	Total Cites	Impact Factor	Articles	Cited Half Life
J Biomed Sci	1379	2.024	72	4.7

Citations to the journal (per cited year)



**JCR
2007**

JCR Metrics

[WELCOME](#)
[HELP](#)
[MARKED LIST](#)

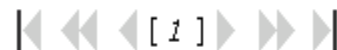
2007 JCR Science Edit

Journal Summary List [Journal Title Change](#)

Journals from: search Full Journal Title for 'JOURNAL OF BIOMEDICAL SCIENCE'

Sorted by:

Journals 1 - 1 (of 1)



Page 1 of 1

Ranking is based on your journal and sort selections.

Mark	Rank	Abbreviated Journal Title <i>(linked to journal information)</i>	ISSN	Total Cites	Impact Factor	Immediacy Index	Articles	Cited Half-life
------	------	---	------	-------------	---------------	-----------------	----------	-----------------

Journal Impact Factor

Cites in 2007 to articles published in: 2006 = 106 Number of articles published in: 2006 = 109
 2005 = 189 2005 = 114
 Sum: 295 Sum: 223

Calculation: <u>Cites to recent articles</u>	<u>295</u>	=	1.323
	Number of recent articles		223

JCR Subject Category	Median	Avg	# of Journals
LAW (<i>Harvard Law Review</i> 5.859)	.87	1.23	100
ECONOMICS (<i>J of Political Economy</i> 4.190)	.65	.99	191
CELL BIOLOGY (<i>Cell</i> 29.887)	2.98	5.60	156

H Index removes effect of a few highly cited articles

Understates highly cited articles

Easy to compute

Score varies by database

G Index emphasizes highly cited articles (Egghe, 2006)

Is always higher than H

Needs more papers for meaningful score and more math ability to calculate

Eigenfactor (<http://www.eigenfactor.org/methods.htm>)

Journals are considered to be influential if they are cited often by other influential journals; mathematical calculation



New Metrics: H-Index

Calculation:

Researcher A has an h-index of 7 if 7 of his 26 papers have at least 7 citations each and the other 19 papers have not more than 7 citations each. (Hirsch, JE Proceedings of the National Academy of Science (2005) issue 16569)

A's H index=7 out of 26 papers on Scopus

RANK	CITES	YR
1	48	2000
2	44	1999
3	43	2000
4	30	2004
5	13	2000
6	12	2002
7	11	2004
8	6	2005
19	0	...

New Metrics – H Index

Author	ISI WOS (general search)	SCOPUS	GS *	Ruth's notes
A	12	4	13	>30 yrs; Econ
B	5	7	10	10 yrs; Operations Mgmt
C	4	2	5	>25 yrs; LIS
D	3	1	11	>35 yrs; Bus and Intl Relations
E	3	5	*	5 yrs; Comp Sci (can't identify)

- Bibliometrics used at University level
- Bibliometrics used in University rankings
- Bibliometrics used in Country Rankings

Research Goals and Key Performance Indicators

Make a fundamental Investment in University's research
and scholarly capabilities

Total number of publications by full time faculty

Number of publications per full time faculty (ex. Lecturers)

Number of citations at University level for full time faculty

Build a faculty of international distinction and promise

Referred publications per tenure track faculty

Number of citations at University level per full time faculty

Case Study New university

Research Metrics

Refereed Publications by
Standing Faculty
Citation Count
Total Number of
Publications
Research Active Faculty

