# Evaluation of scholarly research

## PhD Course in Statistics

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Federico Fogo

# TOPICS

- ✓ Qualitative evaluation

- ✓ Quantitative evaluation

- ✓ Bibliometric indicators

- ✓ Research assessment in Italy

# EVALUATION OF SCHOLARLY RESEARCH: SCOPE

**Researcher**
recruitment, promotion, grant awarding career

**Research groups** (but also departments, universities, research organizations)
grant funding, prestige

**Academic journals**
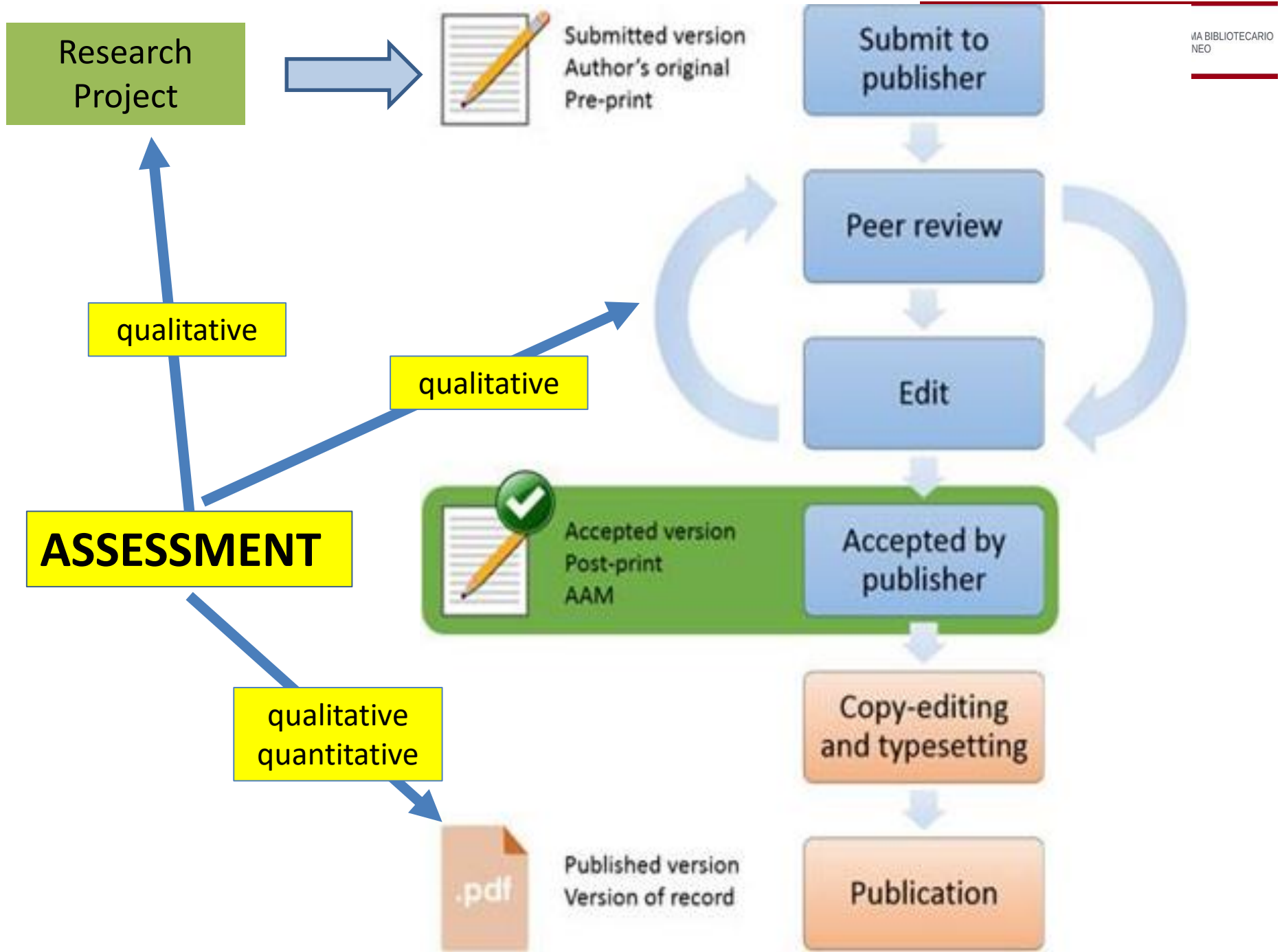to state the most influential and impactful journals in a research area

