

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



دانشگاه اصفهان

دانشکده علوم تربیتی و روانشناسی

گروه علم اطلاعات و دانش شناسی

استخراج اطلاعات در حوزه موضوعی علم سنجی «Scientometric» از پایگاه وب آو ساینس

و تحلیل با نرم افزار Histcite

عنوان درس: کاربردهای علم سنجی در ارزیابی پژوهش

استاد: دکتر علی منصوری

دستیار: سرکار خانم ملیحه سلیمیان ریزی

حسین ترسلی (۹۳۲۵۱۱۱۲۴۰۱۱)

دانشجوی کارشناسی ارشد علم اطلاعات و دانش شناسی - دانشگاه اصفهان

کارشناس مهندسی صنایع - دانشگاه صنعتی امیرکبیر

آبان ماه ۱۳۹۴

## فهرست

- بخش اول: دیداری سازی ساختار علمی خروجی محققان ایرانی در SCI در طول سال های ۲۰۰۰ تا ۲۰۰۶ ..... ۲
- متدلوژی تحقیق و جمع آوری داده ها ..... ۲
- بخش دوم: قدم های اجرایی با توجه به الگوی پژوهش مبنا (بخش اول) ..... ۳
- پیوست ۱: مقاله مبنا ..... ۲۰

## بخش اول: دیداری سازی ساختار علمی خروجی محققان ایرانی در SCI در طول سال های ۲۰۰۰ تا ۲۰۰۶

مقاله ای از سرکار خانم دکتر فریده عصاره و خانم مریم کشوری با عنوان **Visualizing the Structure of Scientific Output of Iranian Scholars in Science Citation Index (SCI) During ۲۰۰۰-۲۰۰۶** ترجمه بخش متدلوژی تحقیق و جمع آوری داده ها و بخش هایی از چکیده و نتیجه گیری آن، ذیلاً و تصویر متن کل مقاله در پیوست می آید.

### متدلوژی تحقیق و جمع آوری داده ها

روش تحقیق برای این مطالعه استفاده از الگوهای علم سنجی است. جامعه تحقیق ۲۴۴۸۰ مقاله تهیه شده توسط نویسندگان ایرانی نمایه شده در SCI در طول سال های ۲۰۰۰ تا ۲۰۰۶ میلادی است.

دیتاها طی سه مرحله و با استفاده از ۳ ابزار جمع آوری و آنالیز شده اند. در اولین گام، داده ها با استفاده از SCI و WOS استخراج شده و در فرمت Plain text ذخیره شده اند. در دومین قدم، دیتاها با استفاده از نرم افزار ISI.exe تحلیل و در مرحله سوم داده های ثبت شده با نرم افزار صفحه گسترده اکسل برای تحلیل آماده شدند.

برای رسم نقشه تاریخی خروجی علمی ایرانیان در SCI، ما از نرم افزار HistCite استفاده کرده ایم. این نرم افزار یکی از محصولات ISI است. ورودی آن شامل فایل های متنی استخراج شده از WOS و خروجی آن شامل تصاویر گرافیکی خروجی های علمی است.

\*\*\*\*\*

در چکیده و مقدمه مقاله این چنین آمده است. بررسی کمی تولیدات علمی، سیاست گذاری علمی، ارتباطات علمی دانش پژوهان، ردیابی انتشار اندیشه ها، ترسیم نقشه تاریخ نگاری برخی از موضوعات حوزه علم سنجی است. بررسی برون دادهای علمی نویسندگان با استفاده از شاخص های علم سنجی ابزاری مؤثر برای درک فرایند تحقیقات علمی و رویکرد دیداری سازی، یکی از روش های علم سنجی محسوب می شود.

در بخش توضیح و تحلیل یافته ها خوشه بندی های مختلف شکل گرفته در دو نمودار GCS و LCS تشریح شده اند.

## بخش دوم: قدم‌های اجرایی با توجه به الگوی پژوهش مبنا (بخش اول)

۱- از پایگاه WEB Of SCIENCE و در بخش Basic Search و در فیلد Topic، کلیدواژه «Scientometric» را با

محدوده زمانی پیش فرض سال‌های ۱۹۷۵ تا ۲۰۱۵ جستجو می‌کنیم.

The screenshot shows the Web of Science Basic Search page. At the top, there are navigation links for 'Web of Science', 'InCites', 'Journal Citation Reports', 'Essential Science Indicators', and 'EndNote'. The 'Web of Science' logo and 'THOMSON REUTERS' are also present. Below the navigation bar, there is a 'Search' button and a dropdown menu for 'Web of Science Core Collection'. The main search area has a 'Basic Search' dropdown, a search input field containing 'scientometric', a 'Topic' dropdown, and a 'Search' button. Below the search field, there are links for '+ Add Another Field' and 'Reset Form'. The 'TIMESPAN' section shows 'All years' selected, with 'From 1975 to 2015' displayed. There is a 'MORE SETTINGS' link. At the bottom, there are links for 'Customer Feedback & Support', 'Additional Resources', 'What's New in Web of Science?', and 'Customize your Experience'. A footer banner states 'Web of Science is the only place where you can get over 1 billion searchable, cited references.' with a 'Learn more.' link.

۲- نتایج منعکس شده، ۷۶۶ پیشینه بازیابی شده را در تاریخ جستجو (۲۸ آبان ۱۳۹۴) نشان می‌دهد.

Web of Science™ InCites™ Journal Citation Reports® Essential Science Indicators™ EndNote™ Sign In Help English

# WEB OF SCIENCE™

THOMSON REUTERS™

Search My Tools Search History Marked List

Results: 766  
(from Web of Science Core Collection)

You searched for: TOPIC: (sciento metric) ...More

Create Alert

Refine Results

Search within results for...

Web of Science Categories

- INFORMATION SCIENCE LIBRARY SCIENCE (394)
- COMPUTER SCIENCE INTERDISCIPLINARY APPLICATIONS (255)
- COMPUTER SCIENCE INFORMATION SYSTEMS (77)
- MULTIDISCIPLINARY SCIENCES (46)
- ENERGY FUELS (44)

more options / values... Refine

Sort by: Publication Date -- newest to oldest

Page 1 of 77

Select Page Save to EndNote online Add to Marked List

1. **Scientometric mapping of research on 'Big Data'**  
By: Singh, Vivek Kumar; Banshal, Sumit Kumar; Singhal, Khushboo; et al.  
SCIENTOMETRICS Volume: 105 Issue: 2 Pages: 727-741 Published: NOV 2015  
Full Text from Publisher View Abstract
2. **A quantitative examination of the intellectual profile and evolution of information security from 1965 to 2015**  
By: Olijnyk, Nicholas V.  
SCIENTOMETRICS Volume: 105 Issue: 2 Pages: 883-904 Published: NOV 2015  
Full Text from Publisher View Abstract
3. **A scientometric analysis of mobile technology publications**  
By: Kumar, R. Santha; Kaliaperumal, K.  
SCIENTOMETRICS Volume: 105 Issue: 2 Pages: 921-939 Published: NOV 2015  
Full Text from Publisher View Abstract
4. **Trends in the chemical and pharmacological research on the tropical trees Calophyllum brasiliense and Calophyllum inophyllum, a global context**  
By: Gomez-Verjan, J.; Gonzalez-Sanchez, I.; Estrella-Parra, E.; et al.  
SCIENTOMETRICS Volume: 105 Issue: 2 Pages: 1019-1030 Published: NOV 2015  
Full Text from Publisher View Abstract

Analyze Results Create Citation Report

Times Cited: 0 (from Web of Science Core Collection) Usage Count

۳- به جهت اینکه مقدمات تحلیل از طریق نرم افزار Histcite را فراهم کنیم لازم است تا خروجی نتایج را ذخیره نماییم تا بتوان در مراحل بعدی از آن استفاده نمود. از گزینه Save to other File Format استفاده می کنیم.

Web of Science™ InCites™ Journal Citation Reports® Essential Science Indicators™ EndNote™ Sign In Help English

# WEB OF SCIENCE™

THOMSON REUTERS™

Search My Tools Search History Marked List

Results: 766  
(from Web of Science Core Collection)

You searched for: TOPIC: (sciento metric) ...More

Create Alert

Refine Results

Search within results for...

Web of Science Categories

- INFORMATION SCIENCE LIBRARY SCIENCE (394)
- COMPUTER SCIENCE INTERDISCIPLINARY APPLICATIONS (255)
- COMPUTER SCIENCE INFORMATION SYSTEMS (77)
- MULTIDISCIPLINARY SCIENCES (46)
- ENERGY FUELS (44)