Research Categories

By School
By Rank (i.e. Asst Prof)
By Tenure or Teaching

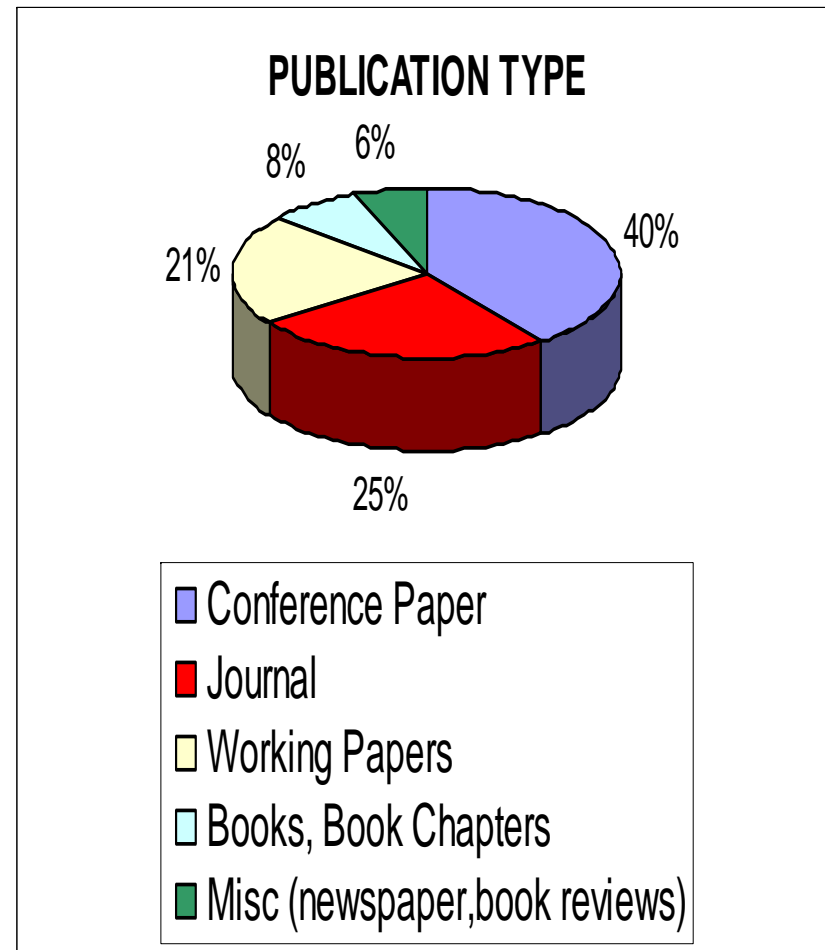
ISSUES: Quality vs Quantity
**Legacy citations from senior faculty/
visiting faculty**

Case Study

TREND	INDICATOR	FY 1	FY 2	FY3 Target
	# Full time faculty (FTF)	300	340	400
- 5%	Total # of publications	1000	950	1200
-17 %	Publications /FTF	3.33	2.75	3.00
+50%	Referred publication/FTF	1	1.5	1.5
+14%	Total Citation Count	14000	16000	19000

Case Study

Publication by Type	Number	Percent
Conference Paper	380	40%
Scholarly Journal	238	25%
Working Paper	200	21%
Books, chapters	76	8%
Misc	56	6%



THE- QS -- Times Higher Education World University
Rankings)

Shanghai Jiao Tong -- Academic Ranking of World
Universities

HEEACT – Worldwide University Ranking for Scientific
Papers

See: 2008 International Symposium: Ranking in Higher Education on
the Global and National Stages, HEEACT

<http://www.heeact.edu.tw/conference2008/>

APPLICATIONS

Bibliometrics Used in University Rankings

THE-QS World University Rankings - 2008

20% of ranking based on citations per faculty

Total Citation count for the past 5 years from SCOPUS (2007-)

Total Number of full time equivalent faculty (FTE)

Bias toward medical and life sciences and teaching in English

<http://www.topuniversities.com/>

Scopus as of 23 June 2008

Comp	Cite/Fac	University Name
5	1	Cal Tech
17	2	Stanford
9	3	MIT
36	4	UC Berkeley
1	5	Harvard
12	6	Princeton
58	7	UC San Diego
41	8	Univ Toronto
30	9	UCLA
13	10	Johns Hopkins

Shanghai Jiao Tong University – Academic Ranking of World Universities

Ranks academic or research performance, including:
highly cited researchers from 21 WOS Categories (20%),
articles indexed in SCI-e & SSCI in the previous year (20% with additional weight for SSCI)
per capita academic performance of an institution (weighted scores of all indicators divided by FTE academic staff (10%))

