



# Leuven 2019



# Journal Impact Measures The Impact Factor



Presented at the european  
summer school for  
scientometrics  
**ESSS**

July 16th, 2019

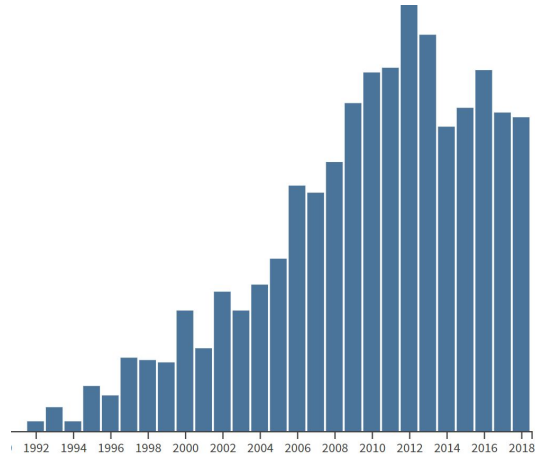
- **Daniel Torres Salinas - Univ Granada / EC3metrics**
- **Nicolás Robinson García - TU Delft**



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# Introduction

# 2300 papers about the impact Factor!!



Why the impact factor of journals should not be used for evaluating research

*BMJ* 1997 ; 314 doi: <https://doi.org/10.1136/bmj.314.7079.497>

(Published 15 February 1997)

Cite this as: *BMJ* 1997;314:497



Editorial | Published: 24 December 2017, Bruce Alberts is Editor-in-Chief of Science.

## Impact Factor Distortions

THIS EDITORIAL COINCIDES WITH THE RELEASE OF THE SAN FRANCISCO DECLARATION ON RESEARCH ASSESSMENT (DORA), the outcome of a gathering of concerned scientists at the December 2012 meeting of the American Society for Cell Biology.\* To correct distortions in the evaluation of scientific research, DORA aims to stop the use of the "journal impact factor" in judging an

# Ending the tyranny of the impact factor



*Nature Cell Biology* 16, 1 (2017)

NATURE | NEWS

Beat it, impact factor! Publishing elite turns against controversial metric

Senior staff at leading journals want to end inappropriate use of the measure

Ewen | Hate journal impact factors? New study gives you one more reason

## Declaration of independence from journal impact factor

Coalition of academics, publishers and funders rejects metric 'obsession'

By Elizabeth Gibney

# Journal Impact Measures

## The Impact Factor

### Our presentation

- **Definition and calculation**
- **Problems and limitations**
- **The Journal Citation Reports**

# Citation analysis as a tool in journal evaluation

**In 1972** Garfield released his first journal impact factors. The result was a list of journals ranked by the average number of citations per research article using the information from the SCI. 2200 Journals

Science  
(178):471-479, 1972

Item No. (1)	Cited Journal (2)	Times Cited Last Quarter 1969 (3)	1969 Citations to 1967 and 1968 Articles (4)	Articles Published in 1967 and 1968 (5)	Impact Factor (6)
1	J AM CHEM SOC	26323	22156	3946	5.614
2	PHYS REV	20674	20740	5767	3.596
3	J BIOL CHEM	17112	10768	1777	6.059
4	NATURE LONDON	15325	15956	6811	2.342
5	J CHEM SOC	14028	17764	5827	3.048
6	J CHEM PHYS	13690	11696	3738	3.128
7	SCIENCE	9752	11880	3968	2.993
8	BIOCHIM BIOPHYS ACTA	9550	10956	3531	3.102
9	P NAT ACAD SCI USA	8260	11548	1348	8.566
10	BIOCHEM J	7638	6348	2074	3.060
11	LANCET	7617	8164	5496	1.485
12	PHYS REV LETT	6581	11380	2317	4.911
13	CR ACAD SCI	5789	6576	8345	0.788
14	AM J PHYSIOL	5420	3156	1013	3.115
15	J ORG CHEM	5401	5756	2475	2.325
16	J APPL PHYS	5190	5072	2880	1.761
17	P SOC EXP BIOL MED	5079	3468	1920	1.806
18	J MOL BIOL	4982	7340	833	8.811
19	J PHYSIOL LOND	4966	3036	1248	2.432
20	P ROY SOC LOND	4864	1916	621	3.085
21	J CELL BIOL	4813	4596	1357	3.386
22	J CLIN INVEST	4785	3652	1086	3.362
23	J PHYS CHEM	4703	4516	1939	2.329
24	CHEM BER	4541	2128	1037	2.052

**The first ranking of journals using the impact Factor**

# Uses of the Impact Factor

In his seminal paper Garfield addressed four possible users and uses



Individual scientists face the problem of **selecting journals to read and keep**, as well as compiling reference for their students



would appear to be of great potential value in the **management of library journal collections**



Editors and editorial boards of scientific journals may also find citation analysis **helpful for editorial policies**



Perhaps the most important application of citation analysis is in studies of **science policy and research evaluation**



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# Definition and calculation