more options / values... Refine

Sort by: Publication Date -- newest to oldest

Page 1 of 77

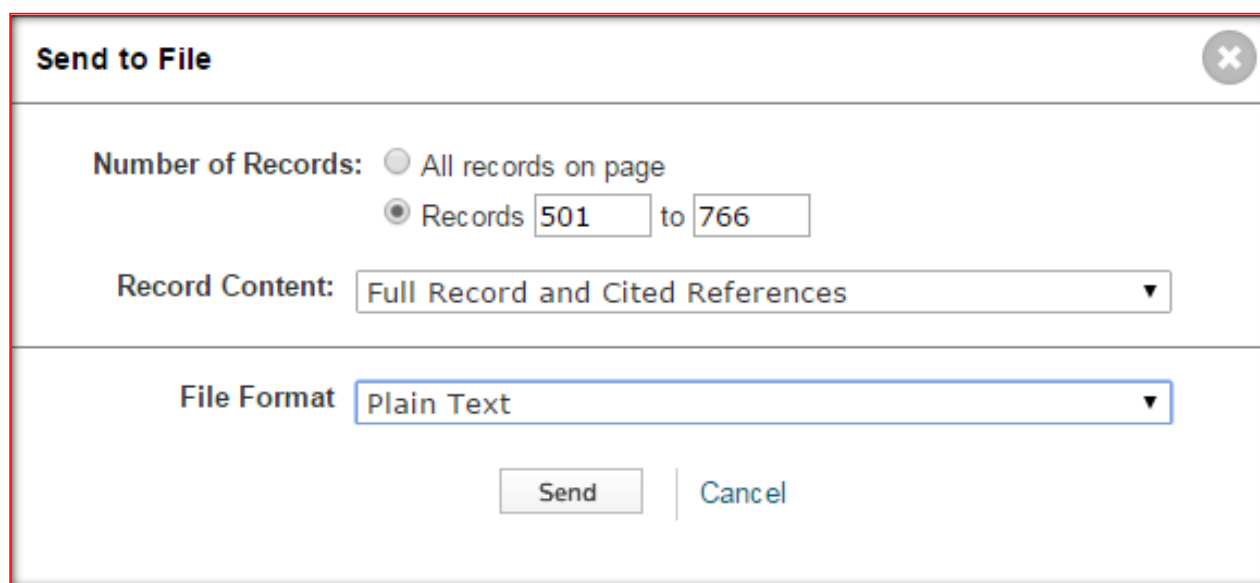
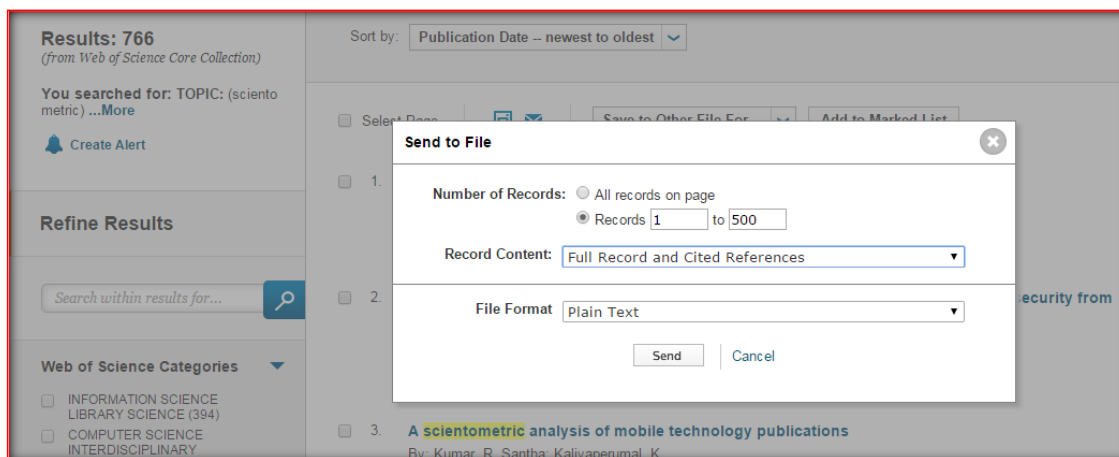
Select Page Save to EndNote online Add to Marked List

1. **Scientometric mapping of research on 'Big Data'**  
By: Singh, Vivek Kumar; Banshal, Sumit Kumar; Singhal, Khushboo; et al.  
SCIENTOMETRICS Volume: 105 Issue: 2 Pages: 727-741 Published: NOV 2015  
Full Text from Publisher View Abstract
2. **A quantitative examination of the intellectual profile and evolution of information security from 1965 to 2015**  
By: Olijnyk, Nicholas V.  
SCIENTOMETRICS Volume: 105 Issue: 2 Pages: 883-904 Published: NOV 2015  
Full Text from Publisher View Abstract
3. **A scientometric analysis of mobile technology publications**  
By: Kumar, R. Santha; Kaliaperumal, K.  
SCIENTOMETRICS Volume: 105 Issue: 2 Pages: 921-939 Published: NOV 2015  
Full Text from Publisher View Abstract
4. **Trends in the chemical and pharmacological research on the tropical trees Calophyllum brasiliense and Calophyllum inophyllum, a global context**  
By: Gomez-Verjan, J.; Gonzalez-Sanchez, I.; Estrella-Parra, E.; et al.  
SCIENTOMETRICS Volume: 105 Issue: 2 Pages: 1019-1030 Published: NOV 2015  
Full Text from Publisher View Abstract

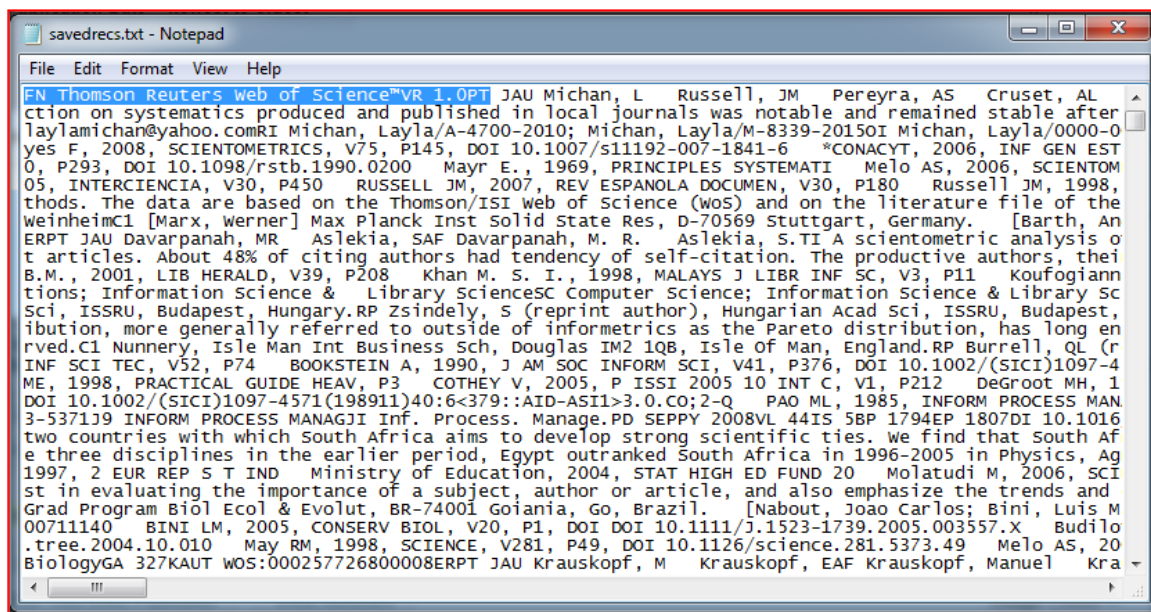
Analyze Results Create Citation Report

Times Cited: 0 (from Web of Science Core Collection) Usage Count

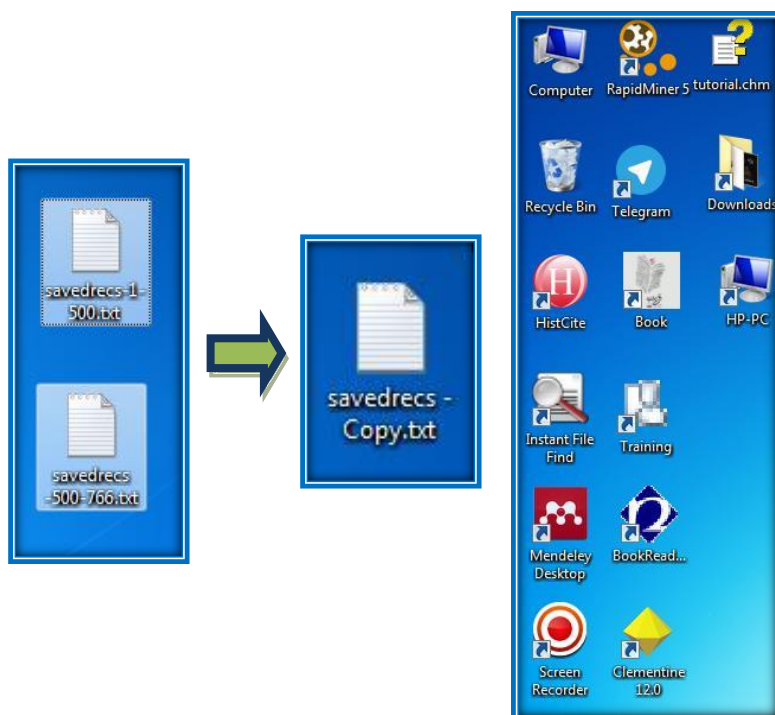
۴- به جهت محدودیت‌های پایگاه وب آو ساینس که خروجی مقالات جستجو شده را به صورت پیش فرض ۵۰۰ عنوان می‌دهد، بایستی خروجی را به صورت ۵۰۰ رکورد در هر مرحله استخراج کنیم که با توجه به عدد نتایج (۷۶۶) این کار در دو مرحله قابل انجام است. به تنظیمات گزینه Record content و File Format توجه شود.



۵- در مرحله بعد فایل خروجی را باز نموده و سطر اول گزینه Science<sup>TM</sup> FN Thomson Reuters Web را به گزینه Knowledge<sup>TM</sup> FN Thomson Reuters Web تغییر می‌دهیم. لازم است دو فایل متنی خروجی در هم ادغام شده تا در قالب یک فایل جامع به عنوان ورودی برنامه HistCite به آن عرضه شود. برای این منظور لازم است تا از فایل دوم بخش اشاره شده در بالا (FN Thomson Reuters Web of Science<sup>TM</sup>) را حذف و مابقی را کپی و به انتهای فایل اول بچسبانیم.



۶- فایل متنی نهایی (Savedrecs-copy.txt) را از طریق Drug & Drug به نرم افزار HistCite عرضه می کنیم و با باز شدن صفحه مربوط به نرم افزار، اطلاعات تحلیلی و گراف های توضیح داده شده در بخش ها و تصاویر بعدی را استخراج می کنیم.