# SCHOLARLY RESEARCH EVALUATION
# 3 MOMENTS

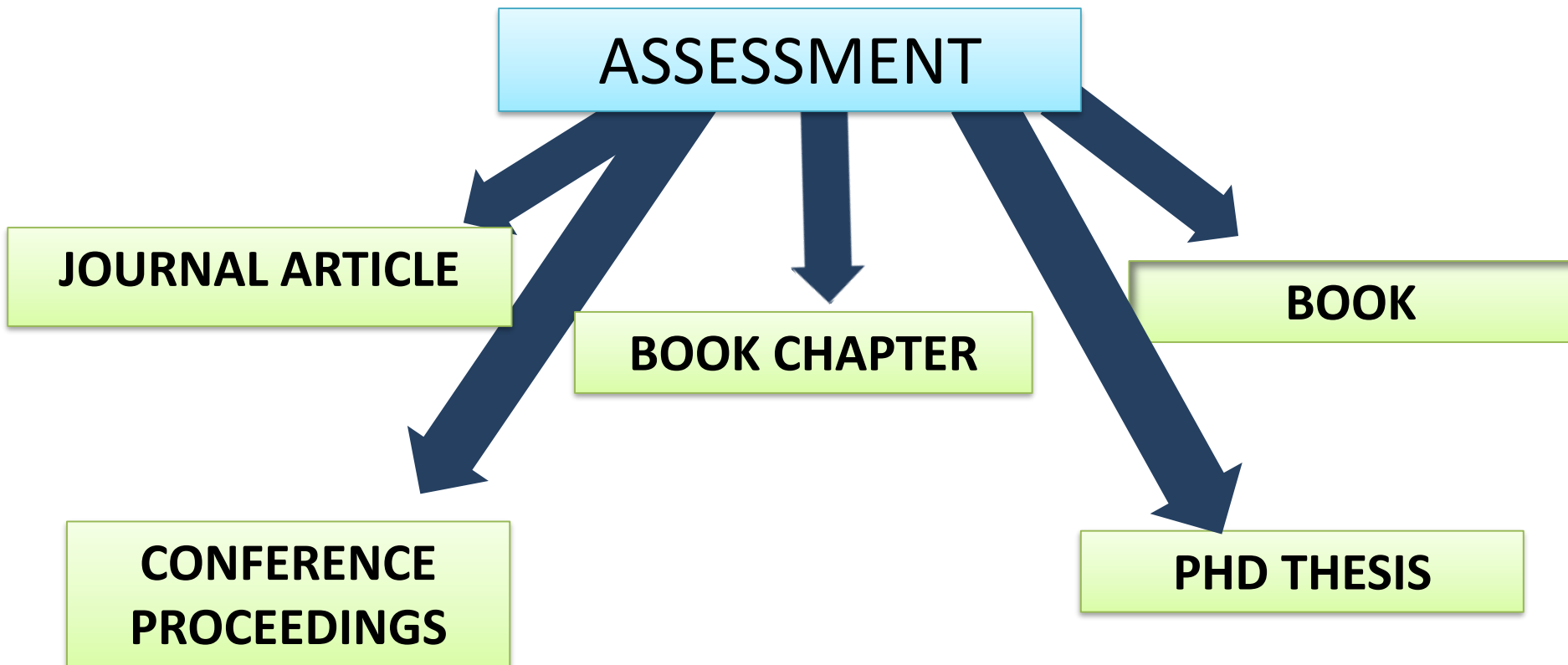Before the research has started: the funding agency assesses whether to fund the research project or not

Before the finished research has been published: the journal (or the publishing house) has experts to evaluate the paper of the research: **referees / peer reviewers**

After the research has been published: the scientific community assesses the published research (e.g. citations)