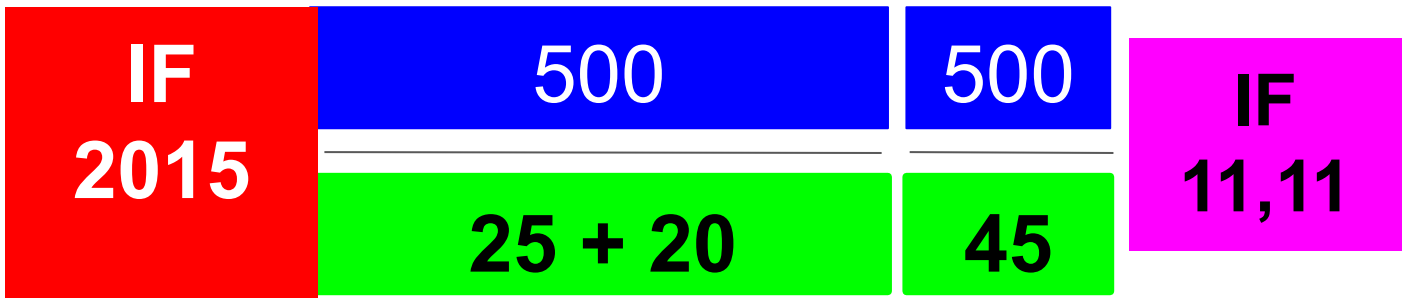
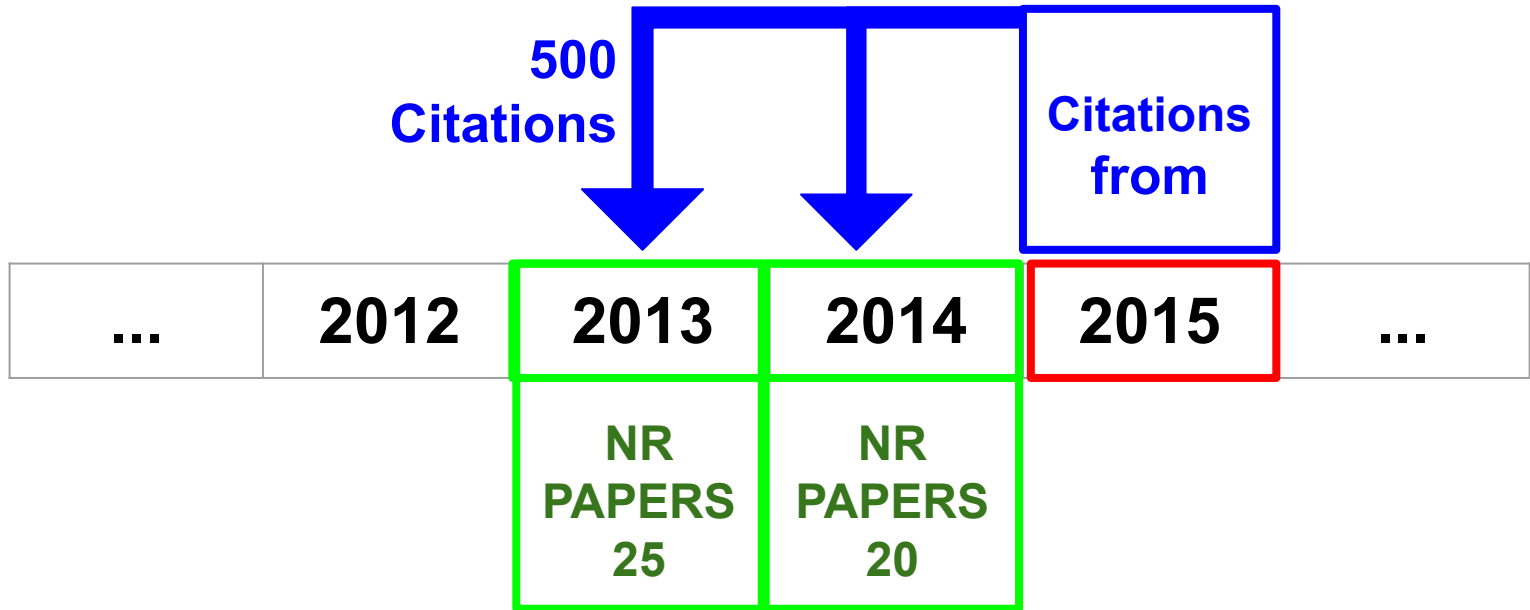
# Definitions

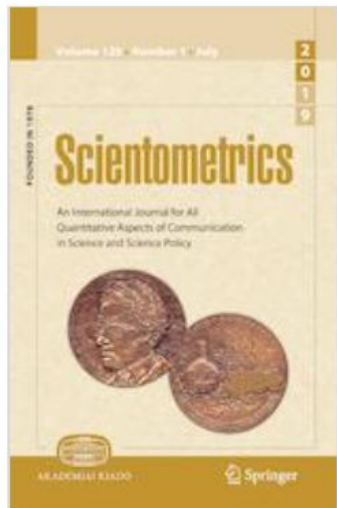
**1972 definition:** *“dividing the number of times a journal has been cited by the number of articles it has published during some specific period of time. The journal impact factor reflect an average citation rate per article”*

**JCR Definition:** all citations to the journal to items published in the previous two years divided by the total number of scholarly items published in the journal in the previous two year

**A functional approximation of the mean citation rate per citable item**

**A Journal Impact Factor of 1.0 means that, on average, the articles published two years ago have been cited one time.**





**2018  
IMPACT FACTOR 2.770**

**Citations in 2018 to  
items published in  
2016 + 2017**

**1997**

**2.770**

**Number of items  
2016 + 2017**

**721**

Impact Factor	Available
2.770	1979 - 2019
Volumes	Issues
120	368
Articles	Open Access
5,835	<u>239 Articles</u>

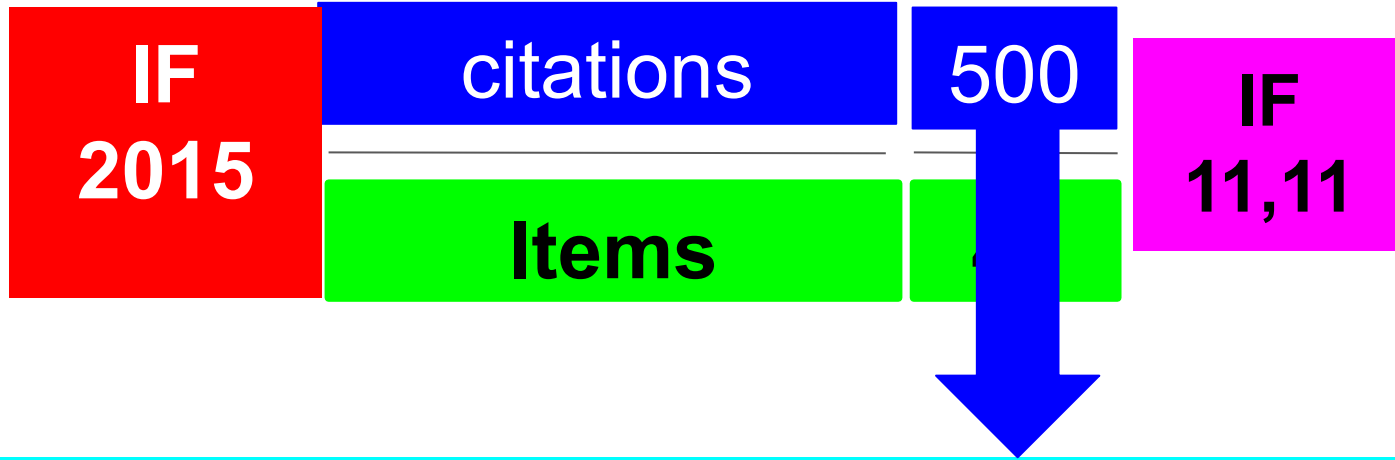
# Numerator and denominator

<b>IF 2015</b>	<b>citations</b>	<b>500</b>	<b>IF 11,11</b>
	<b>Items</b>	<b>45</b>	