۷- رکوردهای مرتبط با پیشنهادها بازایی شده، در اولین مرحله قبل از تشکیل جداول، اطلاعات خلاصه شده زیر (Log File) را نمایش و بلافاصله جداول، قابل رؤیت می شود.

```
ViewFile: "C:\Users\ARA\Desktop\Savedrecs-copy.txt"
Line: "FN Thomson Reuters Web of Knowledge™"
"
Size: ۳,۳۱ MB (۳۴۶۵۸۹۳ bytes)
Format: ISI-WOS
Reading data..
۱۰٪.. ۲۰٪.. ۳۰٪.. ۴۰٪.. ۵۰٪.. ۶۰٪.. ۷۰٪.. ۸۰٪.. ۹۰٪.. ۱۰۰٪ done in ۱ secs
Total records: ۷۶۶, Unique records: ۷۶۵ (new)
Years: ۱۹۷۹ - ۲۰۱۵
```

Indexing records.. done

**Records:** ۷۶۵

**Collection span:** ۱۹۷۹ - ۲۰۱۵

Processing All-Author list.. done

**Authors:** ۱۳۳۵

Processing Journal list.. done

**Journals:** ۲۵۶

Processing Word (in Titles (stopwords ۲ split-hyphen)) list.. done

**Words:** ۱۹۷۷, **Word count:** ۵۹۹۸, **All words count:** ۹۲۴۴

Processing Publication year list.. done

**Publication Years:** ۳۶

Processing Document type list.. done

**Document Types:** ۱۱

Processing Language list.. done

**Languages:** ۱۱

Processing Country list.. done

**Countries:** ۶۰

Processing Institution list.. done

**Institutions:** ۷۰۱

Processing Institution with Subdivision list.. done

**Institution with Subdivisions:** ۱۰۵۲

Processing Cited References..

**Local References:** ۲۸۲

**Global References:** ۲۰۰۲۵

**All Cited References:** ۲۰۳۰۷

All modules: done in ۱ secs

All steps -- done in ۱ secs



۸- از طریق بخش‌های بالایی صفحه یا سربرگ آنالیز، انواع تحلیل‌ها بر روی نویسندگان، مجلات، ارجاعات، کلمات، سال، نوع مدرک، زبان، موسسه و کشور قابل استخراج است.

http://127.0.0.1:1925/ - HistCite - savedrecs - Copy.txt - Internet Explorer

File Analyses View Tools Help

HistCite™

Grand Totals: LCS 1027, GCS 6645, CR 28011  
Collection span: 1979 - 2015

Untitled Collection

List of All Records

Records: 765, Authors: 1335, Journals: 256, Cited References: 20306, Words: 1977  
Yearly output | Document Type | Language | Institution | Institution with Subdivision | Country

|< << < > >> >|

#	Date / Author / Journal	LCS	GCS	LCR	CR
<b>1979</b>					
1	1 LYON WS SCIENTOMETRIC STUDY OF IAEA ACTIVATION-ANALYSIS CONFERENCES TRANSACTIONS OF THE AMERICAN NUCLEAR SOCIETY. 1979; 33 (NOV): 231-232	0	0	0	3
<b>1980</b>					
2	2 HAITUN SD SCIENTOMETRIC INVESTIGATIONS IN THE USSR SCIENTOMETRICS. 1980; 2 (1): 65-84	3	6	0	100
<b>1981</b>					
3	3 BUJDOSO E, LYON WS, BRAUN T SCIENTOMETRIC STUDY OF HEALTH-PHYSICS HEALTH PHYSICS. 1981; 41 (2): 233-242	2	6	0	16
4	4 PRICE DD THE ANALYSIS OF SCIENTOMETRIC MATRICES FOR POLICY IMPLICATIONS SCIENTOMETRICS. 1981; 3 (1): 47-53	5	24	0	0
5	5 PRICE DD THE ANALYSIS OF SQUARE MATRICES OF SCIENTOMETRIC TRANSACTIONS SCIENTOMETRICS. 1981; 3 (1): 55-63	4	41	0	0
6	6 CHERNOGORENKO VB, MUCHNIK SV SCIENTOMETRIC ESTIMATION OF PRESENT-DAY STUDY ON PHOSPHIDES SCIENTOMETRICS. 1981; 3 (2): 127-134	1	3	0	3
7	7 SCHUBERT A, BRAUN T SOME SCIENTOMETRIC MEASURES OF PUBLISHING PERFORMANCE FOR 85 HUNGARIAN RESEARCH INSTITUTES SCIENTOMETRICS. 1981; 3 (5): 379-388	1	13	0	10
<b>1982</b>					
8	8 BUJDOSO E, LYON WS, NOSZLOPI I PROMPT NUCLEAR ANALYSIS - GROWTH AND TRENDS - A SCIENTOMETRIC STUDY JOURNAL OF RADIOANALYTICAL CHEMISTRY. 1982; 74 (1-2): 197-238	2	20	1	34
9	9 HAITUN SD STATIONARY SCIENTOMETRIC DISTRIBUTIONS .1. DIFFERENT APPROXIMATIONS SCIENTOMETRICS. 1982; 4 (1): 5-25	14	58	0	61
10	10 HAITUN SD SCIENTOMETRIC ANALYSIS OF INFORMATION FLOWS IN CHEMISTRY - GRANOVSKY, YV SCIENTOMETRICS. 1982; 4 (1): 77-79	0	0	0	1

۹- جدول صفحه بعد تحلیل سال انتشار را عهده‌دار است. این تحلیل بر اساس تعداد رخداد پیشنهادها در هر سال مرتب شده است و با کلیک بر گزینه Recs لیست مقالات آن سال نشان داده می‌شود.

http://127.0.0.1:1925/?rev=1 - HistCite - savedrecs - Copy.txt - Internet Explorer

File Analyses View Tools Help

**Untitled Collection** HistCite™  
Grand Totals: LCS 1027, GCS 6645, CR 28011  
Collection span: 1979 - 2015

**Publication Year List (36: 1979 - 2015)** Histogram

Records: 765, Authors: 1335, Journals: 256, Cited References: 20306, Words: 1977  
Yearly output | Document Type | Language | Institution | Institution with Subdivision | Country

#	Publication Year	Recs	TLCS	TGCS
1	2015	84	3	20
2	2014	85	24	104
3	2013	74	30	234
4	2012	100	247	674
5	2011	48	95	371
6	2010	61	56	399
7	2009	43	66	570
8	2008	30	66	719
9	2007	26	43	475
10	2006	21	34	259
11	2005	19	17	216
12	2004	8	14	149
13	2003	17	39	337
14	2002	15	13	137
15	2001	17	25	140
16	2000	16	22	200
17	1999	11	24	219
18	1998	11	37	239
19	1997	22	36	396
20	1996	7	32	158
21	1995	1	0	3
22	1994	3	1	18
23	1993	4	5	16
24	1992	7	10	102

۱۰- جدول زیر بر اساس تحلیل نوع مدرک ساماندهی شده است. این تحلیل شامل انواع منابع موجود در مجموعه شامل مقاله تحلیلی، مقاله مروری، مقاله همایش، یادداشت، منابع ویرایشی، نامه، مواد کتابشناختی و بحث و بررسی می‌باشد. در اینجا نیز با کلیک روی Recs می‌توان کل مقالات آن نوع خاص از منبع را مشاهده کرد.

http://127.0.0.1:1925/? - HistCite - savedrecs - Copy.txt - Internet Explorer

File Analyses View Tools Help

**Untitled Collection**

**Document Type List (11)**

Records: 765, Authors: 1335, Journals: 256, Cited References: 20306, Words: 1977  
Yearly output | Document Type | Language | Institution | Institution with Subdivision | Country

#	Document Type	Recs	TLCS	TGCS
1	Article	646	896	5475
2	Review	37	48	552
3	Article; Proceedings Paper	36	58	463
4	Editorial Material	24	24	142
5	Meeting Abstract	7	1	1
6	Letter	5	0	2
7	Book Review	4	0	2
8	Note	3	0	7
9	Bibliography	1	0	1
10	Biographical-Item	1	0	0
11	Correction	1	0	0

۱۱- در جدول زیر، فراوانی زبان مقالات به ترتیب نزولی نمایش داده می‌شود.

http://127.0.0.1:1925/ - HistCite - savedrecs - Copy.txt - Internet Explorer

File Analyses View Tools Help

**Untitled Collection**

**Document Language List (11)**

Records: 765, Authors: 1335, Journals: 256, Cited References: 20306, Words: 1977

[Yearly output](#) | [Document Type](#) | [Language](#) | [Institution](#) | [Institution with Subdivision](#) | [Country](#)

#	Language	Recs	TLCS	TGCS
1	English	691	997	6391
2	Spanish	25	8	182
3	German	16	13	41
4	Russian	13	5	14
5	Portuguese	12	3	11
6	Czech	3	0	2
7	Arabic	1	1	2
8	Croatian	1	0	0
9	French	1	0	0
10	Hungarian	1	0	0
11	Rumanian	1	0	2

۱۲- جدول تحلیلی زیر فراوانی مقالات را بر اساس مؤسسات و دانشگاه‌ها به ترتیب نزولی نمایش می‌دهد.

http://127.0.0.1:1925/ - HistCite - savedrecs - Copy.txt - Internet Explorer					
File Analyses View Tools Help					
<b>Untitled Collection</b>					
<b>Institution List (701)</b>					
Records: 765, Authors: 1335, Journals: 256, Cited References: 20307, Words: 1977					
Yearly output   Document Type   Language   Institution   Institution with Subdivision   Country					
< << < > >> >					
#	Institution	Recs	Percent	TLCS	TGCS
1	Hungarian Acad Sci	36	4.7	136	739
2	Goethe Univ Frankfurt	20	2.6	12	44
3	Humboldt Univ	19	2.5	22	92
4	Free Univ Berlin	16	2.1	21	116
5	Katholieke Univ Leuven	16	2.1	26	237
6	Natl Inst Sci Technol & Dev Studies	14	1.8	17	114
7	Univ Granada	14	1.8	4	100
8	Russian Acad Sci	13	1.7	2	24
9	Unknown	13	1.7	16	43
10	Sirnak Univ	12	1.6	248	302
11	Univ Pretoria	12	1.6	23	116
12	Univ Valencia	12	1.6	0	47
13	Bhabha Atom Res Ctr	11	1.4	21	41
14	Univ Amsterdam	11	1.4	21	297
15	Univ Fed Goias	11	1.4	11	45
16	Hannover Med Sch	8	1.0	14	74
17	Lakehead Univ	8	1.0	29	88
18	Univ Hawaii	8	1.0	16	84
19	Harvard Univ	7	0.9	5	24
20	Lib Hungarian Acad Sci	7	0.9	28	107
21	Drexel Univ	6	0.8	11	38
22	Indiana Univ	6	0.8	5	54
23	Univ Ljubljana	6	0.8	4	28



