



Scientific publications, introduction to bibliometrics and Open Access

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PhD school in Statistics

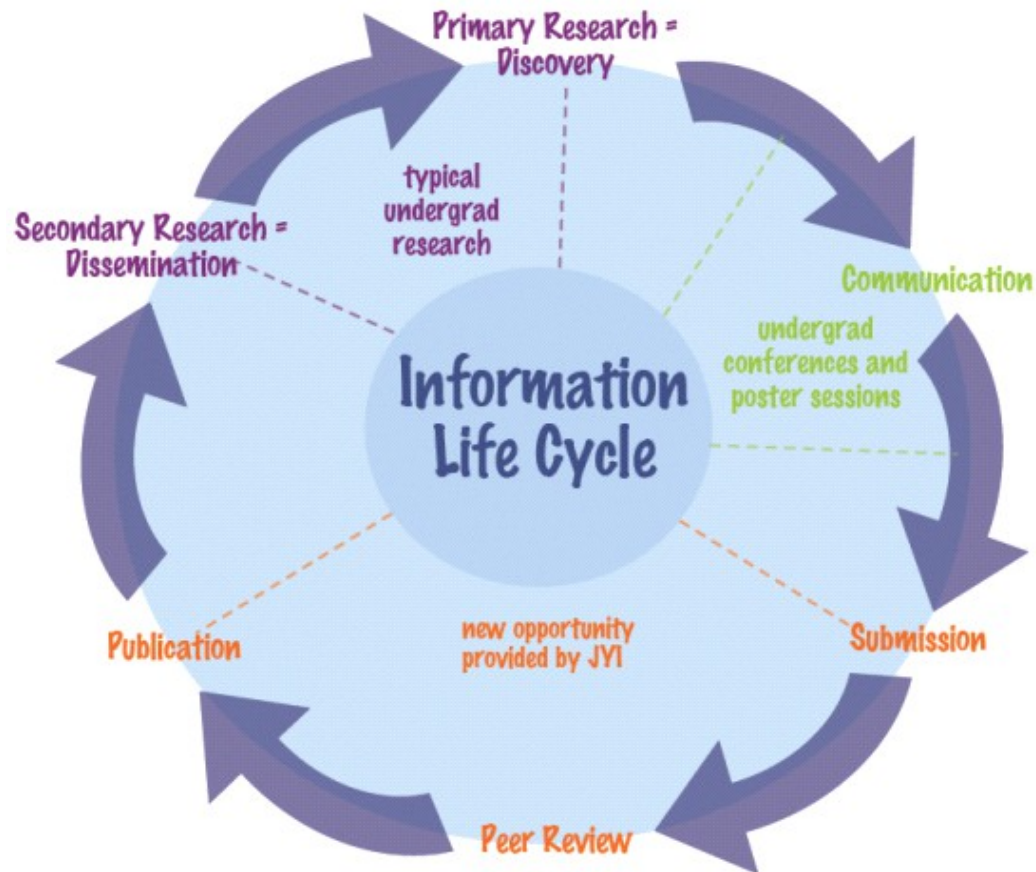


What we will see today

- Scientific Communication
- Evaluation of scientific research
- Open Access

Scientific communication

-> the process of publication and dissemination of research findings

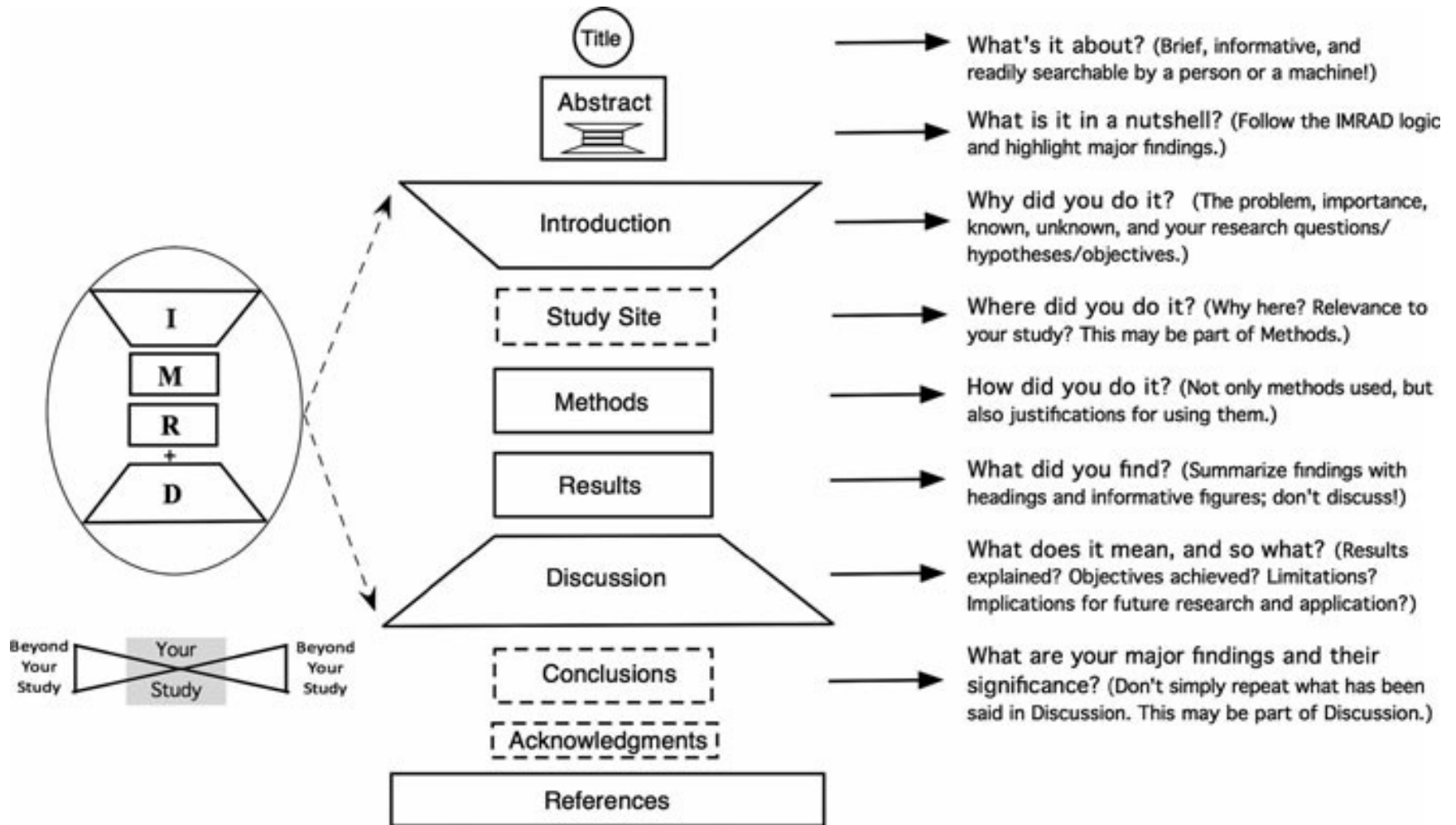




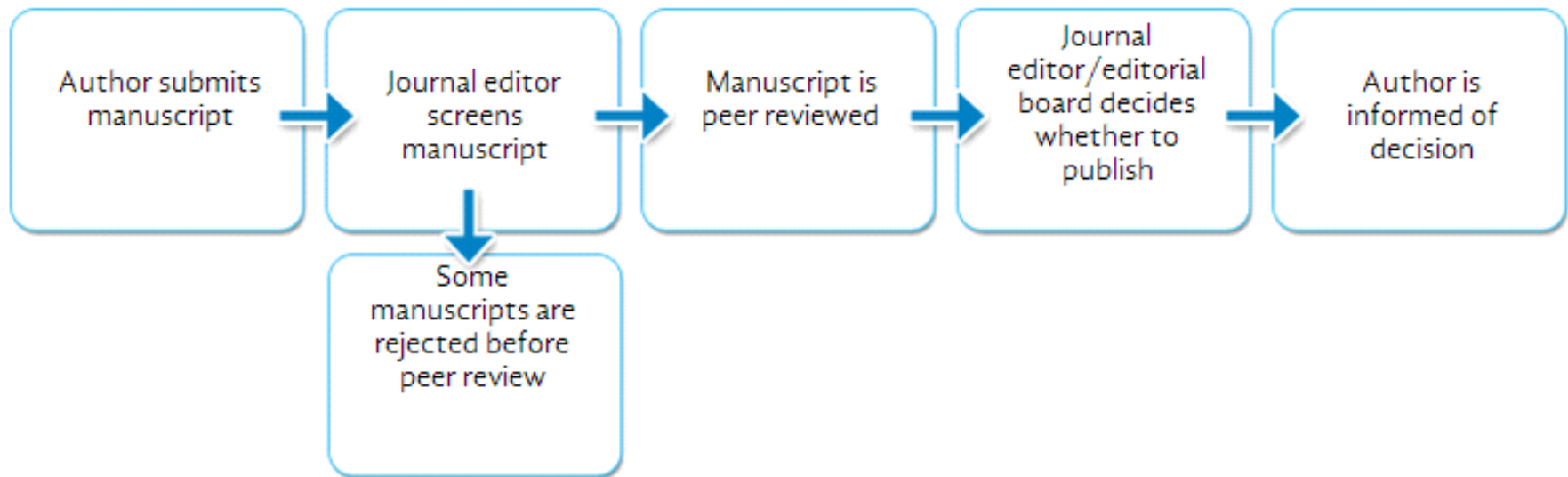
Research publications:

- PAPER OR ARTICLE
- LETTER OR COMMUNICATION
- RESEARCH NOTE
- REVIEW

Scientific writing: structure of a scientific paper



Process of publication of a scientific paper





Scientific journals

STM (Scientific, Technical and Medical) Journals

Journal or Serial

=

publication that appears in intervals of time longer than 24 hours

- › Addressed to the scientific community (expert audience)
- › With selected contents
- › Referee system

In STM field it is imperative to publish research as soon as possible, so journals are the main way to **quickly disseminate information**