**NUMERATOR:** The JCR considers the citations received for all document types: **(Articles + Reviews)** + letters, editorials, meeting abstracts, ...

**DENOMINATOR:** Journals published different document types but for calculate the IF we just take into account:  
**Articles / Reviews / Proceedings**

# Numerator and denominator



IF counts citations from different databases and document types:

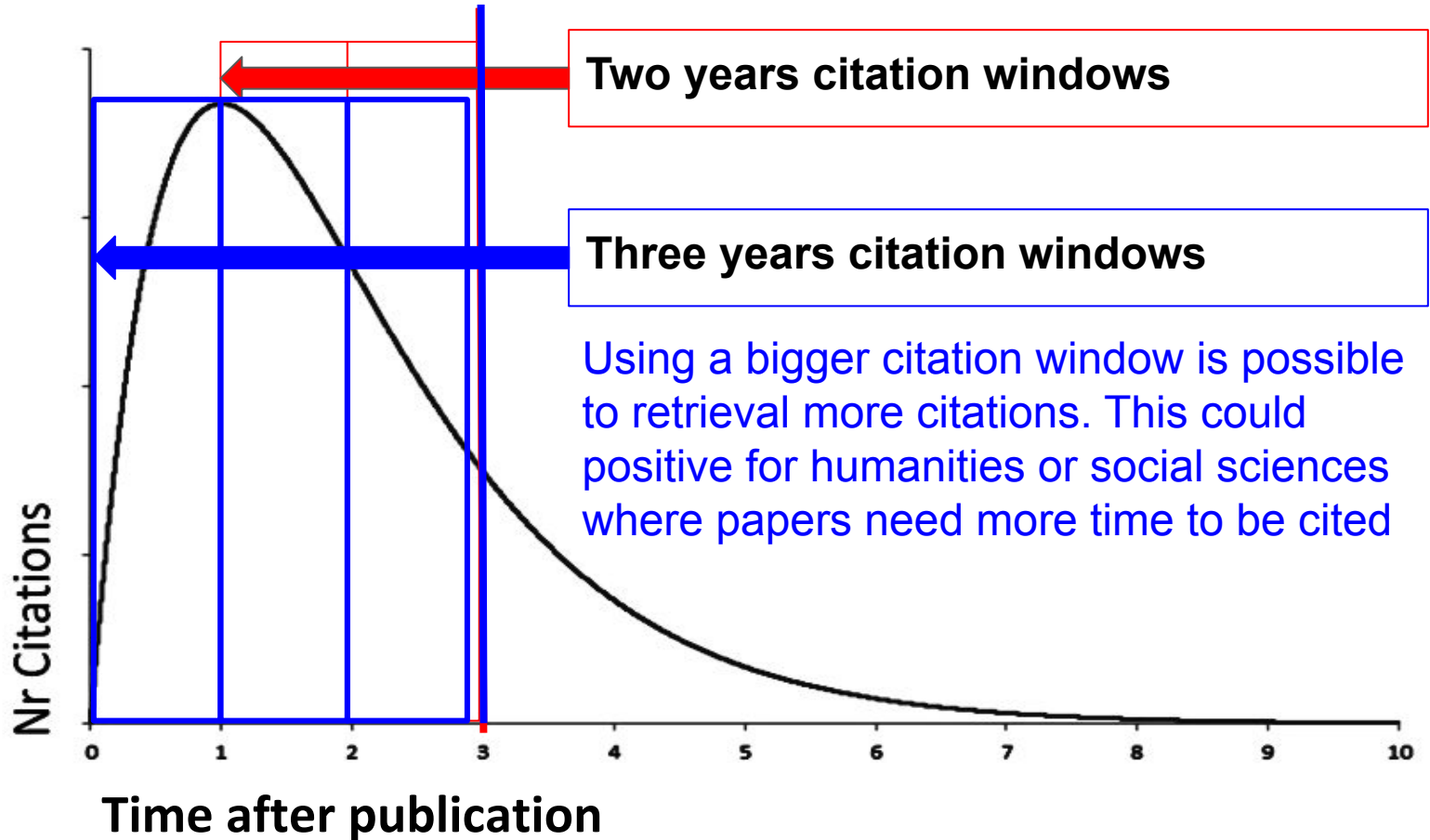
**Journals: Citation Indexes**

**Journals: Emerging Sources Citation Index**

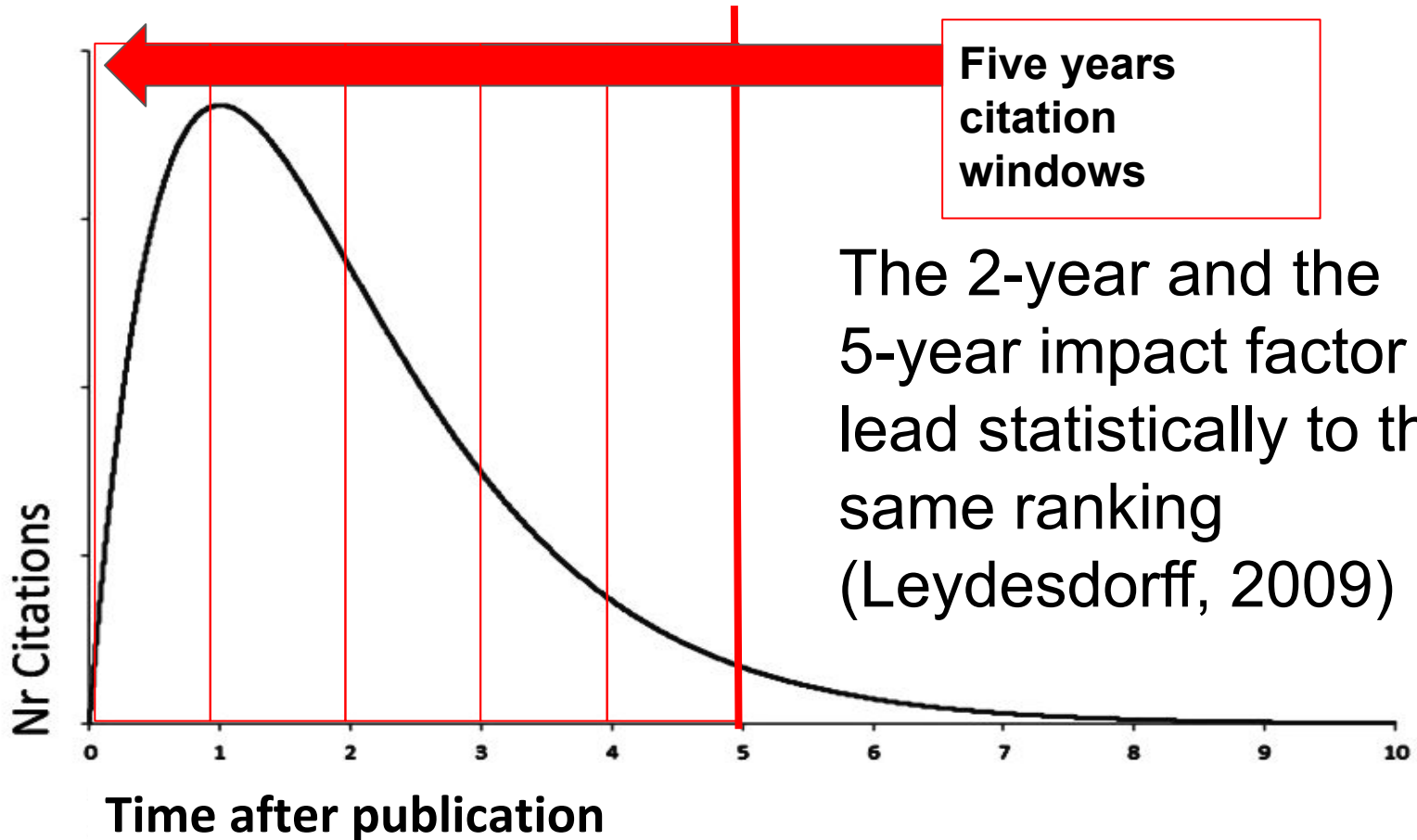
**Book: Book Citation Index**

**Proceedings: Conference Proceedings Citation Index**

# Citation window



# The JCR: 5 years impact factor





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# Problems & limitations



# The main problem with the IF is its use for the evaluation at individual level

## Impact factors are still widely used in academic evaluations

Survey finds that 40% of research-intensive universities mention the controversial metric in review documents — despite efforts to dampen its influence.

18 April 2019

Holly Else

The logo for the journal Nature, featuring the word "nature" in a red, lowercase, serif font.

*“... In more than 80% of research-heavy universities.. use of the impact factor in academic evaluations...”*

*“... many academics and review panels have turned to impact factors as a quick way of judging the quality of a paper....”*

*“In Spain publication in journals with a high impact factor has is an official part of the national system for evaluating researchers’ productivity. A money bonus is awarded only for articles published in top JCR Journals”*



“...Research groups have altered their research agendas. In Spain, research with practical applications, and research on topics that are local... has been replaced by basic research in topics more likely to be better received by the international research community”

# San Francisco Declaration on Research Assessment

The signatories of the San Francisco Declaration on Research Assessment support the adoption of the following practices in research assessment.

## General Recommendation

1. Do not use journal-based metrics, such as Journal Impact Factors, as a surrogate measure of the quality of individual research articles, to assess an individual scientist's contributions, or in hiring, promotion, or funding decisions.