۱۳- جدول تحلیلی زیر شامل نام مؤسسات و بخش‌های فرعی آنها مانند دانشکده‌های یک دانشگاه می‌باشد. برای هر مورد تعداد مقالات، دفعات استناد محلی به مقالات (TLCS)، دفعات استناد جهانی به مقالات (TGCS) نشان داده می‌شود.

http://127.0.0.1:1925/ - HistCite - savedrecs - Copy.txt - Internet Explorer

File Analyses View Tools Help

**Untitled Collection**

**Institution with Subdivision List (1052)**

Records: 765, Authors: 1335, Journals: 256, Cited References: 20306, Words: 1977

Yearly output | Document Type | Language | Institution | Institution with Subdivision | Country

|< << < > >> >|

#	Institution with Subdivision	Recs	TLCS	TGCS
1	Humboldt Univ	14	16	79
2	Natl Inst Sci Technol & Dev Studies	14	17	114
3	Hungarian Acad Sci, Chem Res Ctr	13	81	320
4	Unknown	13	16	43
5	Sirnak Univ, Fac Engn	12	248	302
6	Univ Pretoria, Inst Technol Innovat	9	16	84
7	Lakehead Univ, Fac Business Adm	8	29	88
8	Free Univ Berlin, Charite Univ Med	7	8	61
9	Goethe Univ Frankfurt, Inst Occupat Med Social Med & Environm Med	7	5	18
10	Goethe Univ Frankfurt, Inst Occupat Social & Environm Med	7	7	26
11	Hannover Med Sch, Dept Resp Med	7	11	71
12	Univ Amsterdam, Amsterdam Sch Commun Res ASCoR	7	16	136
13	Univ Hawaii	7	14	71
14	Katholieke Univ Leuven, Dept MSI	6	6	35
15	ACAD SCI USSR, INST SCI & TECHNOL HIST	5	43	177
16	Bhabha Atom Res Ctr, Sci Informat Resource Div	5	6	16
17	Charles Univ Prague, Fac Med 3	5	2	15
18	Inst Sci & Tech Informat China	5	10	48
19	South Asian Univ, Dept Comp Sci	5	7	6
20	Asia Univ, Trend Res Ctr	4	4	37
21	Bhabha Atom Res Ctr, Knowledge Management Grp	4	5	12
22	Harvard Univ, Brigham & Womens Hosp	4	5	5
23	Hungarian Acad Sci, Inst Res Policy Studies	4	3	32

۱۴- در جدول تحلیلی زیر، فراوانی مقالات بر اساس کشورهای مختلف رتبه‌بندی می‌شود. علاوه بر این می‌توان نتایج این تحلیل را به ترتیب تاریخ، نویسنده و مجله مرتب نمود. رتبه شانزدهم کشور ایران قابل توجه است.

http://127.0.0.1:1925/ - HistCite - savedrecs - Copy.txt - Internet Explorer

File Analyses View Tools Help

**Untitled Collection**

**Country List (60)**

Records: 765, Authors: 1335, Journals: 256, Cited References: 20306, Words: 1977

Yearly output | Document Type | Language | Institution | Institution with Subdivision | Country

#	Country	Recs	TLCS	TGCS
1	USA	78	89	662
2	Germany	75	51	374
3	Unknown	68	93	763
4	Peoples R China	67	43	436
5	India	58	61	156
6	Spain	50	9	330
7	Hungary	49	175	924
8	Brazil	37	15	107
9	UK	32	16	290
10	Netherlands	30	24	545
11	France	27	10	157
12	Russia	27	6	58
13	Belgium	23	27	431
14	Turkey	22	256	449
15	Canada	19	38	186
16	Iran	19	12	56
17	South Africa	18	32	202
18	USSR	15	52	193
19	Austria	13	9	155
20	Italy	13	21	310
21	Taiwan	13	8	80
22	Australia	12	14	106
23	Czech Republic	11	3	21
24	Chile	9	3	26

۱۵- در جدول بعد لیست همه نویسندگانی که در مجموعه منابع وجود دارند نشان داده می شود.

TGCS: نشان می دهد که چند بار مقالات یک نویسنده در این مجموعه مورد استناد قرار گرفته است. این معیار بر اساس تعداد استنادهای بازیابی شده از کل WOS محاسبه می شود.

TLCS: نشان می دهد چند بار مقالات یک نویسنده به وسیله مقالات دیگر همین مجموعه منابع مورد استناد قرار گرفته است.

RECS: تعداد مقالات یک نویسنده در مجموعه

بنابراین با این تحلیل تأثیرگذارترین نویسندگان در حوزه مورد مطالعه شناسایی می شوند.

http://127.0.0.1:1925/ - HistCite - savedrecs - Copy.txt - Internet Explorer

File Analyses View Tools Help

**Untitled Collection**

**All-Author List (1335)**

Records: 765, Authors: 1335, Journals: 256, Cited References: 20306, Words: 1977

Yearly output | Document Type | Language | Institution | Institution with Subdivision | Country

|< << < > >> >|

#	Author	Recs	TLCS	TGCS
1	Groneberg DA	25	24	76
2	Quarcoo D	18	24	103
3	Glanzel W	17	40	376
4	Scutaru C	17	23	108
5	Vinkler P	17	97	395
6	Konur O	15	256	313
7	Schubert A	14	55	369
8	Klingelhoef D	13	8	40
9	Pouris A	13	24	122
10	Leydesdorff L	11	35	344
11	Braun T	10	30	150
12	Gupta BM	10	1	29
13	Garg KC	9	15	83
14	Jacso P	9	16	84
15	Vitzthum K	9	13	47
16	Bundschuh M	8	11	25
17	Gerber A	8	10	22
18	Kademani BS	8	19	35
19	Mache S	8	14	29
20	Serenko A	8	29	88
21	Groneberg-Kloft B	7	8	64
22	Berezkin VG	6	0	5
23	Bornmann L	6	10	295

۱۶- لیست مجلات مجموعه را به ترتیب فراوانی مقالات رتبه‌بندی می‌کند. با کلیک بر روی تعداد مقالات می‌توان  
 سیاهه‌ای از عناوین مقالات را مشاهده کرد.

http://127.0.0.1:1925/ - HistCite - savedrecs - Copy.txt - Internet Explorer

File Analyses View Tools Help

HistCite™

Grand Totals: LCS 1027, GCS 6645, CR 28011  
 Collection span: 1979 - 2015

Untitled Collection

Journal List (256)

Records: 765, Authors: 1335, Journals: 256, Cited References: 20306, Words: 1977  
 Yearly output | Document Type | Language | Institution | Institution with Subdivision | Country

|< << < > >> >|

#	Journal	Recs	TLCS	TGCS
1	SCIENTOMETRICS	253	398	2741
2	ENERGY EDUCATION SCIENCE AND TECHNOLOGY PART A-ENERGY SCIENCE AND RESEARCH	37	189	369
3	JOURNAL OF INFORMETRICS	24	38	346
4	JOURNAL OF THE AMERICAN SOCIETY FOR INFORMATION SCIENCE AND TECHNOLOGY	20	24	249
5	CURRENT SCIENCE	17	22	54
6	MALAYSIAN JOURNAL OF LIBRARY & INFORMATION SCIENCE	13	7	14
7	JOURNAL OF INFORMATION SCIENCE	11	14	267
8	PLOS ONE	11	0	72
9	INFORMATION PROCESSING & MANAGEMENT	10	21	246
10	JOURNAL OF ANALYTICAL CHEMISTRY	9	0	10
11	ONLINE INFORMATION REVIEW	8	14	72
12	ENERGY EDUCATION SCIENCE AND TECHNOLOGY PART B-SOCIAL AND EDUCATIONAL STUDIES	7	27	31
13	JOURNAL OF OCCUPATIONAL MEDICINE AND TOXICOLOGY	7	0	29
14	RESEARCH EVALUATION	6	2	21
15	INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH	5	12	23
16	JOURNAL OF THE ASSOCIATION FOR INFORMATION SCIENCE AND TECHNOLOGY	5	0	7
17	REVISTA ESPANOLA DE DOCUMENTACION CIENTIFICA	5	1	7
18	SOUTH AFRICAN JOURNAL OF SCIENCE	5	9	37
19	DRUG DESIGN DEVELOPMENT AND THERAPY	4	5	5
20	INTERCIENCIA	4	2	25
21	JOURNAL OF ANALYTICAL CHEMISTRY OF THE USSR	4	0	0
22	SPECTROSCOPY LETTERS	4	0	17
23	ASIAN JOURNAL OF CHEMISTRY	3	0	0



۱۷- جدول زیر مشتمل بر تحلیل ارجاعات مورد استناد است. این تحلیل به ترتیب نام نویسندگان مرتب شده است و سال، نام مجله و شماره مقاله ذکر شده است و در ستون‌های مقابل هر شخص تعداد مقالات استناد شده هر شخص به منبعی که استنادها از آنجا بازیابی شده است WOS آمده است؛ بنابراین پراستنادترین اشخاص و مقالات مشخص می‌شود. با کلیک روی نام هر شخص سياهه‌ای از منابع استناد دهنده نشان داده می‌شود.