Research Project

Submitted version
Author's original
Pre-print

Submit to publisher

Peer review

Edit

qualitative

qualitative

ASSESSMENT

Accepted version
Post-print
AAM

Accepted by publisher

qualitative
quantitative

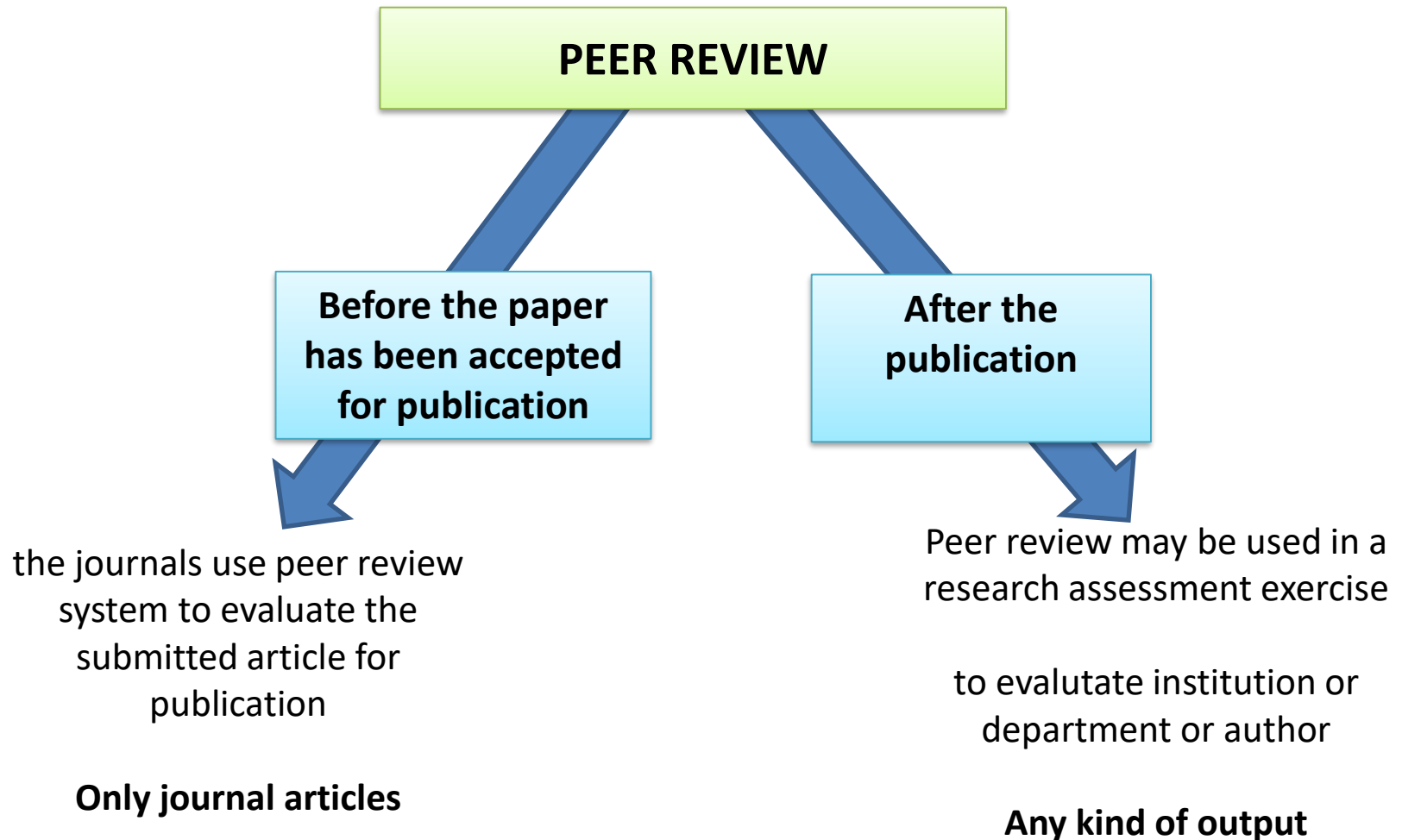Copy-editing
and typesetting

.pdf

Published version
Version of record

Publication

# THE EVALUATION OF SCHOLARLY RESEARCH

It is the assessment of the published outputs of research

ASSESSMENT

JOURNAL ARTICLE

BOOK CHAPTER

BOOK

CONFERENCE PROCEEDINGS

PHD THESIS

# QUALITATIVE ASSESSMENT

**PEER REVIEW**

**Before the paper has been accepted for publication**

**After the publication**

the journals use peer review system to evaluate the submitted article for publication