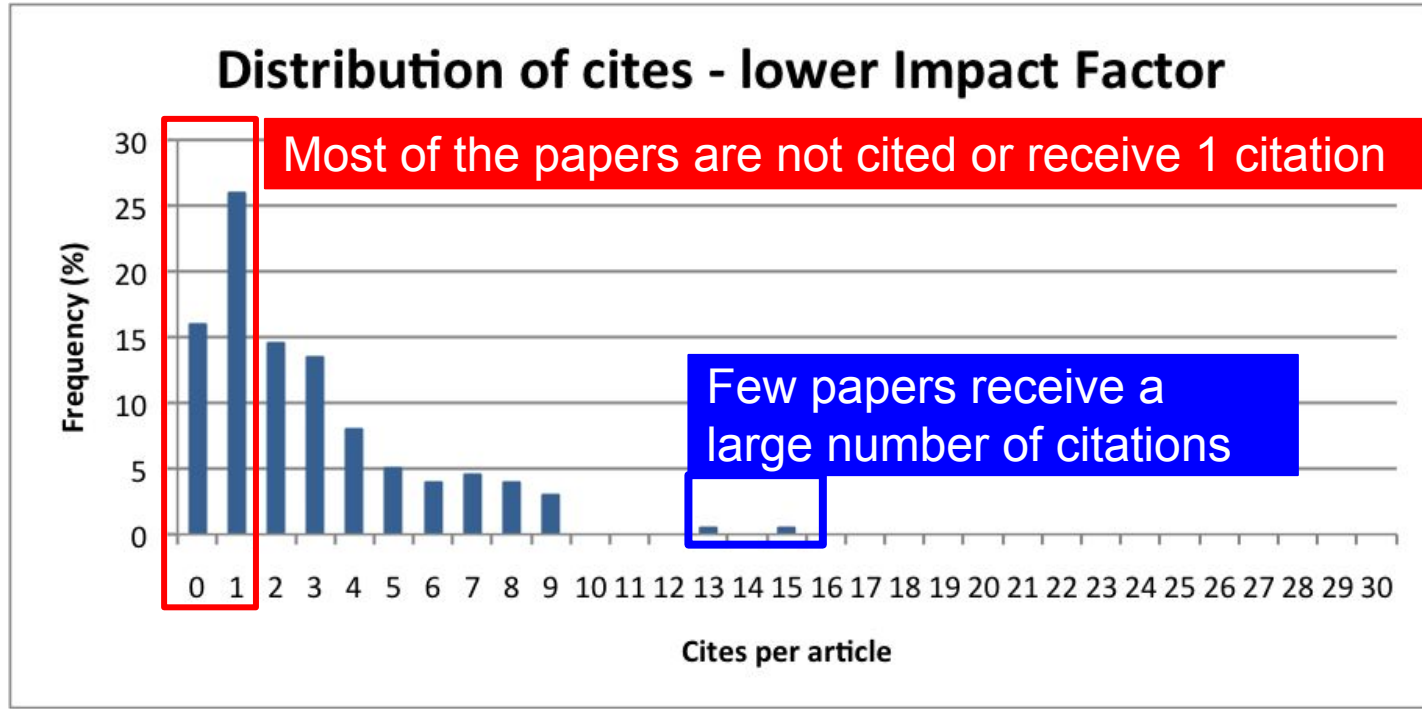
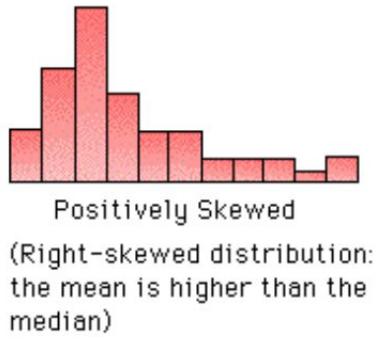
## For funding agencies

2. Be explicit about the criteria used in evaluating the scientific productivity of grant applicants and clearly highlight, especially for early-stage investigators, that the .....

DORA



# Citation distributions within journals are skewed

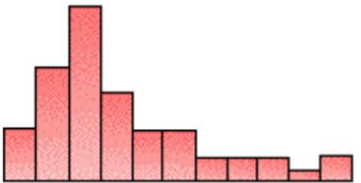


An average like the IF is not representative

# Citation distributions within journals are skewed

## Journal Impact Factor Calculation

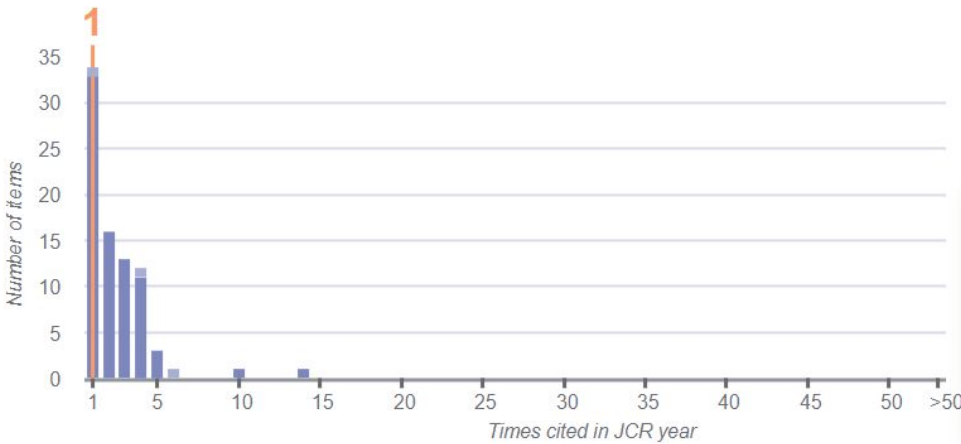
2018 Journal Impact Factor =  $\frac{206}{131} = 1.573$



Positively Skewed

(Right-skewed distribution: the mean is higher than the median)