Evaluation of scientific research: why ?

- Single researcher: recruitment, promotion, grant awarding career
- Research groups (same department, faculty, university, research organization, nation): to grant funding
- Scientific journals: to determine the most influential journals in a research area



Evaluation of scientific research: Italy

The **National Committee of Guarantors for Research** (*Comitato Nazionale dei Garanti per la Ricerca – CNGR*)

Consultative body to the Ministry of Education, University and Research (MIUR), tasked to promote the quality of research and ensure proper functioning of peer reviews.

The **National Agency for the Evaluation of the University and Research Systems** (*Agenzia Nazionale di Valutazione del sistema Universitario e della Ricerca – ANVUR*)

Reports to the MIUR and, on the basis of autonomy, impartiality, professionalism and transparency, works to ensure the quality of higher education and research in Italy.



Evaluation of scientific research: Italy

ANVUR's evaluation project, called **Valutazione della Qualità della Ricerca (VQR 2004-2010)**

The objective is to build, for each scientific area, a **ranking of Italian universities and research institutes** based on the following parameters:

- The best research outcomes obtained by each structure in the seven years from 2004 to 2010.
- The ability to attract funding, the number of international collaborations, patents registered, spinoffs, museums and archaeological sites, third-party activities etc.



Evaluation of scientific research: Italy

Two **methodologies** have been used:

- **Bibliometric analysis**, based on Impact Factor (IF) of the review and on the number of citations received in a year by articles published (therefore, a quantitative analysis of the impact of journal papers).
- **Peer review**, assigned to referees selected by GEV's members (with the help of about 14,000 external reviewers, of whom more than 4,000 were from outside Italy).



