Bibliometric Analysis of Iranian Medical Journals and Related Socio-Cultural Factors

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Researcher's Problem

Our library provides many journals.
But,
those published in Iran are rarely used.

Why?

Why is this a problem?

a) From the library's point of view
What to keep and for how long?
140 medical journals (90) and all of these are circulated free of charge.
Labour and Space

b) From a broader economic perspective
Cost-benefit analysis and resource management for policy decision-making

For both A and B above, we need *objective* criteria for:

1. Which journals are used consistently and frequently (core journals)

2. For what period are articles in such journals referred to by current researchers

Possible Solutions to the Problem

Currently Available Methods

User perception
Method: Questionnaires
Cons: Subjective
Pros: Cheep and Fast

Usage studies
Method: Libraries track usage
Cons: Diversity of access methods
Pros: Objective

Content Analysis
Method: Expert Judgement
Cons: Subjective
Pros: Reliable (theoretically)

Citation analysis
Method: Citation count
Cons: Assumptions about quality
Pros: Objective, large dataset

Selected Solution to the Problem

(Citation Analysis)

**Wanted: Decision-making criteria for assessing the usefulness of journals
Will get ability to:**

- **Calculate the impact factor of Iranian medical journals**
- **Determine the most cited authors**
- **Determine the most productive authors**
- **Determine the percentage of different type of sources listed in articles' citations.**
- **Determine the most cited articles**
- **Determine the recency or immediacy of citations**

So what?

Can be used as tool to assist ordering, archiving, funding and appointment decisions

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Selected Dataset

**All of the 90 research-based Iranian Medical Journals
published between 2002 and 2004**

**Estimated number of records
based on a sample of 100 articles
was**

150,000 records

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A basic problem with citation analysis as the solution to the researcher's problem

Requires…

Availability of a bibliographic database of journals

However…

No such database exits for Iranian Medical journals (or any Iranian Journals)

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The Legwork Begins Here…

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…. And ends here

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Finding a Way Out - First Idea

Request electronic copies of journals from publishers

This was…
wishful thinking:

✓None kept
✓Inaccessible
✓Required OCR

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Finding a Way Out - Second Idea

Use existing resources

i.e.

Hard copies in libraries

Network of friends

to
Compile own database

Step 1: Database design and testing
a) Choice of Database
b) Fields. Tables. Relationships
c) Interface
d) Preliminary Testing

Step 2: Database Implementation

a) Installation
b) Training
c) Scanning
d) OCR
e) Cut and pasted data into forms
f) Supervision (3 weeks)

Problems

No Networking facilities

⇨Duplication
⇨Consistency of Primary keys

Data Entry

⇨Had 8 _paid_ operators
⇨Wrong Fields

OCR

⇨Unreliable Farsi OCR (paid for)

Number of Records

⇨Underestimated (>170,000)

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5 months later…

Less than 20 percent of the data were entered.

A Major Problem!

At this rate, the data entry alone would require…
… 25 months

It would then take another 25 months to…
…correct the data entry problems!

Back to the Drawing Board

R.I.P

Reminder - The Original Problem:
Electronic versions of journals not available.

But now…

Can scan the English data into Word™ and
⇨ **with the help of macros**
⇨ **Text handling formulae in Excel**
⇨ **Importing into MS-ACCESS**

Using this method:

Had 20,000 records in the database in less than 1 week!

However, For performance analysis of Farsi journals…

…the English text was not very helpful

The Next Problem - What to do with the Farsi text?

Solution
Use existing tables of contents, then,
Type the Farsi References

Bibliographic information to be typed (as is) into Word	English OCR
This was completed within one month. Work on the analysis of these results could now begin	Meanwhile, Scanning and conversion of English text Five months.

Preliminary Results

Total number of Articles	6264
Total Number of references	115884
=> No. of references per article	18
Total number of cited articles	448
Total no. of citations received	565
no. of self-citations	183
Most cited authors	found
Most cited papers	found
Total Number of times authors published	19854
=> Average number of authors per article	3.17

Relationship between different types of sources in the references

Source 1	Source 2	Pearson Correlation Coef.	Significance
Articles	Books	-.878(**)	.000
Articles	Thesis & Dissertations	-.850(**)	.000
Articles	Conferences & Seminars	-.838(**)	.000
Articles	Internet Resources	-.679(**)	.000
Articles	Research Projects	-.396(*)	.030
Books	Thesis & Dissertations	.812(**)	.000
Books	Conferences & Seminars	.731(**)	.000
Thesis / Dissertations	Conferences & Seminars	.782(**)	.000
Thesis / Dissertations	Internet Resources	.608(**)	.000
Thesis / Dissertations	Research Projects	.524(*)	.012
Research Projects	Conferences & Seminars	.509(*)	.004

These data show that there is…
A significant negative correlation between the use of articles and other types of resources