## 2018 JIF Citation Distribution for: JOURNAL OF DOCUMENTATION



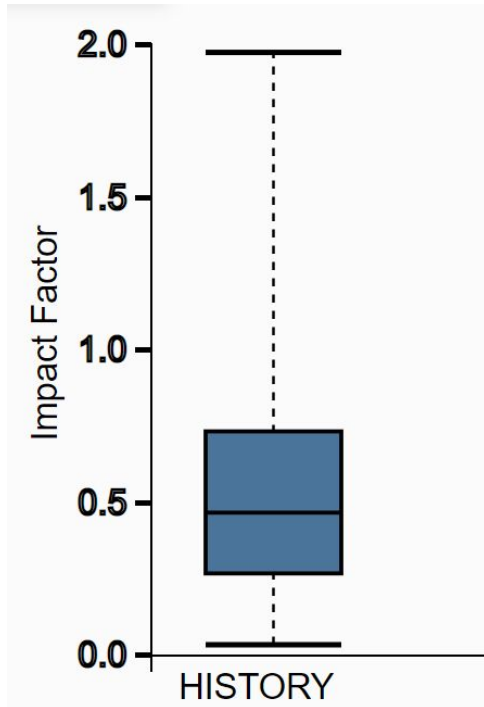
8  
Unlinked citations

0  
Times Cited

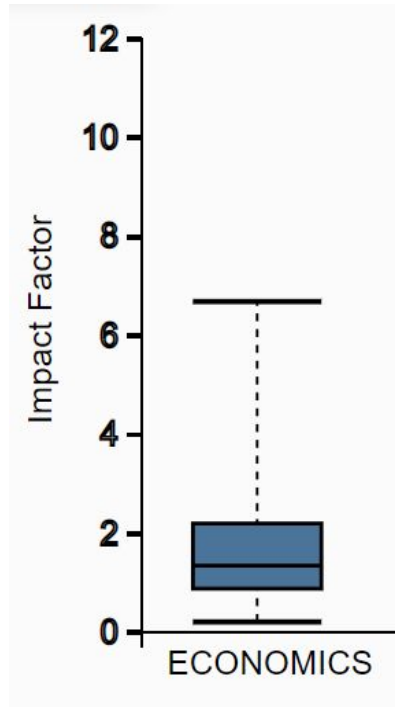
- 46 articles
- 4 reviews
- 2 other

articles reviews other article citation median review citation median

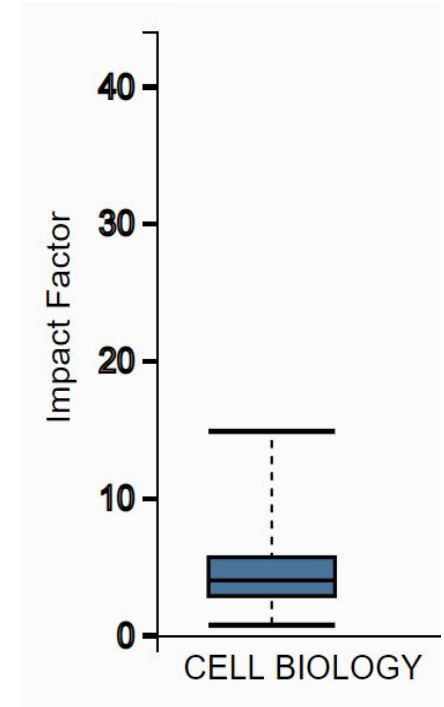
# The properties of the IF are field-specific



**Median IF 2018 = 0.5**  
**Maximum 2018 = 1.94**

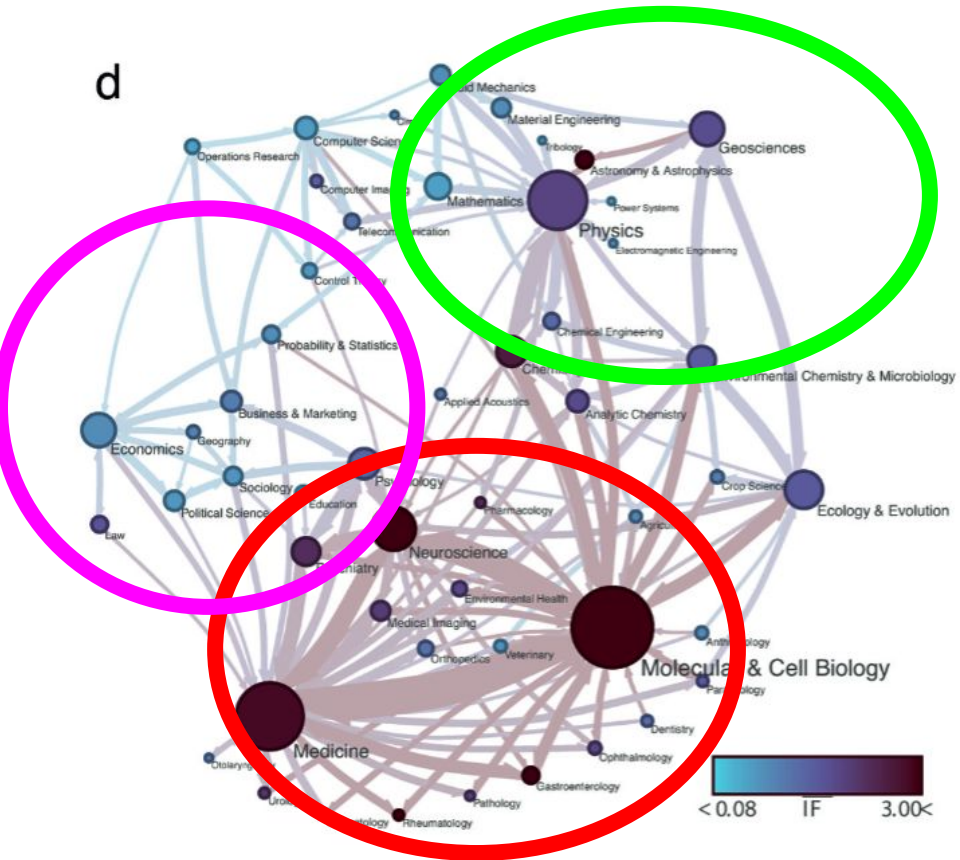


**Median IF 2018 = 1,21**  
**Maximum 2018 = 11,775**



**Median IF 2018 = 3,485**  
**Maximum 2018 = 43,351**

# The properties of the IF are field-specific



	Category	Edition	Median Impact Factor $\nabla$	Aggregate Impact Factor
1	<b>CELL &amp; TISSUE ENGINEERING</b>	SCIE	3.575	4.484
2	<b>ALLERGY</b>	SCIE	3.560	4.991
3	<b>CELL BIOLOGY</b>	SCIE	3.485	5.986
4	<b>IMMUNOLOGY</b>	SCIE	3.197	4.468
5	<b>MATERIALS SCIENCE, BIOMATERIALS</b>	SCIE	3.176	4.695
6	<b>ENDOCRINOLOGY &amp; METABOLISM</b>	SCIE	3.098	4.247
7	<b>ONCOLOGY</b>	SCIE	3.041	4.504
8	<b>GASTROENTEROLOGY &amp; HEPATOLOGY</b>	SCIE	3.033	4.895
9	<b>ENERGY &amp; FUELS</b>	SCIE	3.021	5.829
10	<b>RHEUMATOLOGY</b>	SCIE	3.016	4.173
11	<b>NEUROSCIENCES</b>	SCIE	2.902	4.035
12	<b>NUTRITION &amp; DIETETICS</b>	SCIE	2.876	3.718
13	<b>BIOCHEMISTRY &amp; MOLECULAR BIOLOGY</b>	SCIE	2.875	4.416



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# The Journal Citation Reports