**Only journal articles**

Peer review may be used in a research assessment exercise

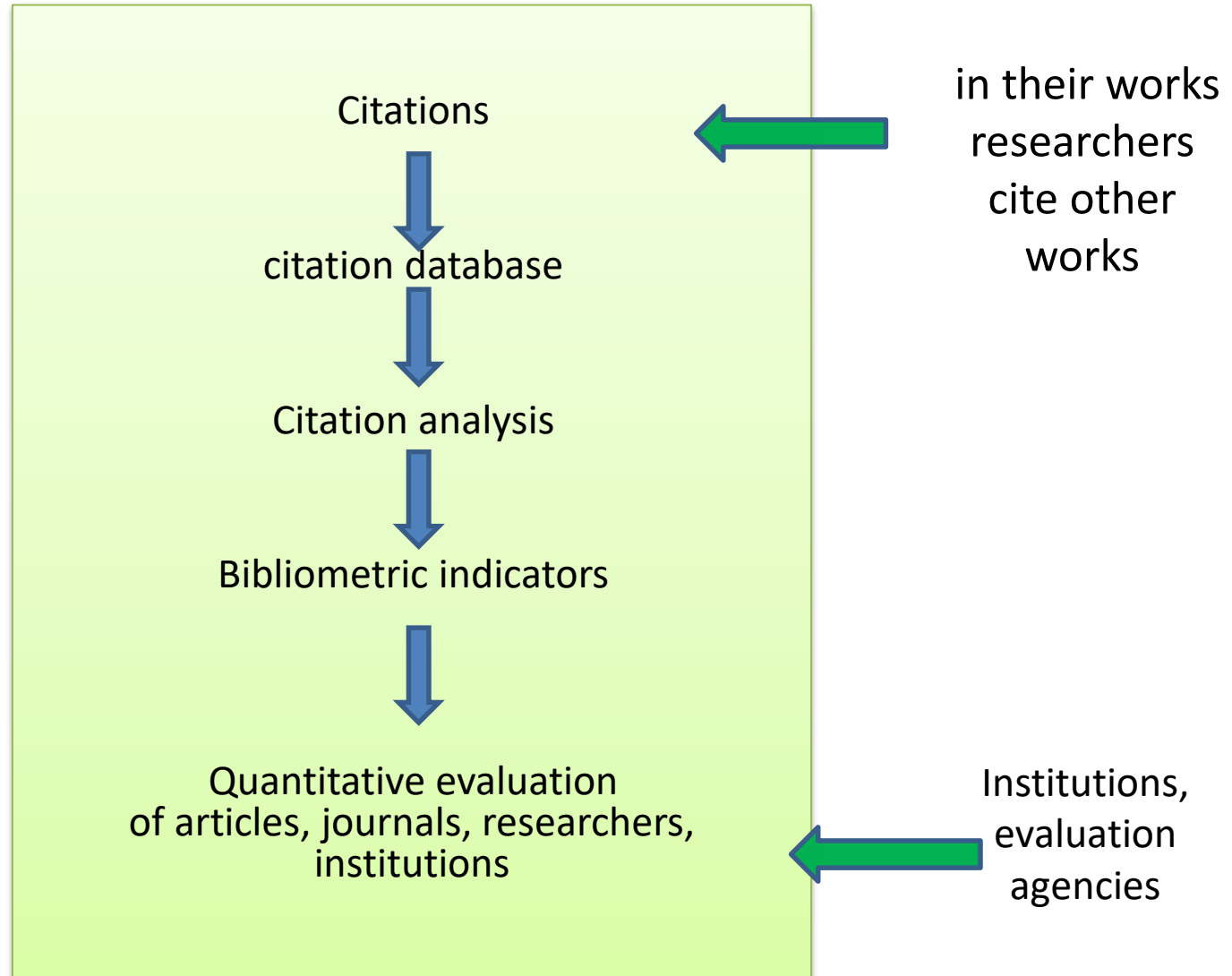to evalutate institution or department or author

**Any kind of output**

# QUANTITATIVE EVALUATION OF RESEARCH: BIBLIOMETRICS

It is the use of mathematics and statistics to analyze citations in books, articles and other research outputs