Evaluation of scientific research: how

Qualitative assessment : review by colleague-scientists (peers)

Quantitative assessment: analysis of bibliographic citations (bibliometric indicators)

Other criteria: congress participation as invited speaker, patents etc.



Evaluation of scientific research: Peer Review

A system to **assess the quality of scientific research** before it is published, varying across journals and research fields.

- SINGLE-BLIND PEER REVIEW
- DOUBLE-BLIND PEER REVIEW
- OPEN PEER REVIEW



Bibliometrics

The branch of library science concerned with the application of **mathematical and statistical analysis to bibliography**; the statistical analysis of books, articles, or other media of communication.

<http://www.oxforddictionaries.com/definition/english/bibliometrics>

That is...

data about publications, or citation frequency



Evaluation of scientific research : Citation Analysis

Citations analysis: number of citations received by a publication

“Assuming that scientists cite the work that they have found useful in pursuing their own research, the number of citations received by a publication is seen as a quantitative measure of the resonance and impact that this publication has created in the scientific community.” (Neuhaus, 2006)



Evaluation of scientific research: Citations analysis

Limits (1)

Time. The existing literature has observed that citations are symmetrically, but not uniformly, distributed over time.

Size of the research community. The probability of being cited is remarkably correlated with the number of scholars working in the same research field.

Editorial practice in the discipline. number of co-authors, the dominant editorial strategy in the discipline (articles or books), the prevailing language (Italian or English), and the average citation <<life>> of publications in the research field.

Citation ethics. Scores on citation indexes can be manipulated through *strategic quoting*.



Evaluation of scientific research: Citations analysis

Limits (2)

Publisher's prestige. positive correlation between visibility and the number of citations.

Nature of the research contribution. Reviews and research proposing new methodologies are more cited.

Atypical meaning of the citation. e.g. «negative» citation.

Sleeping beauties or «Mendel's syndrome» papers.
Underestimation of an original scientific publication.



Bibliometrics tools

The most well-known bibliometrics tools are:

Journal Citation Report
Scopus

Databases that measure
journal impact

Web of Science
Scopus
Google Scholar

Databases mostly used
for **citation searching**



Databases that measure journal impact: JCR

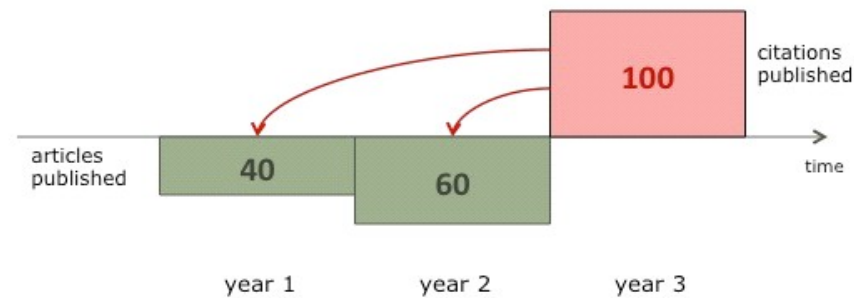
The Journal Citation Reports (JCR) database is a subscription product that calculates and publishes the annual impact factors for journals

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

Impact Factor

The Impact Factor

Introduced in 1950's by Eugene Garfield: ISI



$$IF(\text{year } 3) = 100 / (40 + 60) = 1$$



IF – Some criticisms (1)

- Many journals are not included in the Thomson Reuters citation indexes (no Impact Factor)
- Some subject areas accept and assimilate new research rapidly, e.g., biotechnology versus pure mathematics research (introduced 5 - Year Impact Factor)
- Journal Impact factors cannot assess the quality of individual articles in a journal
- A small percentage of articles from a small subset of journals are highly cited. This small percentage accounts for a large proportion of the total citations



IF – Some criticisms (2)

- Non-English language journals are less accessible to researchers worldwide and therefore may be cited less
- Review articles and review journals may be cited more frequently than items which contain new concepts or research
- Editorials, letters, new items and meeting abstracts are usually not included in article counts
- Sudden changes in a journal's size can affect the impact factor
- Title changes affect the impact factor. JCR does not unify the old and new titles for minor title change and if the title position in alphabetic order does not change



Other performance indicators:

5-Year Journal Impact Factor

IF is calculated on a 5-year citation window. By using a larger citation window than the traditional IF, the 5-year journal IF is more appropriate to evaluate theoretical fields with a more “durable” literature.