<http://www.arwu.org/rank2008/EN2008.htm> 14 August 2008

HEEACT – Performance Ranking of Scientific Papers

Table 1: The Criteria, Indicators, and Their Respective Weightings Used for the Overall Performance Based Ranking

Criteria	2008 Overall Performance Indicators	Weighting	
Research productivity	Number of articles of the last 11 years (1997-2007)	10	20
	Number of articles of the current year (2007)	10	
Research impact	Number of citations of the last 11 years (1997-2007)	10	30
	Number of citations of the last 2 years (2006-2007)	10	
	Average number of citations of the last 11 years (1997-2007)	10	
Research excellence	H-index of the last 2 years (2006-2007)	20	50
	Number of Highly Cited Papers (1997-2007)	15	
	Number of articles of the current year in high-impact journals (2007)	15	

Historical publication and citation data is from ESI

Current data is from SCI and SSCI; high impact journals from JCR

<http://ranking.heeact.edu.tw/en-us/2008/Page/Methodology>

Comparative World University Rankings Using Bibliometrics

SHANGHAI Jiao Tong (40% bibliometrics)	HEEACT (100% bibliometrics)	THE-QS (20% bibliometrics)
Harvard	Harvard	Harvard
Stanford	Johns Hopkins	Yale
U C – Berkeley	Stanford	Cambridge
Cambridge	Univ Washington	Oxford
MIT	UCLA	Cal Inst Tech
Cal Inst Tech	UC– Berkeley	Imperial Col London (H27)
Columbia	Univ Michigan	Univ Col London (H20)
Princeton	MIT	Univ Chicago
Univ Chicago	UC – San Francisco	MIT
Oxford	UC – San Diego	Columbia

Comparative Asian* Rankings Using Bibliometrics

Shanghai Jioa Tong - without* Australia, Israel	HEEACT *without Australia, Israel	THE – QS (no A-P list) *taken from general list
Tokyo	Tokyo	Tokyo
Kyoto U	Kyoto	Kyoto
Osaka	Osaka	Univ Hong Kong
Tohoku	Tohoku	Ntl Univ Singapore
Kyushu	Seoul Ntl Univ	HKUST
Nagoya	Ntl Univ Singapore	Chinese U (HK)
Ntl Univ Singapore	Nagoya	Osaka
Tokyo Inst Tech	Kyushu	Peking U
Hokaido	Ntl Univ Taiwan (141 World; 15 A-P)	Seoul Ntl Univ
Ntl Univ Taiwan (152- 200 World; 17-22 Asia-Pac)	Tokyo Inst Tech	Tsinghua Ntl Taiwan U) (15

APPLICATIONS

Country Bibliometrics

The U.S. Myth (1995-2005)