#	Author / Year / Journal	WoS	Recs
1	Hirsch JE, 2005, P NATL ACAD SCI USA, V102, P16569, DOI 10.1073/pnas.0507655102	102	102
2	de Solla Price D. J., 1963, LITTLE SCI BIG SCI	49	49
3	Konur O, 2011, APPL ENERG, V88, P3532, DOI 10.1016/j.apenergy.2010.12.059	44	44
4	Lotka A. J., 1926, J WASHINGTON ACAD SC, V16, P317	43	43
5	Konur O, 2012, ENER EDUC SCI TECH-A, V28, P727	39	39
6	Konur O, 2012, ENER EDUC SCI TECH-A, V29, P309	36	36
7	Konur O, 2012, ENER EDUC SCI TECH-A, V28, P903	35	35
8	GARFIELD E, 1972, SCIENCE, V178, P471, DOI 10.1126/science.178.4060.471	34	34
9	Konur O, 2011, SCIENTOMETRIC EVALUA	34	34
10	Konur O, 2012, ENER EDUC SCI TECH-A, V28, P1003	34	34
11	SCHUBERT A, 1986, SCIENTOMETRICS, V9, P281, DOI 10.1007/BF02017249	34	34
12	King DA, 2004, NATURE, V430, P311, DOI 10.1038/430311a	33	33
13	Konur O, 2012, ENER EDUC SCI TECH-A, V28, P1051	31	31
14	Egghe L, 2006, SCIENTOMETRICS, V69, P131, DOI 10.1007/s11192-006-0144-7	29	29
15	Gastner MT, 2004, P NATL ACAD SCI USA, V101, P7499, DOI 10.1073/pnas.0400280101	29	29
16	Konur O, 2011, 6 INT GREEN EN C IGE	28	28
17	Konur O, 2012, ENER ED SCI TECH A, V29, P325	28	28
18	MERTON RK, 1968, SCIENCE, V159, P56, DOI 10.1126/science.159.3810.56	26	26
19	MOED HF, 1995, SCIENTOMETRICS, V33, P381, DOI 10.1007/BF02017338	26	26
20	BRAUN T, 1995, SCIENTOMETRICS, V33, P263, DOI 10.1007/BF02017332	25	25
21	Demirbas B, 2011, ENER EDUC SCI TECH-A, V28, P453	24	24

۱۸- تحلیل صفحه بعد شامل لیست کلمات کلیدی است.

TGCS: نشان می‌دهد که چند بار یک کلمه در مقالات این مجموعه مورد استناد قرار گرفته است. این معیار بر اساس تعداد استنادهای بازیابی شده از کل WOS محاسبه می‌شود.

TLCS: نشان می‌دهد یک کلمه چند بار توسط مقالات دیگر همین مجموعه منابع مورد استناد قرار گرفته است.

RECS: تعداد تکرار کلمه‌ی کلیدی در عنوان مقالات را نشان می‌دهد. با کلیک روی این مورد، لیست مقالاتی که شامل این کلمات می‌باشند، نمایش داده می‌شوند.

http://127.0.0.1:1925/ - HistCite - savedrecs - Copy.txt - Internet Explorer

File Analyses View Tools Help

### Untitled Collection

**Word(i) List** (1977) Word count: 5998, All words count: 9244

Records: 765, Authors: 1335, Journals: 256, Cited References: 20306, Words: 1977  
[Yearly output](#) | [Document Type](#) | [Language](#) | [Institution](#) | [Institution with Subdivision](#) | [Country](#)

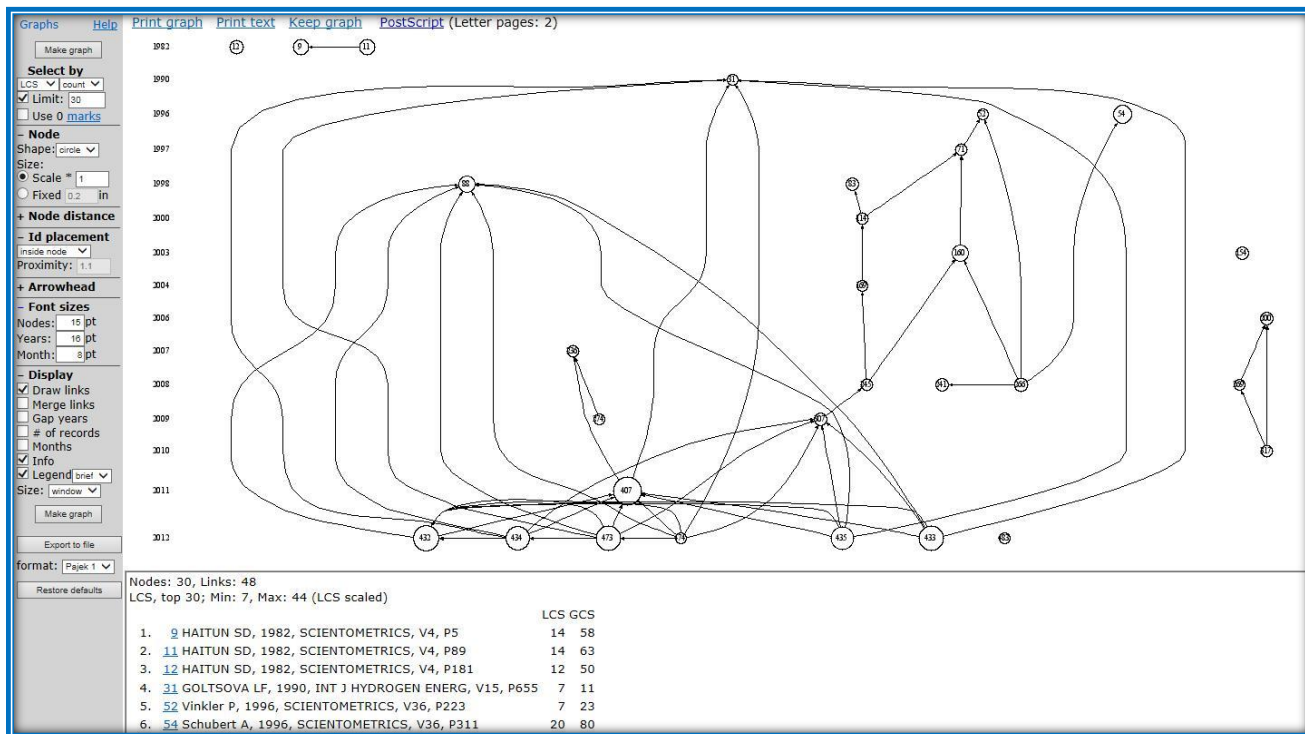
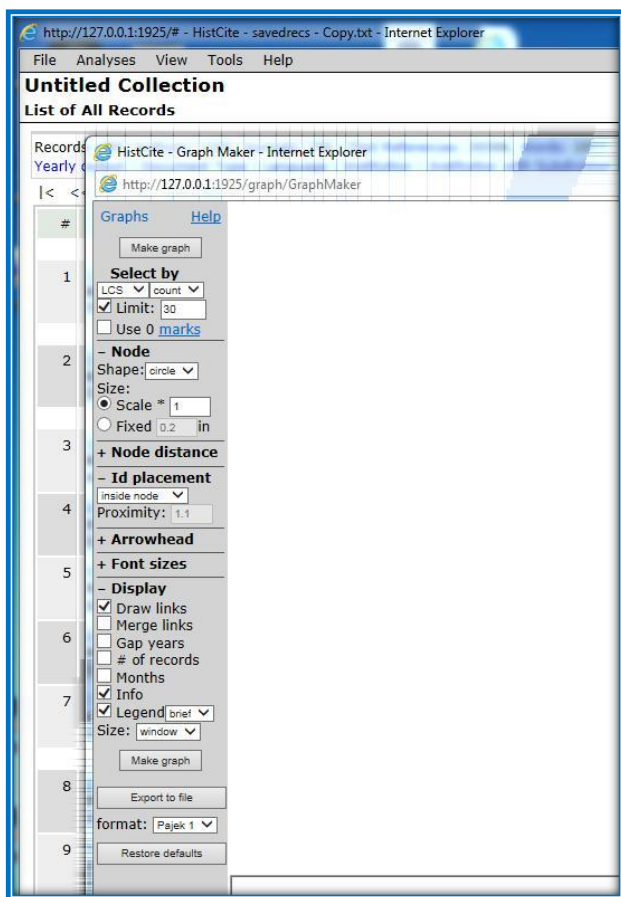
|< << < > >> >|

#	Word	Recs	TLCS	TGCS
1	SCIENTOMETRIC	341	668	2526
2	RESEARCH	237	417	1693
3	ANALYSIS	191	146	1076
4	SCIENCE	97	100	995
5	SCIENTIFIC	77	87	726
6	IMPACT	59	94	889
7	CITATION	56	75	1056
8	EVALUATION	55	251	615
9	INDICATORS	42	135	768
10	PUBLICATIONS	41	30	145
11	INDEX	39	56	501
12	JOURNALS	38	29	305
13	MAPPING	34	30	195
14	JOURNAL	33	30	239
15	APPROACH	32	165	303
16	BIBLIOMETRIC	32	39	365
17	TRENDS	32	34	219
18	BASED	31	48	319
19	SCIENTOMETRICS	31	29	232
20	INFORMATION	30	28	222
21	SCIENCES	30	36	306
22	LITERATURE	29	37	270
23	DATA	28	30	319