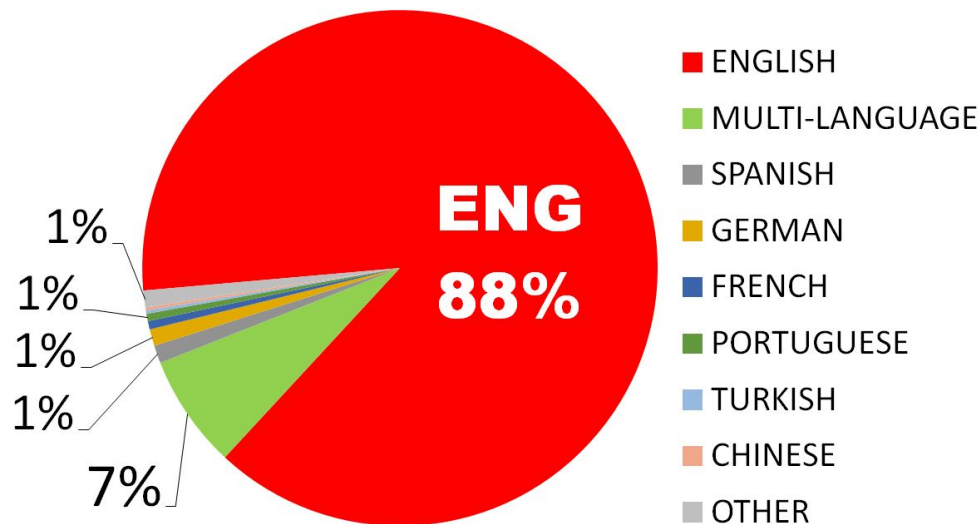


# Countries and Languages coverage: JCR 2018 ed.

USA	4245
ENGLAND	2821

**7066 - 56%**

NETHERLANDS	908
GERMANY (FED REP GER)	671
JAPAN	247
SWITZERLAND	239
FRANCE	198
CHINA MAINLAND	181
AUSTRALIA	167
RUSSIA	151
POLAND	137
CANADA	126
SPAIN	126
ITALY	124
BRAZIL	119
SOUTH KOREA	117



# Other indicators included in the JCR

Compare Selected Journals    Add Journals to New or Existing List    **Customize Indicators**

	Full Journal Title	JCR Abbreviated Title	ISSN	Total Cites	Journal Impact Factor
1	CA-A CANCER JOURNAL FOR CLINICAL ONCOLOGISTS	CA-CANCER J CLIN	0007-3225	32,410	228
2	Nature Reviews				74
3	NEW ENGLAND JOURNAL OF MEDICINE				70
4	LANCET				59
5	NATURE REVIEWS DISCOVERY				57
6	CHEMICAL REVIEWS				54
7	Nature Energy				54
8	NATURE REVIEWS				51

### Customize Indicators

- JCR Abbreviated Title
- Total Cites
- Journal Impact Factor
- Impact Factor without Journal Self Cites
- 5 Year Impact Factor
- Immediacy Index
- Citable Items
- Normalized Eigenfactor
- Cited Half-Life
- Citing Half-Life
- Eigenfactor Score
- Article Influence Score
- ISSN
- % Articles in Citable Items
- Average JIF Percentile

# What can be known about a Journal in the JCR

Information included in  
the JCR for journals

**Key Indicators**

**Source data**

**Rank**

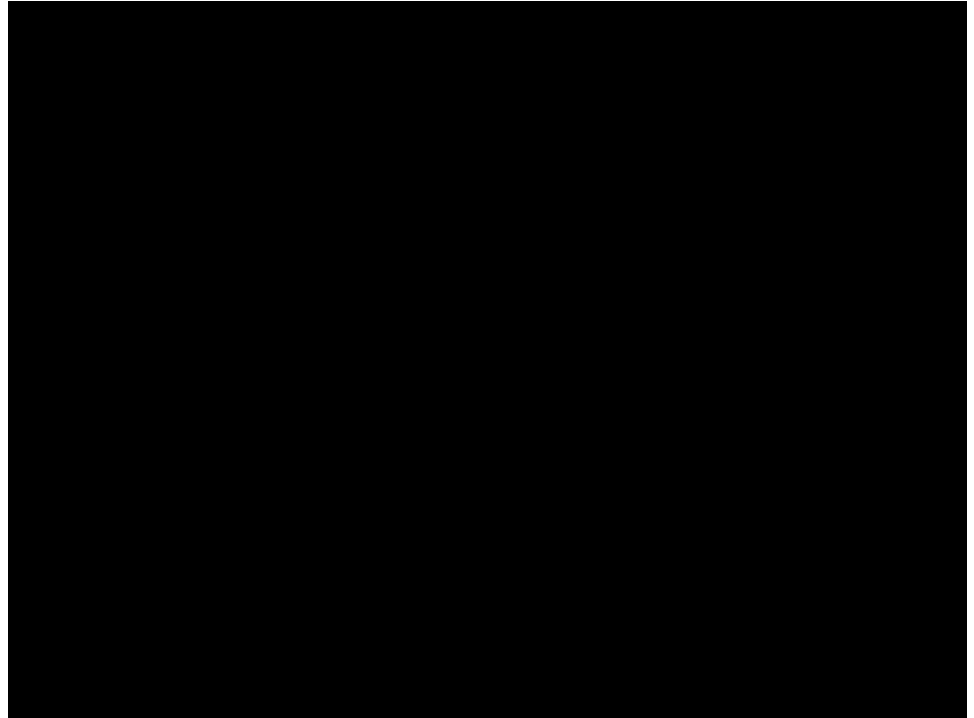
**Cited Journal Data**

**Citing Journal Data**

**Box Plot**

**Journal Relationships**

VIDEO - CLICK ON



## Fake metrics

### List of Misleading and Fake Metrics

This is a list of possibly misleading metrics.