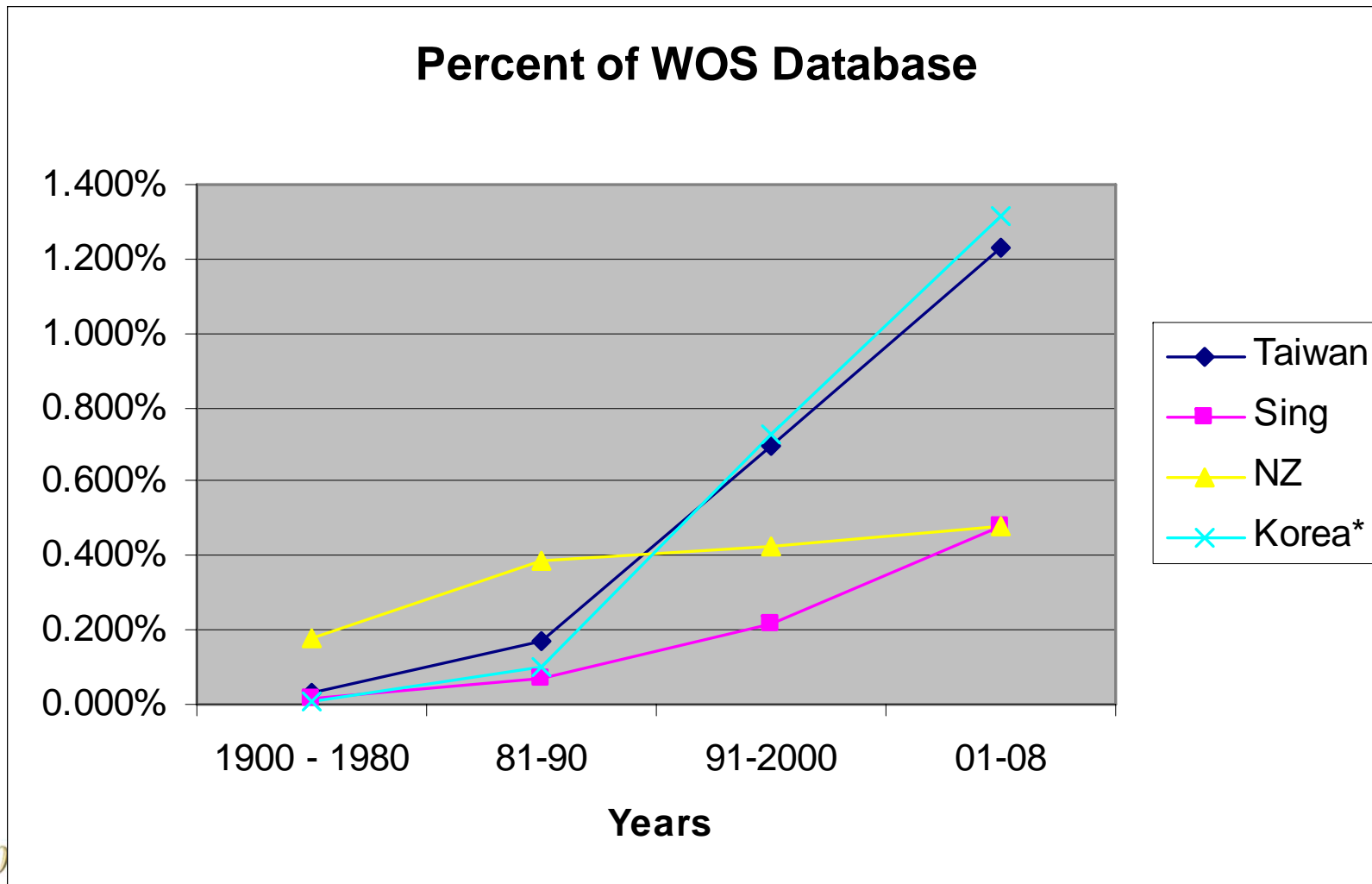
Worldwide S&E output grew at an average annual rate of 2.3%.

Total U.S. output grew 0.6% a year compared to 1.8% for the EU and 6.6% for a group of 10 Asian countries*

Asia-10 share increased from 13% to 20%. U.S. share of total world article output fell between from 34% to 29%; EU share declined from 35% to 33%,