# BIBLIOMETRICS AND QUANTITATIVE EVALUATION

Citations

↓

citation database

↓

Citation analysis

↓

Bibliometric indicators

↓

Quantitative evaluation
of articles, journals, researchers,
institutions

in their works
researchers
cite other
works

Institutions,
evaluation
agencies

# BIBLIOMETRIC INDICATORS

Bibliometrics is based on bibliometric indicators

They are made by counting and processing the number of citations to
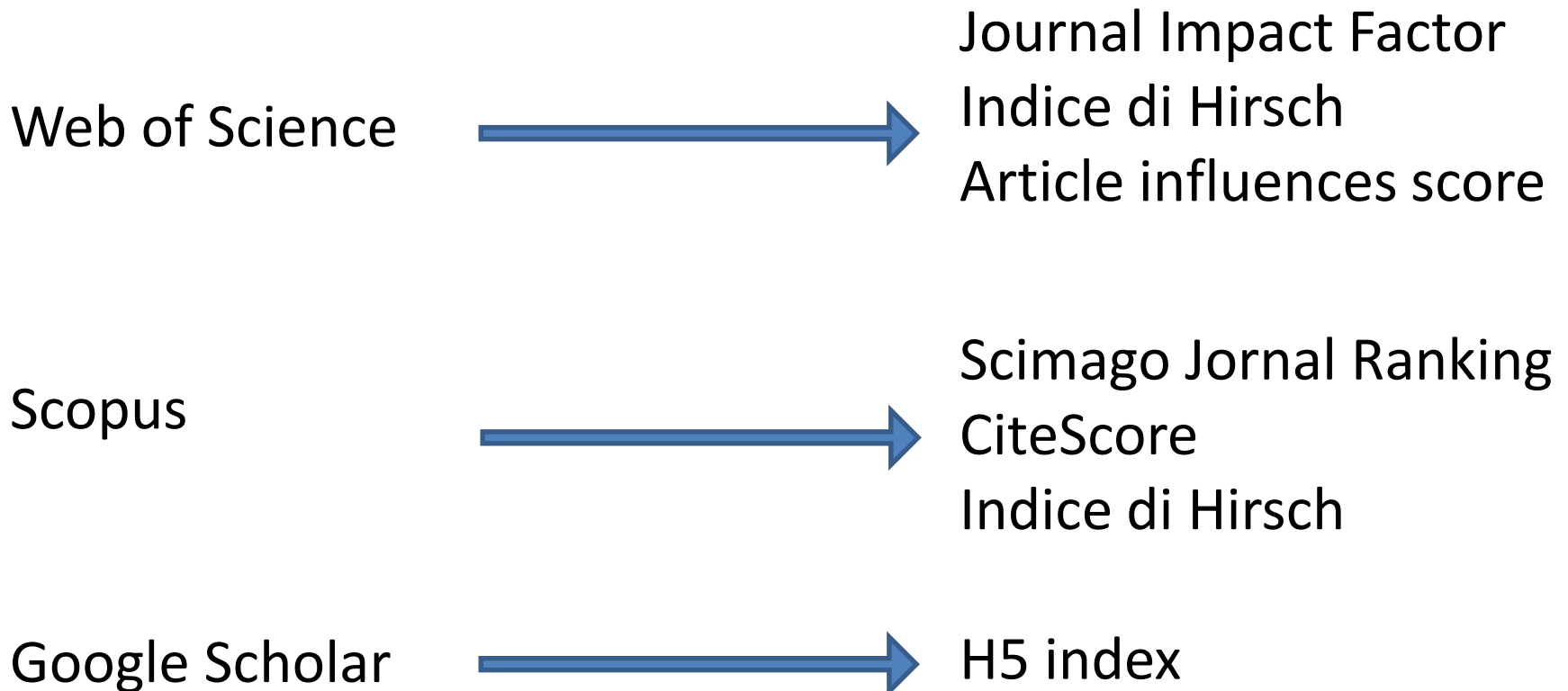
a paper
a journal
a researcher
an institution

# MOST IMPORTANT BIBLIOMETRIC INDICATORS

- Number of citations to a work
- Journal Impact factor
- Eigenfactor score
- Article Influence Score
- Scimago Journal Ranking
- Snip
- CiteScore
- Hirsch Index

# WHO COUNTS CITATIONS? CITATION DATABASES

They count and process citations to produce bibliometric indicators

Web of Science ⟶ Journal Impact Factor
Indice di Hirsch
Article influences score

Scopus ⟶ Scimago Jornal Ranking
CiteScore
Indice di Hirsch

Google Scholar ⟶ H5 index

# BIBLIOMETRIC INDICATORS: WHERE TO FIND THEM

https://jcr.clarivate.com/

(university network or SSO)

http://www.eigenfactor.org/

https://www.scopus.com/sources

https://www.scimagojr.com/

https://www.journalindicators.com/

free access

# BIBLIOMETRIC INDICATORS FOR JOURNALS

- Impact Factor (2 years)
- Impact Factor (5 years
- Immediacy Index
- Eigenfactor Score
- Article Influence Score