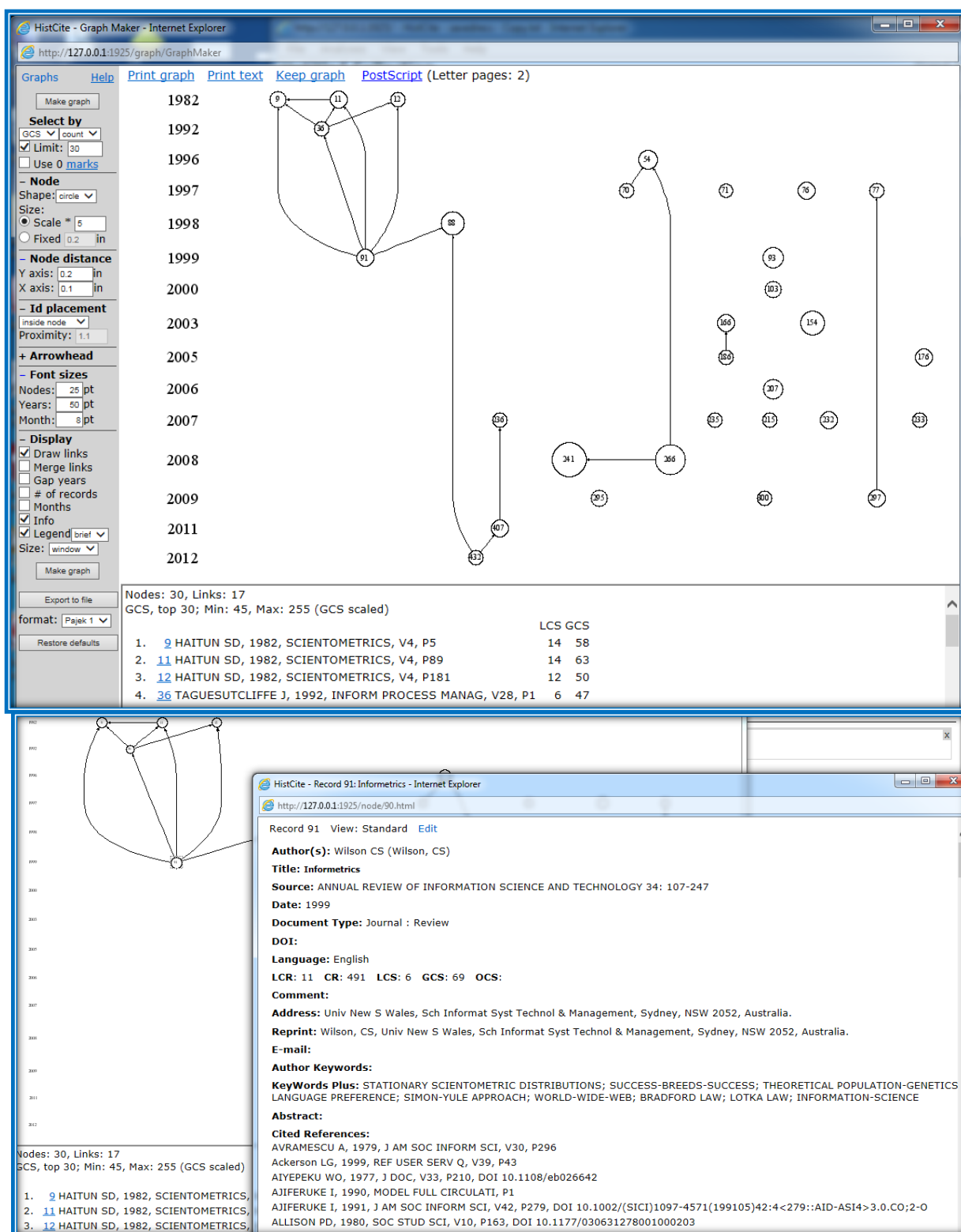
۱۹- از سربرگ Tools نسبت به ترسیم نمودار هیستوگراف اقدام شده است. با استفاده از داده‌های موجود و با انتخاب

گزینه Graph Maker نمودار رسم شده است. توضیح اینکه کادر سمت چپ امکانات مختلفی مانند شیوه انتخاب مقالات محلی یا جهانی، نشان دادن گره‌ها به صورت دایره یا مربع، تعیین فاصله گره‌ها و ... در اختیار قرار می‌دهد.

در پایین نمودار، تعداد گره‌ها، تعداد یال‌های ایجاد شده بین گره‌ها و حداقل و حداکثر تعداد LCS نمایش داده می‌شود. خاطرنشان می‌شود که در نرم‌افزار هیست سایت دو نوع نمودار GCS و LCS می‌تواند ایجاد شود. در نمودارهای تولیدشده زیر، دایره‌ها بیانگر مقالات هستند. اندازه دایره متناسب با امتیاز LCS است. شماره داخل دایره، شماره گره است. با کلیک بر روی دایره جزئیات رکورد منبع مقاله آورده می‌شود. فلش‌ها از یک گره به گره بعدی یا معمولاً به یک مقاله قدیمی‌تر، بر رابطه استنادی بین مقالات دلالت می‌کند.



۲۰- نمودار GCS و توضیحاتی که با کلیک بر رکورد پراستناد شماره ۹۱ ظاهر می شود، ذیلاً نمایش داده شده است.





## Visualizing the Structure of Scientific Output of Iranian Scholars in Science Citation Index (SCI) during 2000-2006

Iranlı Bilim İnsanlarının Bilimsel Üretim Yapısını Görselleştirme: Science Citation Index (SCI) Verilerine Dayalı Bir Araştırma (2000-2006)

Farideh Osareh

Shahid Chamran University, Faculty of Education and Psychology, Department of Library and Information Science, Ahwaz-Iran. fosareh@yahoo.com

Maryam Keshvari

Shahid Chamran University, Ahwaz-Iran. ma.keshvari@gmail.com

**Abstract:** To visualize the structure of Iranian scientific output in Science Citation Index (SCI), accessible via Web of Science (WOS), during 2000-2006, we used scientometric techniques and HistCite software. The number of Iranian documents indexed in SCI during the study period was 24,480. Generally HistCite analyzes citation data on two different levels: based on citations in WOS (Global Citation Scale), and citations in collection of retrieved documents (Local Citation Scale). The results of this study showed that, in the study period a total of 8 clusters have been formed on the two levels (GCS and LCS): Clusters 1 and 2 (with 3 sub-clusters) in GCS and clusters 3, 4, 5, 6, 7, and 8 in LCS. The subject area of whole clusters was chemistry, but different areas of this discipline. The prominent subject area in our study was organic chemistry. The most effective document in this study was an article by Zolfigol with 123 global citations and 71 local citations. The subject category of cluster 1 was analytical chemistry and membrane electrodes. Cluster 2 consists of 3 sub-clusters (sub-cluster 1 hydrocarbons, sub-cluster 2 in the field of oxidation and nitrogen, and sub-cluster 3 catalysts). Cluster 4 was crystal structure, cluster 5 electrochemical analysis, cluster 6 macro cycles, cluster 7 aliphatic and aromatic complexes and the 8<sup>th</sup> cluster was polymers.

**Keywords:** Scientometrics, historiographical map, scientific output, citation indexes, Iran

**Öz:** Web of Science (WOS) aracılığıyla erişilen Science Citation Index'te (SCI) İran'ın 2000-2006 yılları arasındaki bilimsel üretim yapısını görselleştirmek için bilimetric teknikler ve HistCite yazılımını kullandık. Araştırma kapsamına giren süre içinde SCI'de dizinlenen İran'a ait belge sayısı 24.480'di. Genelde HistCite atıf verilerini iki farklı düzeyde, WOS'taki atıflara dayalı olarak (Küresel Atıf Ölçeği) ve erişilen belge dermesindeki atıflara dayalı olarak (Yerel Atıf Ölçeği) analiz etmektedir. Bu araştırmanın sonuçları iki düzeyde (KAÖ ve YAÖ) toplam 8 küme oluştuğunu göstermektedir: KAÖ'de Küme 1 ve Küme 2 (3 alt küme ile birlikte), ve YAÖ'de Küme 3, 4, 5, 6, 7 ve 8. Bütün kümelerin konu alanı kimya, ancak kimya disiplininin farklı alanlarıydı. Çalışmamızda öne çıkan konu alanı organik kimya idi. Bu araştırmadaki en etkin belge 123 küresel atıf ve 71 yerel atıfla Zolfigol'un makalesiydi. Küme 1'in konu kategorisi analitik kimya ve membran elektrotlarıydı. Küme 2, üç alt kümeden oluşmaktadır (hidrokarbonlar, oksitlenme ve nitrojen, ve katalistler). Küme 4 kristal yapısı, Küme 5 elektrokimyasal analiz, Küme 6 makro devirler, Küme 7 alifatik ve aromatik kompleksler ve Küme 8 polimerler ile ilgiliydi.

**Anahtar sözcükler:** Bilimetrici, tarihyazımsal harita, bilimsel üretim, atıf dizinleri, İran

### Introduction

The issue of scientific production was first introduced at the University of Tehran in 1978 but was not pursued. In 1993-1994 this topic was studied more seriously, and in 1997 the citation role in evaluating scientific collaborations was the main subject area of the "Conference of Methodology and Research Techniques" which was carried out by the research deputy of the University of Tehran (Osareh, 1997). After 1999, scientific production was considered by the Iranian Ministry of Science, Research and Technology (MSRT). According to the law passed by MSRT, each Iranian who publishes an article in a Thomson ISI Journals receives a considerable reward (Moosavi Movahedi, Kiani Bakhtiari, & Khan Chamani, 2003).

The government supports and encourages the attention and tendency of Iranian authors towards internationalized Iranian research output, and this has caused a gradual increase in Iranian scientific output (Osareh & Wilson, 2002).

A simple search in WOS on Iranian scientific output showed that an exponential increase has happened in recent years. For instance, the number of Iranian publications in SCI in 2000 was only 1371, while this rate increased to 5630 in 2005, 13440 in 2008 and 16492 in 2009. In this article, we decided to study Iranian scientific output using scientometric indicators.

### Importance and Necessity of Research

One of the important factors for sustainable development in each country is the number of the scientific products indexed in international accredited databases. Based on the importance of scientific products on national and international scales, this paper is trying to visualize scientific output of Iranian scholars in WOS during 2000-2006. To this end, the subject areas of established clusters will be identified, and the effective authors and articles in both GCS and LCS will be recognized. We also try to explore the participation rate of Iranian scholars in creating these products. In other words, in this research we consider the scientific products of Iran in the Thomson ISI. We should draw your attention to the Iranian national language which is Farsi; therefore a lot of Iranian scientific output is in Farsi so does not have a chance to be indexed in Thomson ISI databases. Hence, in this research we have mapped Iranian non-Farsi publications in the Science Citation Index via WOS.