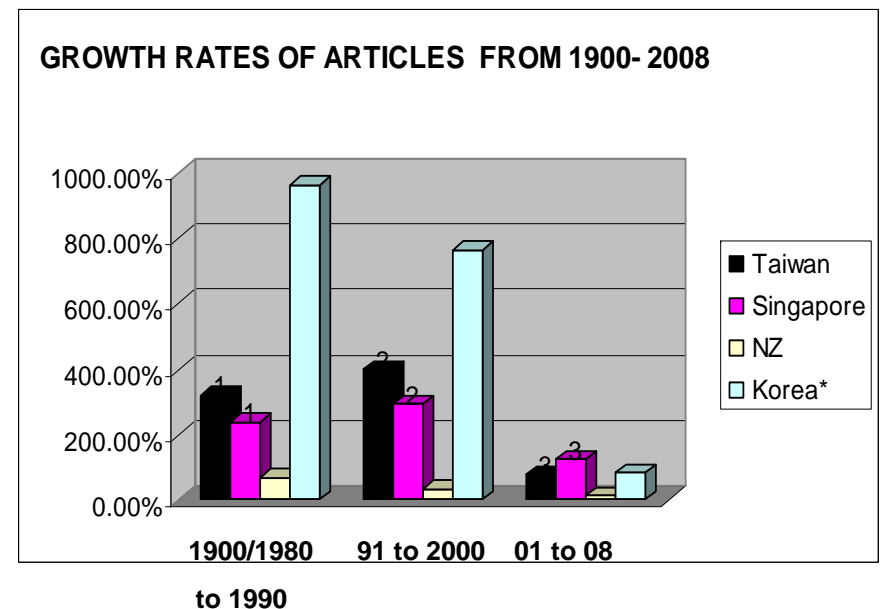
NOTE: Asia-10 includes China (& Hong Kong) India, Indonesia, Japan, Malaysia, Philippines, Singapore, South Korea, Taiwan, and Thailand
Science and Engineering Indicators, 2008 <http://www.nsf.gov/statistics/seind08/c5/c5h.htm>

Country Bibliometric % of Selected Asian Country Articles



	1900 - 1980	81- 90	90-20'	01-08
Taiwan	3523	14819	73881	132374
S'pore	1716	5832	23027	51617
N Z	19892	33815	45089	51392
Korea	838	8931	77336	141452
WOS '000	10999.7	8686,6	10652.4	10740.3

% Change among decades



Country Metrics Leading Subjects in Taiwan

1980	#	% Output
Plant Science	37	6.42
Intl Relations	36	6.25
Pharmacology	36	6.25
Political Science	36	6.25

2007	#	% Output
Electrical Eng	2279	11.11
Physics	1706	8.32
Materials Science	1403	6.84
Optics	713	3.48
<i>Plant Sci</i>	234	1.14

scienceWATCH

Science in Taiwan 2002-2006

Field	% Papers from TAIWAN	Relative Cites Impact to World
Engineering	3.96	-22
Materials Sci	3.35	-9
Physics	2.38	-21
ALL Papers	% cites 1.69	1
Agricultural Sci	1.31	+1

Source of Rankings Data Essential Science Indications

For influence and impact measures, *Essential Science Indicators* employs both total citation counts and cites per paper scores. The former reveals gross influence while the latter shows weighted influence, also called impact. It is important to recognize that the data in *Essential Science Indicators* are limited to Thomson Scientific-indexed journal articles only. No books, book chapters, or articles published in journals not indexed by Thomson Scientific are taken into account here, either in terms of publication or citation counts.

Level of Aggregation

Citation Ranking:

Scientists

Institutions

Countries

Journals

Most cited papers

Highly cited papers (10

Hot papers (2 yrs)

Benchmarking:

By broad subject area

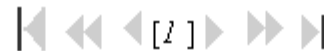
User-defined topic

Using Papers and Citations to Track Specific Topics









RESEARCH FRONTS RANKINGS FOR CORPORATE GOVERNANCE

Sorted by: Citations

1 - 4 (of 4)



Page 1 of 1

View	Fronts	Papers	Citations	Citations Per Paper	Mean Year
1  	INTERNATIONAL CORPORATE GOVERNANCE; MANAGEMENT AFFECT FIRM VALUE; CORPORATE GOVERNANCE STANDARDS; FAMILY FIRM; FIRM PERFORMANCE	43	1,828	42.51	2004.1
2  	WEAK GOVERNANCE CAUSE WEAK STOCK RETURNS; CORPORATE GOVERNANCE; GOVERNANCE MECHANISMS; EQUITY PRICES; BUSY BOARDS EFFECTIVE MONITORS	12	403	33.58	2005.1
3  	SOFT BUDGET CONSTRAINT; ENTERPRISE RESTRUCTURING; EMERGING ECONOMIES; CORPORATE GOVERNANCE; EASTERN EUROPE	5	261	52.20	2004.1
4  	AMERICAN CORPORATE GOVERNANCE SYSTEM FEDERALISM; QUACK CORPORATE GOVERNANCE; STATE COMPETITION; CORPORATE LAW; ONE SMALL STATE	5	245	49.00	2004.1