Immediacy index

This index is calculated by taking the number of times that articles published in a given journal are cited by others and then dividing this number by the number of articles published in that journal in that same year. It is a useful indicator to identify journals publishing in emerging areas of research.

Eigenfactor Score (EF)

It measures the number of times articles from the journal published in the past 5 years have been cited in the JCR year

Article Influence Score (AI)

It determines the average influence of a journal's articles over the first 5 years after publication.



Other Journal Ranking Tools

SCOPUS SNIP (Scopus citations data)

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

Free Scopus journal metrics: <http://www.journalmetrics.com>

Freely available Tools (for journal or citations impact):

SCImago SJR (free, Scopus citations data)

<http://www.scimagojr.com/index.php>

Google Scholar Metrics (Journals) (free, publications 2010 - 2014)

<http://scholar.google.com/intl/en/scholar/metrics.html>

Google Scholar+Harzing's Publish or Perish (PoP)

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



And the authors?

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 has been applied also to journals, research teams, institutions, nations (see Scimago)

It is always a whole number

Hirsch, J. E. (2005). An index to quantify an individual's scientific research output. Proc.Nat.Acad.Sci., 46, 16569.



H-index in Scopus and Web of Science

You can find an author's h-index in

Scopus

Scopus' analysis is based on data from 1996, but it is in progress of updating pre-1996 cited references going back to 1970. The h-index might increase over time.

Web of Science

Web of Science data from 1985

Publish or Perish

Free software



And the future? ALTMETRICS

A record of attention: how many people have been exposed to and engaged with a scholarly output?

A measure of dissemination: where and why a piece of research is being discussed and shared, both among other scholars and in the public sphere?

An indicator of influence and impact: some of the data gathered via altmetrics can signal that research is changing a field of study, the public's health, or having any other number of tangible effects upon larger society.

<https://www.altmetric.com>



And the future of scientific publication?

OPEN ACCESS





Useful links

Science Information life cycle, UCI Libraries

http://www2.lmu.edu/lib/science_tutorial/science_mod01pg01.html

Web of science (Thomson Reuters)

http://apps.webofknowledge.com/WOS_GeneralSearch_input.do?product=WOS&search_mode=GeneralSearch&SID=W2Brw9EJTUqNfRoFLqo&preferencesSaved=

WoS Training

http://thomsonreuters.com/products_services/science/training/wos/

Journal Citation Reports Training

http://wokinfo.com/training_support/training/journal-citation-reports/

Scopus

<http://www.scopus.com>

Scopus Live Training

<https://www.elsevier.com/solutions/scopus/support>



Useful links

Scopus Tutorials

http://help.scopus.com/flare/Content/tutorials/sc_menu.html

How calculate the h-index

<https://blog.scopus.com/topics/h-index>

Publish or Perish (Google scholar)

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

H-index

http://it.wikipedia.org/wiki/Indice_H

How calculate the H-Index in Google Scholar

<https://library.ucar.edu/finding-your-h-index-hirsch-index-google-scholar>



What is Open Access?

Open-access (OA) literature is
digital, online, free of charge,
and **free of most copyright** and licensing restrictions.

What makes it possible is
the internet and the consent of the author or copyright-holder.

A Very Brief Introduction to Open Access by Peter Suber

<http://legacy.earlham.edu/~peters/fos/brief.htm>



What are the benefits?