A significant positive correlation between non-articles sources

Why?
Hypothesis:
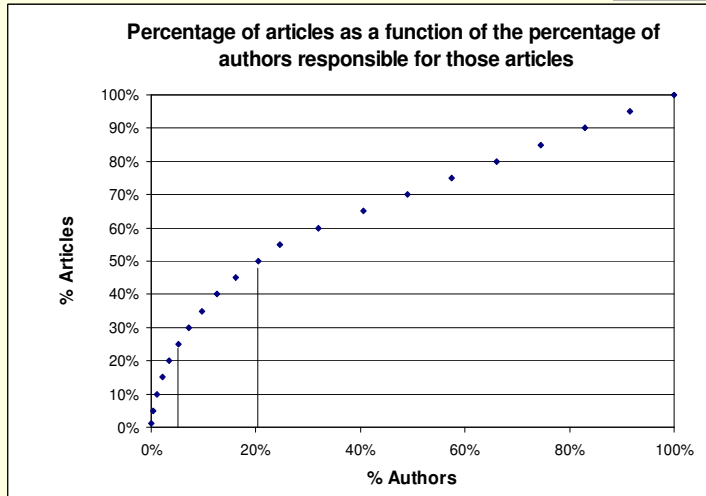## Those who have access to original articles rely on them.
Those who can't, use a mixture of more accessible sources.

From this, it transpired that the top 10% (~2000) authors were responsible for

more than one third of all of the published articles.

Percentage of articles as a function of the percentage of authors responsible for those articles

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■ **Too few citations to Iranian articles**

Traditional Method for calculating impact factor:

Classical Journal Impact Factor (e.g. for 2004)
=
Number of times a Journal was cited in the year (e.g. 2004)
Total number of articles published by the journal in the previous two years (e.g. 2002-3)

Solution

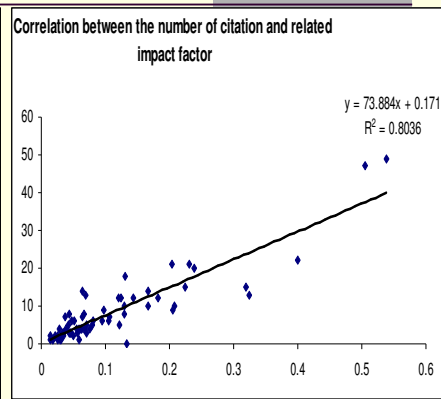| **Number of times a Journal was cited in the previous three years (e.g. 2002-04)** |
|:---:|
| **Total number of articles published by the journal in the previous two years (e.g. 2002-3)** |

$$MJIF = \frac{C_y + C_{y-1} + C_{y-2}}{A_{y-1} + A_{y-2}}$$

Using this formula,

The Modified Impact Factors for 83 journals published between 2002 and 2004 have been calculated and the journals have been ranked accordingly. Here are the top 10

Rank	Journal	No of citation	Impact Factor
1	Journal of Endocrinology and Metabolism	49	0.538
2	Hakim	47	0.505
3	Lipid and diabetics disorder	22	0.400
4	Iranian anatomical journal	13	0.325
5	Southern Medical Journal of Boushehr MSUJ	15	0.319
6	Journal of Andisheh v Raftar	20	0.238
7	Journal of Kosar	21	0.231
8	Medical plants	15	0.224
9	Yakhteh	10	0.208
10	Iranian journal of medical education	9	0.205

Correlation between the number of citation and related impact factor

$y = 73.884x + 0.171$
$R^2 = 0.8036$

Half-life of foreign **and Farsi journals from 2002 to 2004**

|		Half-life of Farsi journals in 2002	Half-life of foreign journals in 2002	Half-life of Farsi journals in 2003	Half-life of foreign journals in 2003	Half-life of Farsi journals in 2004	Half-life of foreign journals in 2004
N	Valid	406	10570	497	15130	420	15288
Percentiles	50	1377	1994	1377	1995	1378	1996
		5 years	9 years	6 years	9 years	6 years	9 years

The most cited internationally published journals half-life from 2002 to 2004 by Iranian medical scholars(2002-2004)

JOURNALS	TIME CITED	HALF_LIFE
NEJM	498	1992
LANCET	360	1993
BMJ	296	1993
AM J CLICAL NUTRITION	263	1996
PEDIATRICS	254	1998
J CLINCAL ENDO MET	243	1997
OBS & GYN	237	1996
AM J OBST& GYN	231	1993
CIRCULATION	203	1995
JAMA	197	1993
J PEDIATRICS	178	1994
BIABETIC CARE	178	1996
CANCER	158	1990
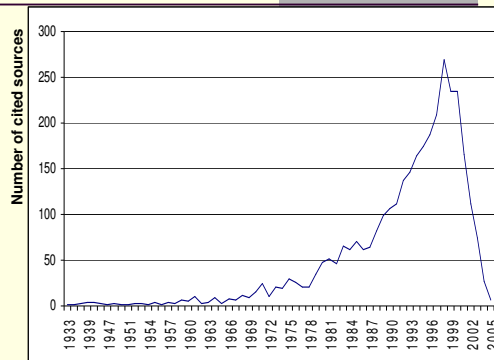
Distribution of citations by years (*N* =3358)