Based on Web of Science data

- Scimago Journal Ranking
- SNIP
- Citescore

Based on Scopus data

# CITATION DATABASES

Scopus and Web of science are the most important citation databases

But they are bibliographic databases too

# JOURNAL IMPACT FACTOR

It is the ratio between the number of citations received in a year by the papers published in the previous two years and the total number of papers published in the previous two years

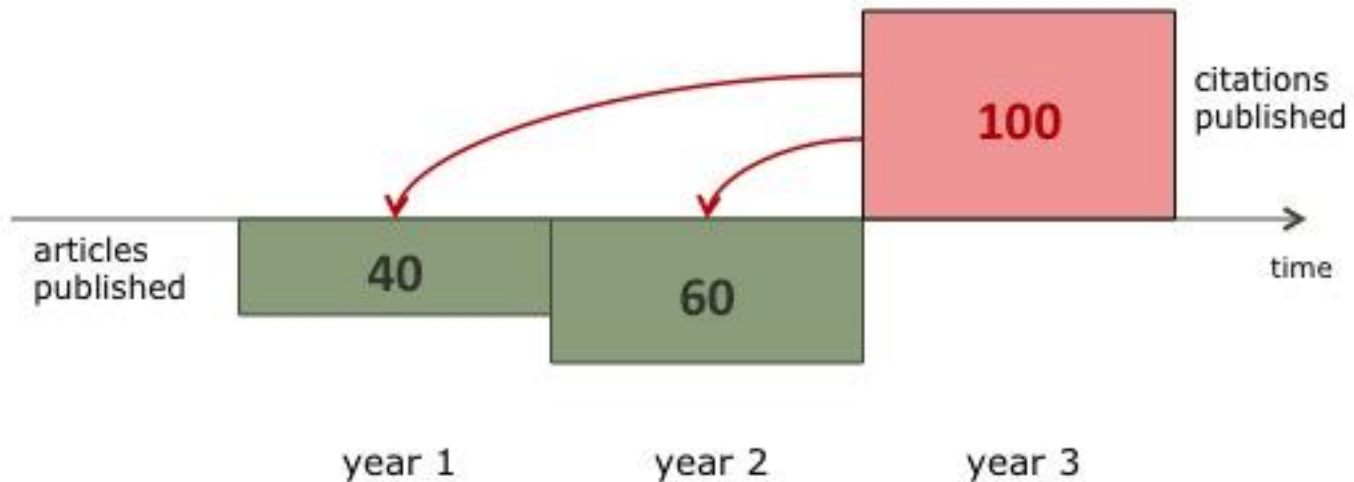$$\frac{\text{number of citations 2021 to papers 2019+2020}}{\text{number of papers 2019+2020}} = \text{JIF}$$

In a few words it is the yearly average number of citations of articles published in the last two years in a given journal.

# The Impact Factor

Introduced in 1950's by Eugene Garfield: ISI



$$IF(year\,3) = 100/40 + 60 = 1$$

# JOURNAL IMPACT FACTOR

The Impact Factors of about 12,000 scholarly and technical journals and conference proceedings are published **yearly** in

## **The Journal Citation Reports (JCR)**

a subscription database that calculates and publishes the impact factors for journals

https://jcr.incites.thomsonreuters.com/

°° *University of Padova has access to JCR back to 1997 (IF back to 1997)*

# SCIMAGO JOURNAL RANKING SJR

it is a journal metric that measures the scientific influence of scholarly journals, developed from Scopus data

it is based on the number of citations received by the journal and on the prestige of journals where citations come from

It is like a prestige measure

# SCIMAGO JOURNAL RANKING SJR

in other words, SJR "weights" citations:
citations are weighted, worth more or less, depending on the source they come from

the important journals will be those which receive many citations from other important journals

# SCIMAGO JOURNAL RANKING SJR

number of weighted* citations received in a year by the documents published in the past 3 years

―――――――――――――――――――――――  = SJR

number of documents published in the past 3 years

* The incremental factor depends on the SJR of the journal the citation comes from