Nowadays, it is widely recognized that
making research results more accessible

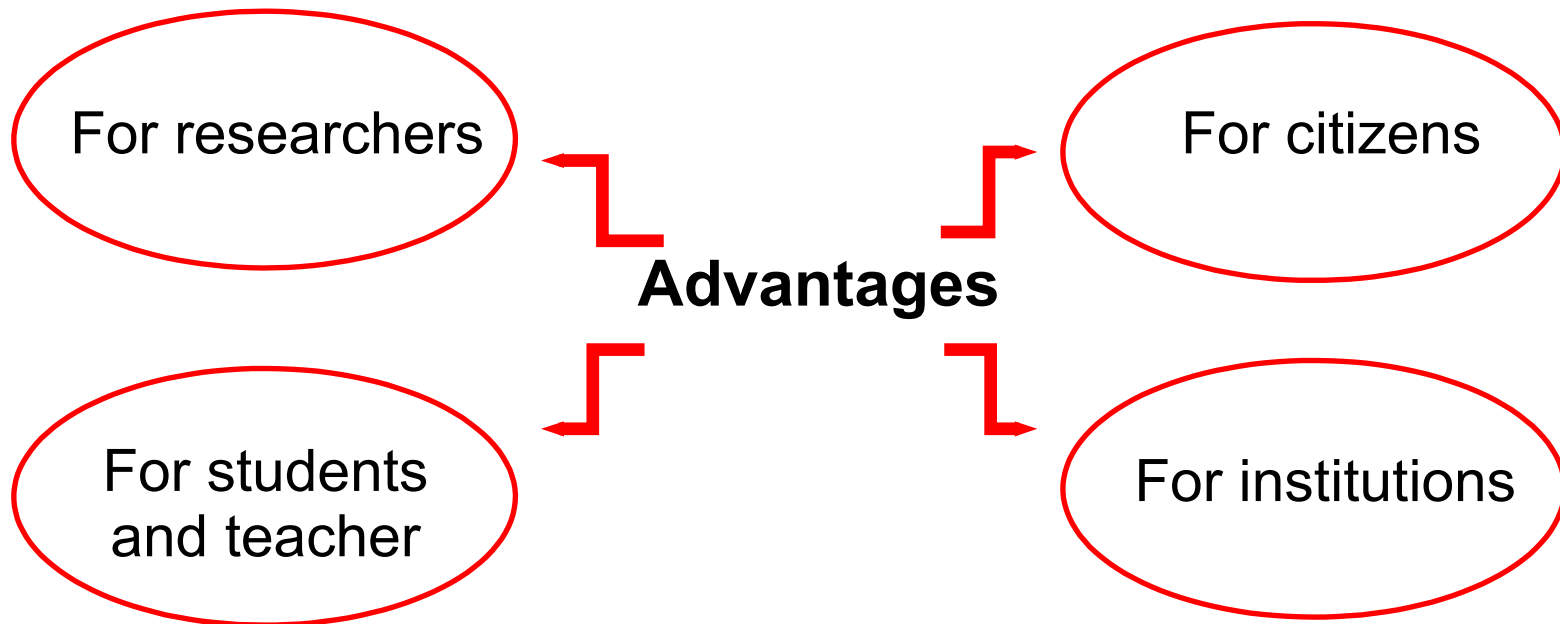
**contributes to better and more efficient science,
and to innovation in the public and private sectors.**

European Commission, Horizon2020

<https://ec.europa.eu/programmes/horizon2020/en/h2020-section/open-science-open-access>



What are the benefits?