### Aims and Purposes

The main purpose of this research is to visualize the structure of the scientific products of Iranian scholars indexed in Thomson ISI accessible via WOS during 2000-2006. According to this map, we will study the history of science and recognize the effective authors, based on citations on both LCS and GCS. To reach the above goals we should answer the following questions.

### Research Questions

1. How is the historiographical map of Iranian scientific output in WOS during 2000-2006?
2. What are the most important scientific clusters formed in Iranian scientific output during 2000-2006? And what are their subject areas?
3. Who are the most productive and effective Iranian authors on both citation levels (GCS & LCS) during 2000-2006?
4. What are the most effective articles based on both GCS and LCS citation levels and their publication dates?

### Background

Osareh and Wilson (2002) analyzed international collaboration of Iranian scientific publications in SCI during 1995-1999. The results show that Iran's publication output in science and technology increased dramatically in the SCI during 1995-1999. One of the most important and significant factors that caused this rise seems to be the government's research policies in the last few years of their study. In 1996, the Iranian government announced the first national research call for papers and continued it for the following years. The researchers selected topics according to their areas and started working with large research grants. This can lead the researchers towards the research topics needed by the government. Another result of this study shows that Iran's main international collaborators are authors with institutional affiliations in the US or the UK. However, it is obvious that Iran is looking more and more for collaborative partners elsewhere. Collaboration with authors in Canadian and Australian institutions has increased either in absolute numbers, relative percentages or both.

Osareh and McCain (2008) tried to draw the intellectual structure of Iranian chemistry research in Science Citation Index (SCI). The results of this research showed that since 1990, Iranian chemistry research, as represented in the SCI, has grown at a rate of roughly 26% and 7 major clusters, Oxidation of Organic Compounds, Physical Organic Chemistry, Ionosphere, Analytical Chemistry, Solvent-Free Synthesis, C.J. Pedersen and Crown Ethers, Synthesis of Carbonyl Compounds, were identified. The topic areas were primarily in organic chemistry, and secondarily in analytical chemistry; other major topic areas such as biochemistry, applied chemistry, and chemical engineering were not seen.



### Research Methodology and Data Gathering

The research method for this study was the scientometric method. The population of this research comprises 24480 documents produced by Iranian authors, indexed in SCI during 2000-2006.

Data were gathered and analyzed in 3 steps using 3 tools. In the first step, data were extracted by using SCI and via WOS in plain text format. In the second step, data were recognized by ISI.exe software, and in the third step data were registered into an Excel spreadsheet and made ready for analysis.

To draw the historiographical map of Iranian scientific output in SCI, we used HistCite software. This software is a product of ISI. Its input contains plain text files extracted from WOS and its output contains a graphical image of scientific outputs (Garfield, Paris, & Stock, 2006).

### Data Analysis

#### A) Describing data

The analysis of the data revealed that there were totally 24480 documents produced and indexed in SCI by Iranian authors during 2000-2006. The publication year, document type and the language of the documents were analyzed and are displayed in Table 1.

The publication rate of Iranian scientific products increased from 2000 to 2006: 5.85 percent of the total for the period (1417 documents) were published in 2000 and 24.74 percent (5995 documents) in 2006. In other words, Iran increased its annual productivity 4.23 fold from 2000-2006.

The results of the analysis of the type of documents showed that the documents are in 13 different formats. The most frequent format was the article with 21513 (87.88%) titles, followed by meeting abstracts with 2139 (8.74%) titles (Table 1).

As can be seen in Table 1, Iranian scientific products in SCI during 2000-2006, were published in five different languages. English with 24499 (99.88%) documents ranked top, followed by French and German with 18 (0.07 %) titles, and 10 (0.04 %) titles respectively.

Table 1. Iranian scientific products by language, format and publication year

Publication year			Type of documents			Language		
Year	Frequency	Percent	Format	Frequency	Percent	Language	Frequency	Percent
2000	1,417	5.85	Article	21,513	87.88	English	24,449	99.88
2001	1,775	7.32	Meeting Abstract	2139	8.74	French	18	0.07
2002	2,411	9.95	Literature Criticism	336	1.37	German	10	0.04
2003	3,234	13.35	Review	209	0.85	Russian	2	0.01
2004	4,062	16.77	Editor Review	200	0.83	Italian	1	0
2005	5,335	22.02	Correction	61	0.25	Total	24,480	100.0
2006	5,995	24.74	News	17	0.07			
Total	24,229	100.0	Biography	2	0.01			
			Database Review	1	0			
			Reprint	1	0			
			Bibliography	1	0			
			Book Review	0	0			
			Software Review	0	0			
			Total	24,480	100			

#### B) Historiographical Map

A historiographical map has been drawn based on two separate levels, using HistCite: 1. Global citations scale (GCS). 2. Local citations scale (LCS). For the GCS map, the data sample was based on 300 documents (nodes). For the LCS map, due to the high number of links, and to have a clear graph we, drew the map with only 200 nodes.

### *Analyzing the Clusters of Iranian Scientific Products in SCI during 2000-2006*

Because of the length of the map, we decided to divide it by clusters and identify the clusters one by one. The results of the research showed that on the GCS level there were only 2 clusters; cluster 2 had 3 sub-clusters due to the diversity of the subject areas. In the LCS map we observed 6 clusters. The subject fields of clusters in the GCS map were "membrane electrode" (cluster 1); the 3 sub-clusters of cluster 2 were in "operation on hydrocarbons", "oxidation and nitrogen" and "catalysts". In the LCS map, clusters were in "operation in organic chemistry", "crystal structure", "electrochemical analysis", "macro cycles", "aliphatic & aromatic complexes" and "polymers". Firouzabadi and Heravy each participated in 3 clusters of which two had the same subject areas: "operation in hydrocarbons" and "operations in organic chemistry". The subject category of the 3<sup>rd</sup> cluster for Firouzabadi was "aliphatic & aromatic complexes", while Heravy participated in "catalysts" as the 3<sup>rd</sup> cluster. It should be noted that the first authors in all clusters were Iranian.

#### *Scientific Clusters in SCI on GCS Map:*

Considering the GCS map, 2 clusters have been observed in Iranian scientific output in SCI during 2000-2006. Clusters 1 and 2 will be defined shortly. It should be noted that due to the subject diversity of cluster 2, it has formed 3 sub-clusters.

#### *Cluster 1*

This cluster has been established by the collaboration of 7 Iranian authors (Shamsipour, Ganjali, Mousavi, Shahrokhian, Javanbakht, Mashhadizadeh and Bagheri) during 1999-2005, in the area of "membrane electrode" in analytical chemistry. Figure 1 shows cluster 1, with the top 5 articles based on the number of citations and links which are shown in bold numbers in this Figure.

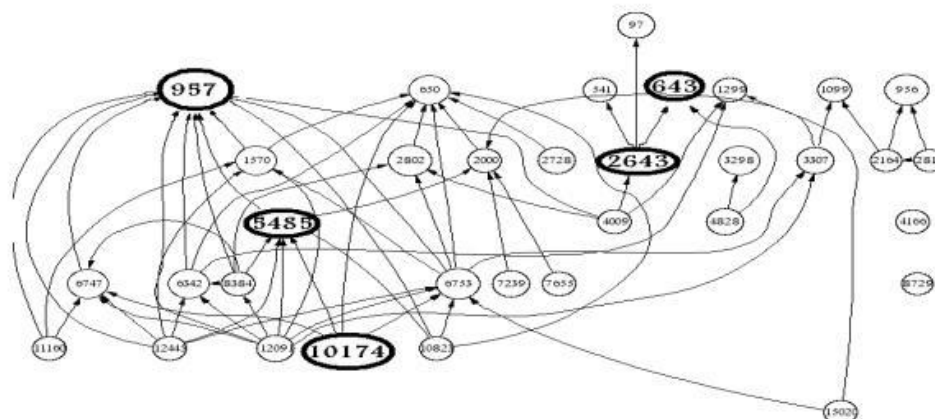


Figure 1. Cluster 1 in membrane electrode area on GCS map

In this cluster, the most effective document (considering the number of citations received and links to it) is by Shamsipour (957) with 102 GCS. This document with 66 LCS is also the most effective document in LCS map.

#### *Cluster 2*

As was mentioned and can be seen in Figure 2, cluster 2 is a large and separable cluster. Therefore, it was divided in 3 sub-clusters due to the diversity of subject areas. Each sub-cluster will be analyzed separately.



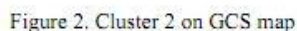
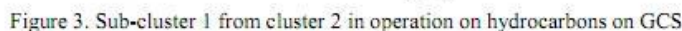


Figure 3 shows the first sub-cluster of cluster 2. This sub-cluster is established by collaboration of 7 Iranian authors (Kaboudin, Karimi, Azizi, Firouzabadi, Habibi, Saidi, and Heravy) during 1999-2006. The subject area of this cluster is "operation on hydrocarbons". The most effective document (3195) is by Kaboudin with 76 GCS. In Figure 3 the top 5 most effective documents in this sub-cluster are in bold.



The subject area of this sub-cluster is "oxidation, nitrogen and catalysts" in the area of organic chemistry. The most important document in this sub-cluster is indicated by the number 3194 in Figure 4 and titled "Silica sulfuric acid/ $\text{NaNO}_2$  as a novel heterogeneous system for production of thionitrites and disulfides under mild conditions" by Zolfigol (2001). It received 123 GCS and 71 LCS. This document received the highest number of citations in both parts: GCS and LCS.