Country Metrics

Subject Area: Computer Science for 2007

SJR SCImago
Journal & Country
Rank

	Country	Docu- ments	Citable Docs	Cites	Self Cites	Cites/D oc	H Index
1	China	19792	19686	858	601	0.04	74
2	USA	17277	16519	3176	1620	0.18	267
3	UK	6468	6202	991	461	0.15	121
4	Germany	5508	5333	768	383	0.14	109
10	Spain	3679	3580	443	237	0.12	71
11	Taiwan	3436	3352	292	150	0.08	69
12	Australia	2572	2484	354	142	0,14	75

Examples of Other Bibliometric Sources

Subscription Databases

- Science Direct – search by cited author and affiliation; link to SCOPUS for citations for cited articles
- ACM Portal – Downloads and citation counts; Disambiguation of names
- Academic Search Premier and PsycInfo on Ebsco – includes citations within the databases

Sample Free Websites

- Citebase – Physics: Citations and downloads; part of Open Citation Project
- Repec – Economics and statistics; citations and downloads

Downloads from ACM Portal

THE GUIDE TO COMPUTING LITERATURE

 [Feedback](#)

(computing) and (Affiliation:taiwan)

Terms used: **computing taiwan**

Sort results by

 [Save results to a Binder](#)

Refine these results ·
Try this search in [Th](#)

Display results

Open results in a new window

Results 1 - 20 of 6,347

Result page: [1](#) [2](#) [3](#) [4](#) [5](#) [6](#) [7](#) [8](#) [9](#) [10](#) [next](#) [>>](#)

1 [Self-animating images: illusory motion using repeated asymmetric patterns](#)



Ming-Te Chi, Tong-Yee Lee, Yingge Qu, Tien-Tsin Wong

August 2008 **SIGGRAPH '08**: ACM SIGGRAPH 2008 papers

Publisher: ACM

Full text available:  [Pdf](#) (5.65 MB)

Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Bibliometrics: Downloads (6 Weeks): 125, Downloads (12 Months): 125, Citation Count: 0

Illusory motion in a still image is a fascinating research topic in the study of human motion perception. Physiologists and psychologists have attempted to understand this phenomenon constructing simple, color repeated asymmetric patterns (RAP) and ...

Keywords: illusory motion, repeated asymmetric pattern (RAP)

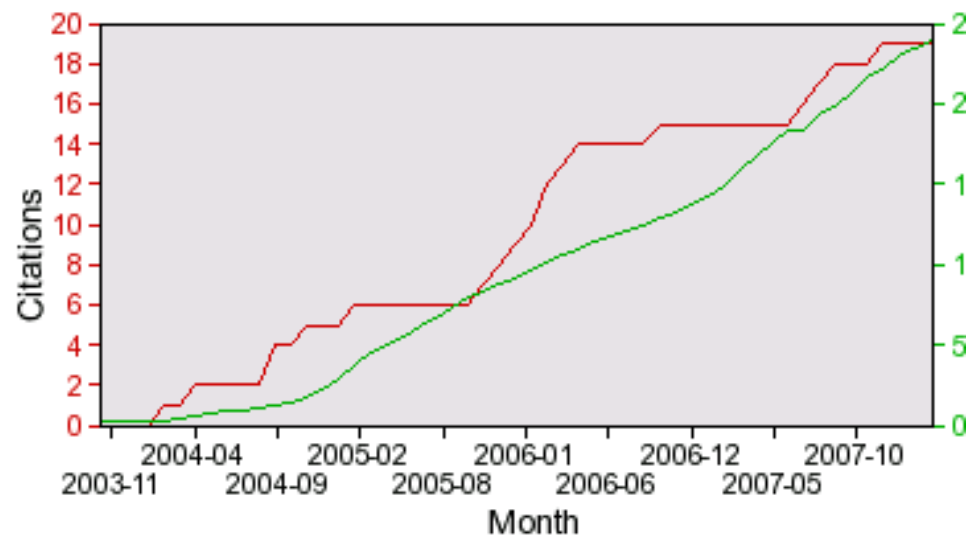
citebase Search

Citebase is currently only an experimental demonstration. Users are cautioned not to use it for academic evaluation yet. Citation coverage and analysis is [incomplete](#) and hit coverage and analysis is both [incomplete](#) and [noisy](#).