# CiteScore 2021 of a journal is:

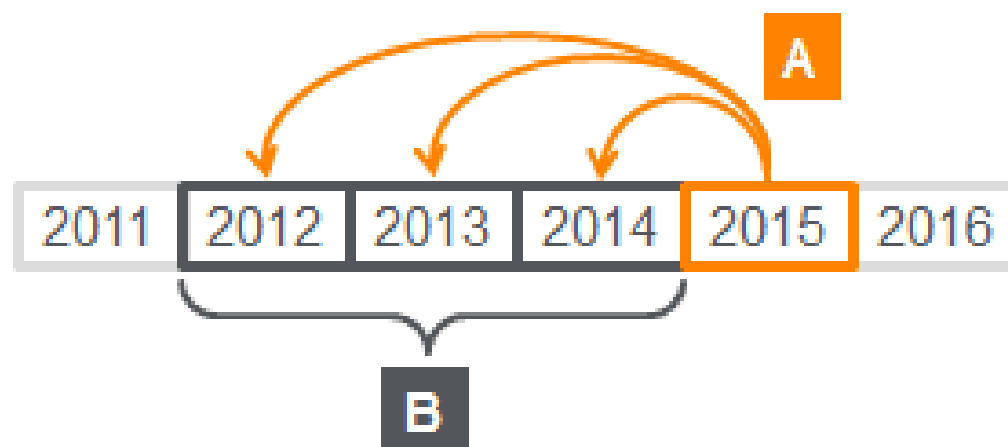number of citations in 2019-2021 to articles published in the period 2019-2021

————————————————

number of articles published in the journal in the period 2019-2021

= Citescore

= Citations from 2015

20XX = Documents published in year 20XX

2011 | 2012 | 2013 | 2014 | 2015 | 2016

A

B

CiteScore 2015 value = A / B

Category STATISTICS in Journal Citation Reports

https://jcr.clarivate.com   *[university network or SSO]*

Browse Categories > Mathematics>

Find STATISTICS & PROBABILITY in the list >

Click on #journals


Category STATISTICS in Scimago Journal Rank

https://www.scimagojr.com/ *[free access]*

Click on Journal Rankings

Scroll down the first menu on the left to choose Mathematics

Scroll down the second menu on the left to choose Statistics and probability

# HIRSCH INDEX (h-index)

✓ It measures the output of a scientist through the number of citations of his published works and the number of published works

✓ It is applied to journals, research teams, institutions, nations as well (see Scimago)

✓ It is always a whole number

# Impact + Productivity

# HIRSCH INDEX (h-index)

In other words it measures the scientific productivity of an **author** combining:

The number of published works

The total number of received citations

# WHAT KIND OF EVALUATION FOR BOOKS?

Citation databases index mostly journal articles

So bibliometric indicators measure journals only

Actually there is no quantitative evaluation regarding books, book chapters, conference proceedings
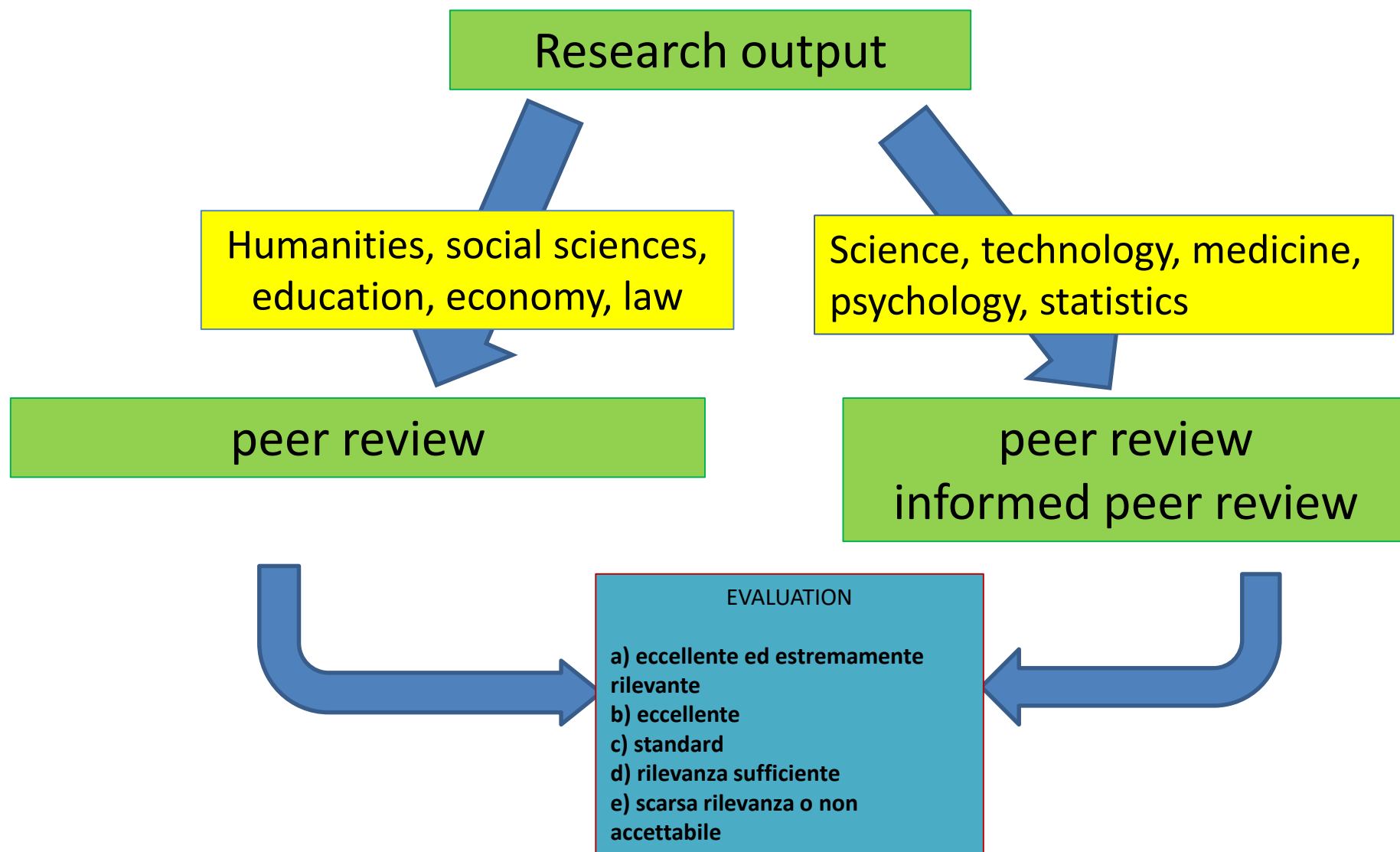
# RESEARCH ASSESSMENTIN ITALY