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Distribution of internationally published cited journals by years (*N* =28590)
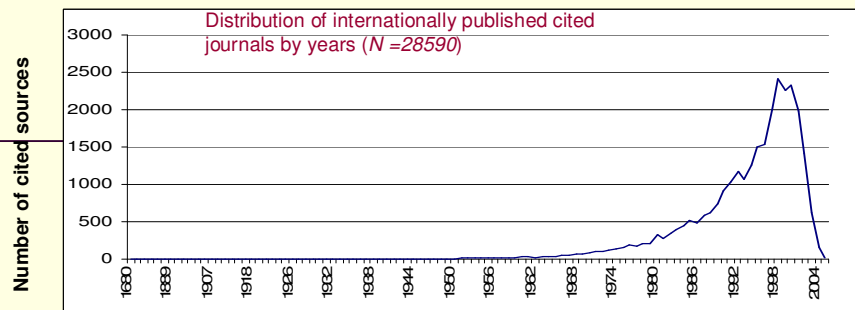
Distribution of farsi cited journals by years (*N* =1301)

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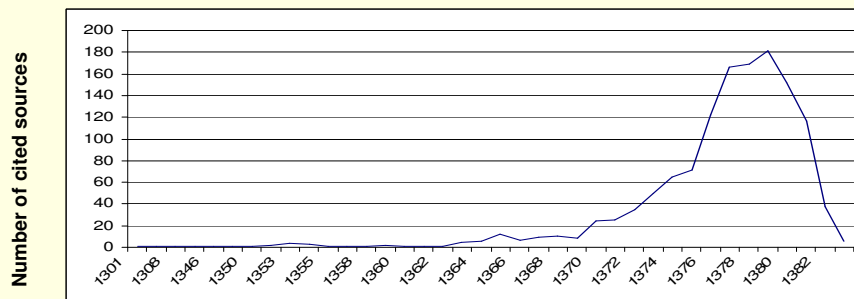
Other Intriguing observations
Low citation of Iranian articles:
Proportion of Iranian articles cited in relation to

foreign **articles…**

7.2 %

Why?

The answer to this question took the research into the realms of
CITATION BEHAVIOUR

Citation Behaviour is…
…the study of the "Cultural" factors mentioned in the title of this work
Aim
To determine the factors influencing citing behaviour amongst Iranian medical researchers
Methods
Phase 1: Fact finding
Asked around _____ Iranian medical researchers to comment on their reasons for the low citation of Iranian articles.
Phase 2: Pilot Study
Constructed a preliminary questionnaire and distributed it to _____ researchers.
Tested the reliability and internal validity of the questions.
Phase 3: Questionnaire distribution
Posted the final questionnaire onto the internet and distributed it by post, through colleagues and contacts in the ministry and through emails.
Collected the results via a web-based flat file database.

Hurdles:
Who to ask
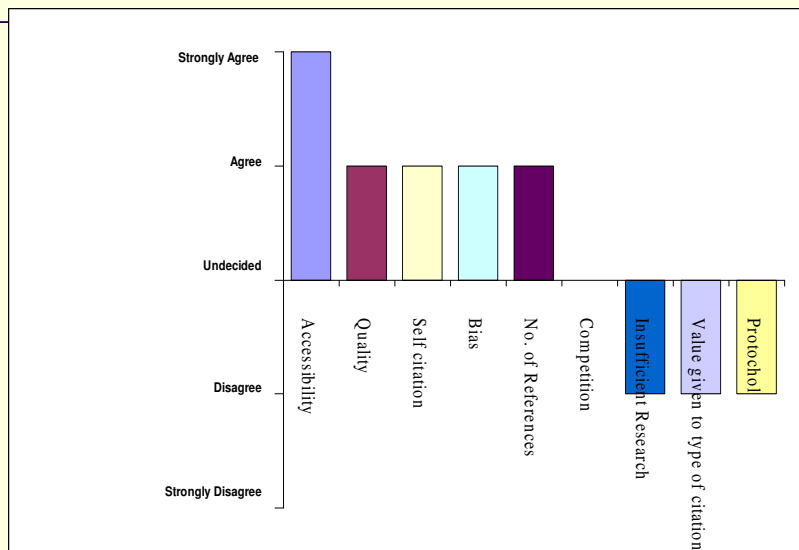## (1000) Stratified sampling based on academic position

Full-professor	**331**
Associate professor	**6434**
Assistant professor	**889**
Tutor	**3786**
Total	**11440**

How to ask
Phone calls, E-mails, personal visits

Results… …so far
Preliminary analysis of 350 of the responses

These results indicate that:

Accessibility is a major concern

This is supported by type of reference analysis

Competition: Not considered to be a major factor

✓**No. of reference**

✓**Protocol**

✓**Values given to type of citation**

✓**Bias**

✓**Quantity (insufficient research)**

✓**Self citation**

✓**Citation (Quality or impact)**

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The saga continues…

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