Metrics are judged to be misleading if they meet the following criteria:

1. The website for the metric is nontransparent and provides little information about itself such as location, management team and its experience, other company information, and the like
2. The company charges journals for inclusion in the list.
3. The values (scores) for most or all of the journals on the list increase each year.
4. The company uses Google Scholar as its database for calculating metrics (Google Scholar does not screen for quality and indexes predatory journals)
5. The metric uses the term “[impact factor](#)” in its name.
6. The methodology for calculating the value is contrived, unscientific, or unoriginal.
7. The company exists solely for the purpose of earning money from questionable journals that use the gold open-access model. The company charges the journals and assigns them a value, and then



More than  
50 fake  
journal  
metrics

# Global Impact Factor: <http://globalimpactfactor.com>



Institute for Information Resources

**News Updates** Annual membership fee is of just 40 Dollars for existing members and they can renew their membership for year 2016



# Journal Impact Factor (JIF):



## GLOBAL INSTITUTE FOR SCIENTIFIC INFORMATION (GISI) JOURNAL IMPACT FACTOR (JIF)

[HOME](#)[ABOUT US](#)[JOURNAL SUBMISSION](#)[JOURNAL IMPACT FACTOR \(JIF\)](#)[CONTACT](#)[HELP](#)

to get **Journal Impact Factor (JIF)**

### Journal Impact Factor (JIF)

**Journal Impact Factor (JIF)** is a measure reflecting the average number of citations to articles published in journals, books, patent document, thesis, project reports, news papers, conference/ seminar proceedings, documents published in internet, notes and any other approved documents. It is measure the relative importance of a journal within its field, with journals of higher journal impact factors deemed to be more important than those with lower ones. Journal Impact factors are calculated in yearly/half- yearly/ Quarterly/Monthly for those journals that are indexed in Journal Reference Reports (JRR).

[more](#)

### News

JIF **NEW**

[Journal Impact factor based on Google Scholar Citation](#) **NEW**

10 September 2012

[Global Institute for Scientific Information](#)

# Cite Factor: <https://www.citefactor.org>

[Home](#)[About Us](#)[Impact Factor](#)[Publishers](#)[Suggest](#)[Contact](#)[Login](#)

## Categories

[Articles](#)

151059

[Journals](#)

20483

## Search

 Journals  Articles[Advance Search](#)

## News

[Journal Impact Factor Report 2018](#)

Date: 24th November, 2018

[Impact Factor 2017-2018 \(Latest\)](#)

Date: 22nd July, 2018

[Journal Impact Factor List 2015 \( Now Available\)](#)

Date: 15th January, 2016

The CiteFactor server provides indexing of major international journals and proceedings. Author can get information about international journal **impact factor**, proceedings (research papers) and information on upcoming events. All the journal pages have pointers to Web pages of the publishers which are integrated into the CiteFactor stream pages.

The purpose is to increase the visibility and ease of use of open access scientific and scholarly journals. If your journal is indexed & got validated stamp from Citefactor, you can request for the calculation of impact factor for your journal.

"In addition, CiteFactor is working on next major task to link



Note: Get EOI for  
Journal/Conference/ Thesis  
paper.  
(contact: [eoi@citefactor.org](mailto:eoi@citefactor.org)).

## Latest Updates

[What is EOI ?](#)

Date: 29th December, 2018



# Universal Impact Factor: <http://uifactor.org>





# Bonus1

# Practical applications



**Sometimes we need to calculate impact factor for a set of documents, for examples the output a institution or author. In this tutorial:**

- How can we download data from JCR?
  - How can we import this JCR data in a local database?
- How can we connect data from web of science with data from JCR?
- How can we can calculate impact factors for a set of WoS records?

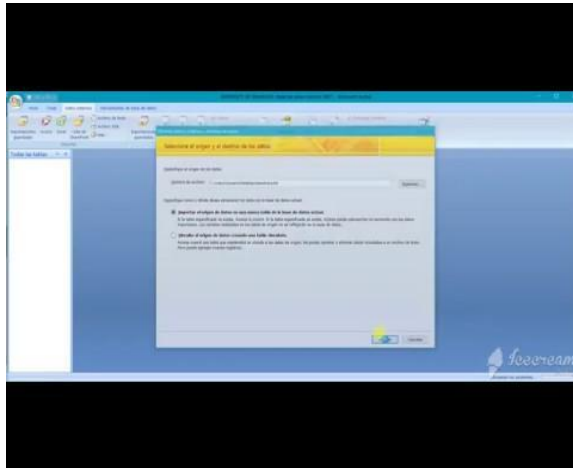
**Example:**

**Calculating impact factor and quartile for the scientific output of the university of Granada in Artificial Intelligence**

# How can I integrate the JCR in my local database?

## STEP 1

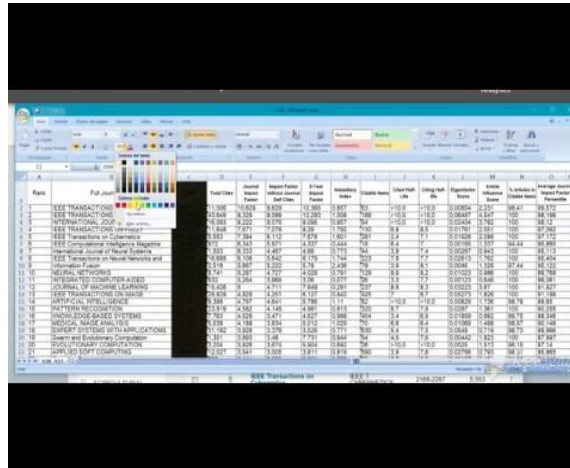
Download records from your institution and import to DB



Video Click on

## STEP 2

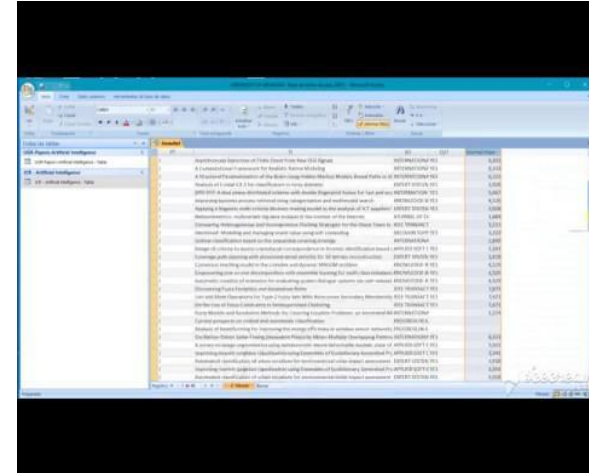
Download journal data from JCR and import DB



Video Click on

## STEP 3

Create a query to join records with indicators



Video Click on