Record Year between and

Rank matches by

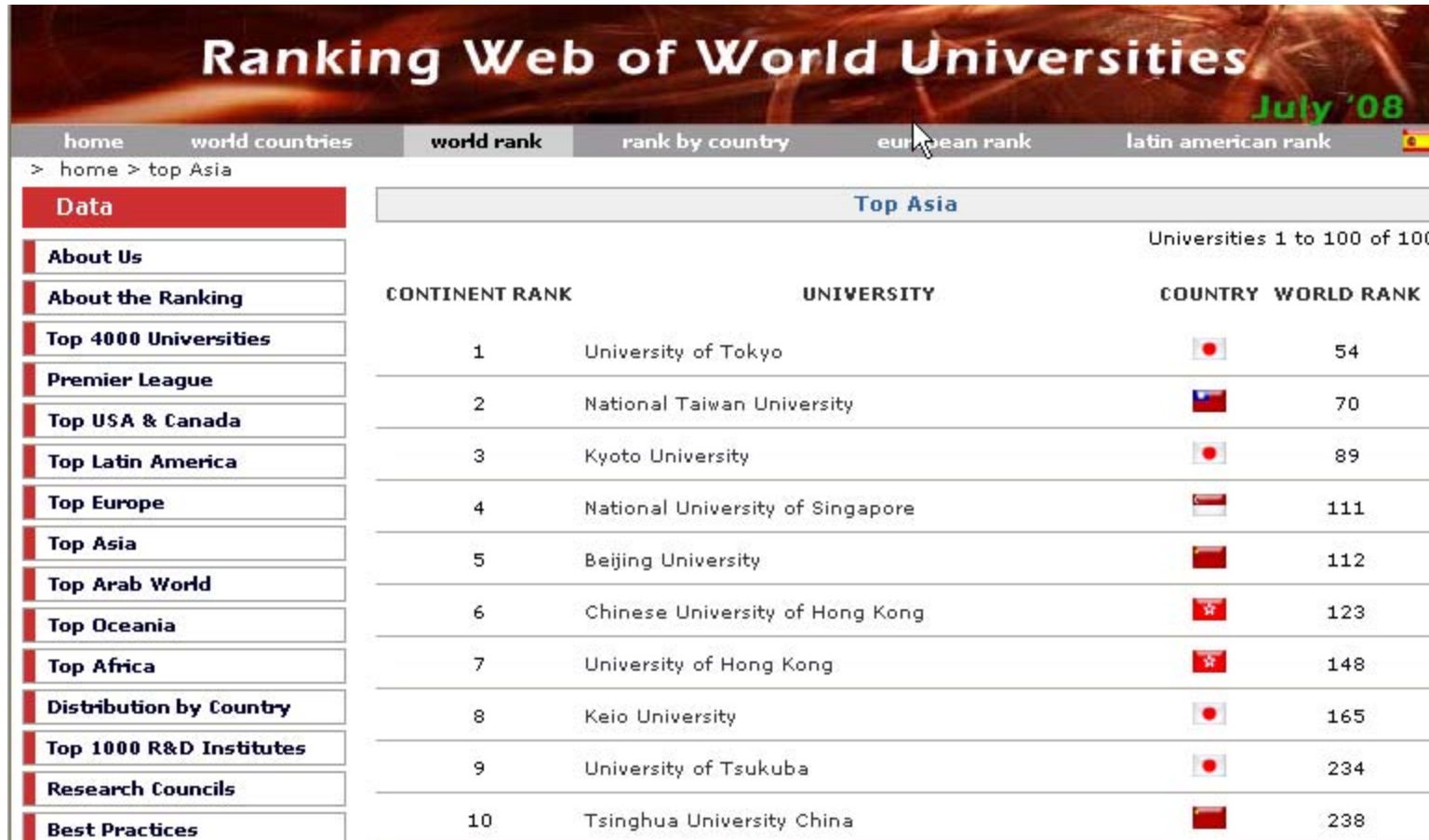
	Citations	Downloads
To this article	19	2400
To authors (mean)	3.75	198.66