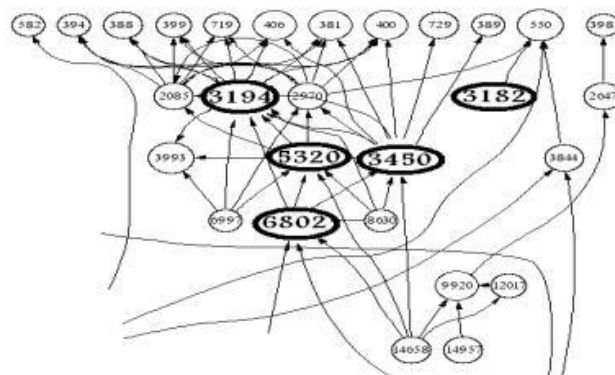


Figure 4. sub-cluster 2 of cluster 2 on GCS map

As can be seen in Figure 4 sub-cluster 2 is a big sub-cluster and has been established by collaboration of 10 authors (Zolfigol, Salehi, Firouzabadi, Shirini, Heravy, Khosropur, Mohamadpour, Balterak, Khodayi, Iranpour, and Sadeghi) by 28 documents during 2000-2006. Zolfigol with 14 documents produced the most articles in this sub-cluster. All of the first authors in these documents are Iranians. The top 5 most important documents from this sub-cluster are bold in Figure 4.

#### Sub-cluster 3 from Cluster 2

This is a small sub-cluster with only 5 documents and by collaboration of 2 Iranian authors (Heravy and Bamoharram). It was established during 2005-2006 in the "Catalysts" subject area. The most effective document in this cluster is document number 18231 from Heravy with 47 GCS.

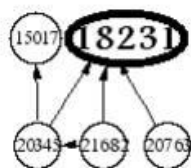


Figure 5. Sub-cluster 3 from cluster 2 on GCS map

#### Clusters in SCI in Local Citation Scale

According to local scales, there are 6 clusters in scientific products of Iranian authors in SCI during the research period. Here we analyze them.

#### Cluster 3

This is another big cluster with 29 documents and collaboration of 8 authors (Zolfigol, Shirini, Salehi, Firouzabadi, Sadeqi, Keypour, Mirjalili, and Heravy). This cluster was established during 2000-2005 based on LCS. Zolfigol produced 21 documents out of 29 in this cluster. As was mentioned his document number 3194 received the most number of citations based on LCS and GCS. The subject category of this cluster is "oxidation, nitrogen and catalysts" in Organic Chemistry. First authors in all documents of this cluster are Iranian.

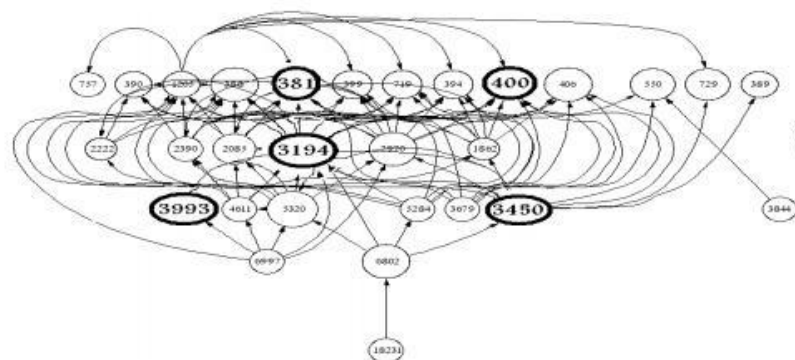


Figure 6. Cluster 3 in oxidation, nitrogen and catalysts on GCS map

#### Cluster 4

This cluster has 9 documents produced by 2 authors (Moghimi and Ranjbar). It was established during 2001-2005 and its subject area is "crystal structure". The most effective document in this cluster is document 4170, by Moghimi, with 28 LCS.

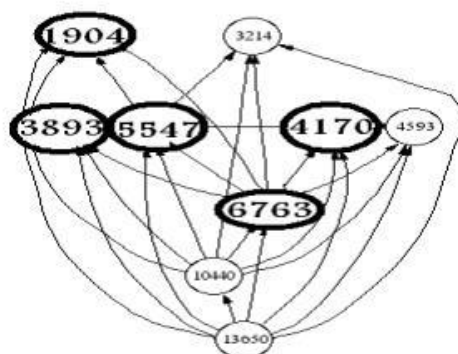


Figure 7. Cluster 4 in Crystal structure on LCS map

#### Cluster 5

The subject area of this cluster is "electrochemical analysis". It has 29 documents with collaboration of 7 Iranian authors (Shamsipour, Shahrokhian, Ganjali, Javanbakht, Musavi, Rahmani and Bagheri). This cluster was established during 1999-2004 based on LCS.

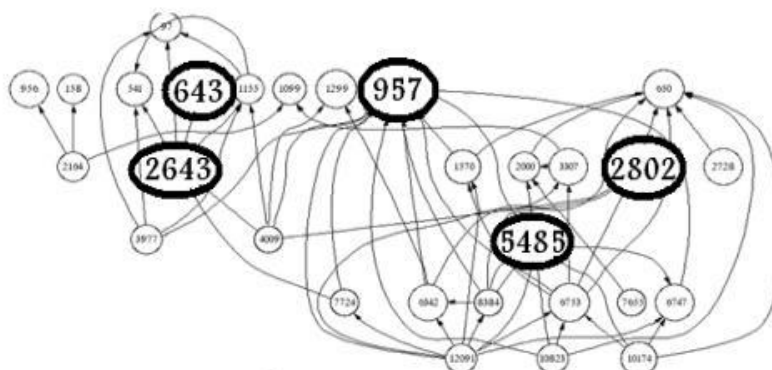


Figure 8. Cluster 5 in Electrochemical analysis based on LCS map

*Cluster 6*

This cluster has 7 documents by one author (Salavati Niasri). It was in "macro cycles" and has been established during 2003-2005. The most effective documents in this cluster are numbers 10714 and 11621 which each received 21 LCS.

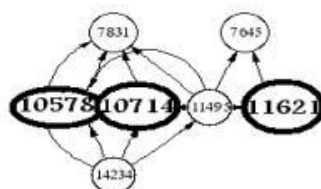


Figure 9. Cluster 6 in Macro cycles on LCS map

*Cluster 7*

This cluster has 9 documents by 4 authors (Karimi, Firouzabadi, Azizi and Saidi) and was established during 1999-2004 in the area of aliphatic and aromatic complexes. The most effective document in this cluster is document number 1364 with 22 citations in local scale. The information of this cluster is available in Figure 10. All of the first authors in this cluster are from Iran.

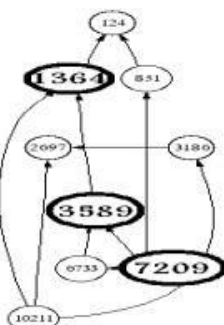


Figure 10. Cluster 7 in aliphatic and aromatic on LCS map



### Cluster 8

Cluster number 8 was established by 17 documents by 2 Iranian authors (Hajipour and Malekpour) during 2000-2004, in the subject area "Polymers". The most effective documents in this cluster are documents number 868 with 54, and documents number 558 and 852 each with 52 LCS.

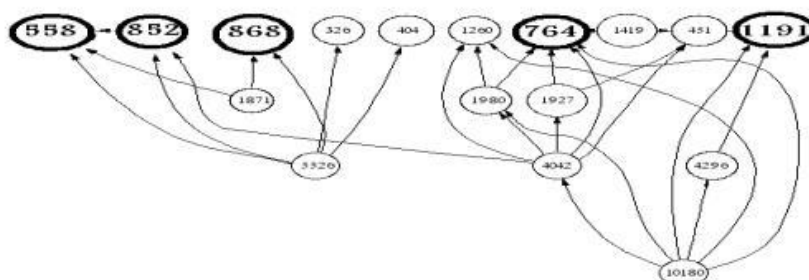


Figure 11. Cluster 8 in polymers on LCS map

### Conclusions and Suggestions

This article found that, the total rate of scientific production in the period of this research was increasing and the scientific products of Iran from 2000 to 2006 showed a growth rate of 4.23 percent. The most similar research to this study was done by Osareh and McCain (2008) in which all clusters were about chemistry. These results were proved in our research and shown that generally, Iranian chemists have a tendency to produce scientific documents first in the field of organic chemistry and second in analytical chemistry. The most participant authors in the clusters of this study were Firouzabadi and Heravy who each participated in 3 clusters. Of those one was in the 3rd sub-cluster of cluster 2 (in GCS) and 2 other clusters in LCS. Among all 8 clusters, 1 cluster was formed by only 1 author. Two clusters were formed by publications of 2 authors. Other clusters had more than 2 authors. The results of this study also showed the influential Iranian authors and articles during 2000-2006 in WOS. The subject areas of clusters were recognized as follows:

"membrane electrode", "operation on hydrocarbons", "operation oxidation and nitrogen", "organic chemistry" and "catalysts". In LCS map, clusters were in "operation in organic chemistry", "crystal structure", "electrochemical analysis", "macro cycles", "aliphatic & aromatic complexes" and "polymers".

Using information visualization in different scientific disciplines could be useful for specialists as well as policy makers. The specialists at a glance can see which subject areas in their discipline have been under research by their colleagues, and which areas have been less attendant during a specific time. The results of such studies would let the policy makers allocate the budgets to subject fields with more confidence. The results of such studies also would be helpful for scientists and young specialists who can save their time by reading the works of key authors and influential scientific output in their disciplines.

### References

- Garfield, E., Paris, S., & Stock, W.G. (2006). HistCited™: A software tool for informatic analysis of citation linkage. *Information Wissenschaft und Praxis* 57, 391-400.
- Moosavi Movahedi, A.A., Kiani Bakhtiari, A., & Khan Chamani, J. (2003). Methods of production and dissemination of scientific findings. *Rahyafi*, 31, 5-19. (in Farsi).
- Osareh, F. (1997). Bibliometrics. *Journal of School of Education & Psychology of Shahid Chamran University*, 8(4), 90-97. (in Farsi)
- Osareh, F. & McCain, W. (2008). The structure of Iranian chemistry research, 1990-2006: An author cocitation analysis. *Journal of the American Society for Information Science and Technology*, 59(13), 2146-2155.
- Osareh, F. & Wilson, C.S. (2002). Collaboration in Iranian scientific publications. *Libri*, 52, 88-98.