The Italian National Agency for the Evaluation of Universities and Research Institutes (ANVUR) oversees the national quality evaluation system for universities and research institutions

The main evaluation exercises carried out by ANVUR are:

- **VQR Valutazione della Qualità della Ricerca**
  it aims at evaluating the research outcomes of public universities and research institutes every five years
  VQR focuses on institutions

- **ASN Abilitazione Scientifica Nazionale**
  it is a necessary requirement to apply for permanent positions of Full and Associate Professor in Italian Universities

  ASN focuses on individuals (researchers)

# VQR Valutazione della Qualità della Ricerca

**Research output**

**Humanities, social sciences, education, economy, law**

**Science, technology, medicine, psychology, statistics**

**peer review**

**peer review
informed peer review**

EVALUATION

**a) eccellente ed estremamente rilevante
b) eccellente
c) standard
d) rilevanza sufficiente
e) scarsa rilevanza o non accettabile**

# NOT BIBLIOMETRIC DISCIPLINES

Area 10 - Scienze dell'antichità, filologico-letterarie e storico-artistiche
Area 11a - Scienze storiche, filosofiche, pedagogiche
Area 12 - Scienze giuridiche
Area 14 - Scienze politiche e sociali

All other disciplines are bibliometric disciplines

# VQR: RESEARCH OUTPUTS EVALUATED

- Scholarly journal articles

- Scholarly books

- Book chapters

- Conference proceedings

- Other products such as expositions, audiovisuals, software, databases

# VQR: EXERCISES

2004-2010 (results in 2013)

2011-2014 (results in 2017)

2015-2019 (in progress)

# VQR 2015-2019

Research products proposed by the departments (and universities) are evaluated by peer reviewers and ranked in a 5-levels classification (very excellent, excellent, international standards compliant, national level considerable, not very relevant)

**a) eccellente ed estremamente rilevante**
**b) eccellente**
**c) standard**
**d) rilevanza sufficiente**
**e) scarsa rilevanza o non accettabile**

# VQR 2015-2019

# BIBLIOMETRICS CONSIDERED FOR SCIENZE ECONOMICHE E STATISTICHE

- ✓ 5-year impact factor
- ✓ Article influence score
- ✓ Citescore
- ✓ Scimago Journal Rank

# ASN Abilitazione Scientifica Nazionale 2018-2020

In bibliometric disciplines, considered parameters are:

- ✓ number of journal articles (published in the previous 10 or 15 years) indexed by Scopus or Web of Science)

- ✓ Number of citations received in the previous 10 or 15 years) indexed by Scopus or Web of Science)

- ✓ Hirsch Index