Top Research Items

- Top Items by Citations (all works, updated daily)
 - [Number of citations \(recent\)](#)
 - [Number of citations, weighted by simple impact factors \(recent\)](#)
 - [Number of citations, weighted by recursive impact factors \(recent\)](#)
 - [Number of citations, discounted by citation age \(recent\)](#)
 - [Number of citations, weighted by discounted impact factors \(recent\)](#)
 - [Number of citations, weighted by recursive discounted impact factors \(recent\)](#)
- Top Items by Downloads in RePEc Services
 - [Top Working Papers](#)
 - [Top Journal Articles](#)
 - [Top Software Components](#)
 - [Top Chapters](#)
 - [Top Books](#)
- Top Items by Abstract Views in RePEc Services

<http://ideas.repec.org/>



Ranking Web of World Universities July '08











home world countries world rank rank by country european rank latin american rank

> home > top Asia

Data

- About Us
- About the Ranking
- Top 4000 Universities
- Premier League
- Top USA & Canada
- Top Latin America
- Top Europe
- Top Asia
- Top Arab World
- Top Oceania
- Top Africa
- Distribution by Country
- Top 1000 R&D Institutes
- Research Councils
- Best Practices

Top Asia
Universities 1 to 100 of 100

CONTINENT RANK	UNIVERSITY	COUNTRY	WORLD RANK
1	University of Tokyo		54
2	National Taiwan University		70
3	Kyoto University		89
4	National University of Singapore		111
5	Beijing University		112
6	Chinese University of Hong Kong		123
7	University of Hong Kong		148
8	Keio University		165
9	University of Tsukuba		234
10	Tsinghua University China		238

“ Therefore, as a general principle we state that optimal research evaluation is realised through a combination of metrics and peer review” (Scoping, p. 32)

http://www.hefce.ac.uk/pubs/rdreports/2007/rd18_07/rd18_07.doc

The broad consensus among bibliometric researchers is that journal impact factors should not be used as surrogates of actual citation impact (Scoping p. 34)

The report ...strongly cautions against the over-reliance on citation statistics such as the impact factor and h-index (ScienceDaily July 11, 2008)

IT WOULD HELP OUR COUNTING IF FACULTY

- Used a middle initial
- Used the same name consistently and let us know what that was
- Registered at sites that are creating authority lists
- Included their full SMU affiliation
- Added papers to open access repositories such as new SMU DL
- Posted a list of all publications on your web site

FOR FACULTY INTERESTED IN KEEPING THEIR OWN COUNTS

- Set up database alerts (Library can help)
- Maintain a continuously updated file of citations as they are discovered
- Search the Web for items not indexed in CI databases (but remember data cleansing is required)

CONCLUSION

TIME IS MONEY

TIME IS PRODUCTIVITY

THERE WILL ALWAYS BE SOMETHING ELSE
TO COUNT AND NEW TOOLS WITH WHICH
TO COUNT

Thank you
ruthpagell@smu.edu.sg

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Ethics in Science and Environmental Politics, special issue on “Use and Misuse of Bibliographic Indices in Evaluating Scholarly Performance”, June 2008

<http://www.int-res.com/abstracts/esep/v8/n1/>

Practitioner Newsletters

Research Trends, vol 1 2007 <http://info.scopus.com/researchtrends>

ScienceWatch online form 1997 <http://sciencewatch.com>