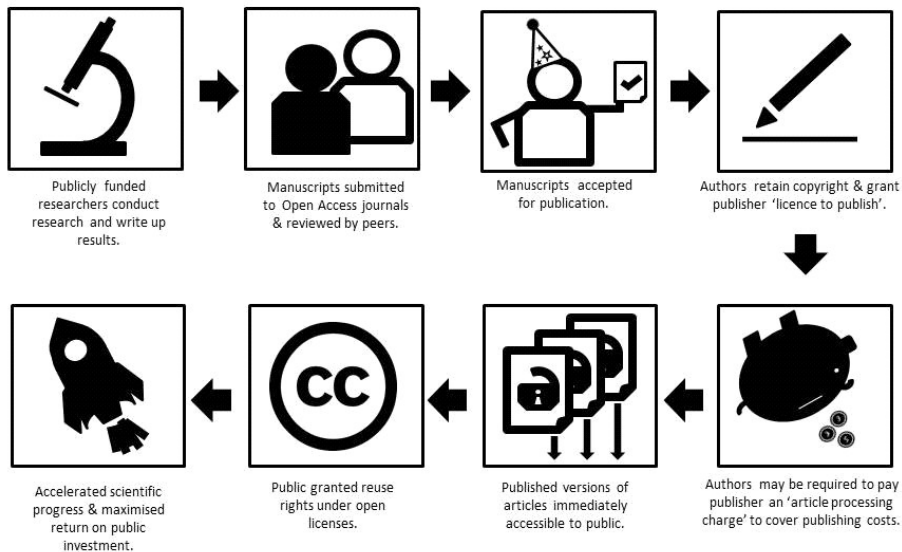
How do you make your work openly accessible?

Open access logo, originally designed by Public Library of Science.

https://commons.wikimedia.org/wiki/File:Open_Access_logo_PLoS_white.svg

GOLD OPEN ACCESS

maximised dissemination, economic efficiency & social impact



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Model and text adapted from: Timothy Vollmer and Teresa Sempere Garcia 'Research article cycles' http://wiki.creativecommons.org/File:Research_article_cycles.jpg



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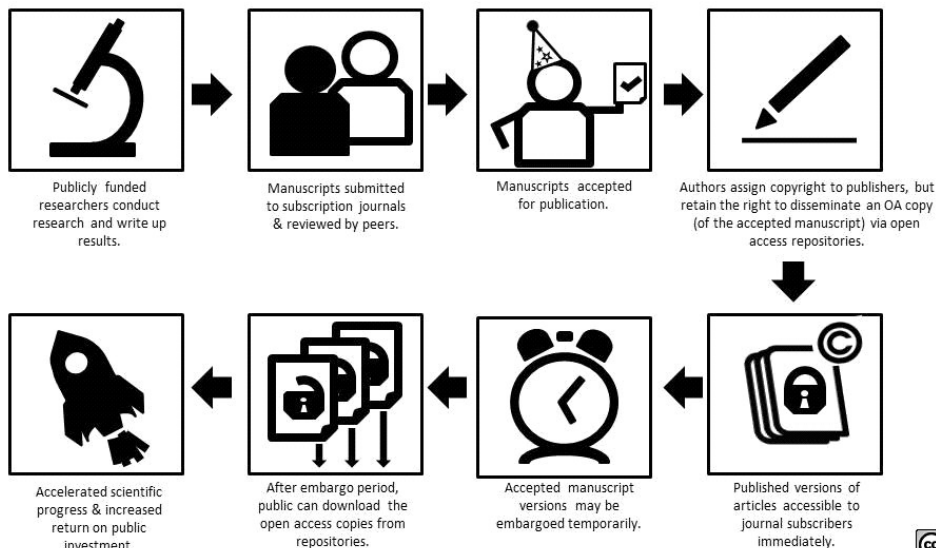
<https://aoasg.org.au/what-is-open-access/>

- Publish in an **open access journal**
- or in a journal which supports open access (**hybrid**)
- Open access **fee is paid by the author**, or on their behalf for example by their institution
- Public access is to the **final published article**
- Access is immediate

<https://www.elsevier.com/about/open-science/open-access#options>

GREEN OPEN ACCESS

increased dissemination, economic efficiency & social impact



Model and text adapted from Timothy Vollmer and Teresa Sempere Garcia "Research article cycles" http://wiki.creativecommons.org/File:Research_article_cycles.jpg

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<https://aoasg.org.au/what-is-open-access/>

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- Free access to a **version of your article**
- **No fee is payable** by the author as publishing costs are covered by library subscriptions
- **Authors retain the right** to re-use their articles for a wide range of purposes

<https://www.elsevier.com/about/open-science/open-access#options>



Advice to Authors: you are the owner of copyrights!

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2. Find out more about publishers' open access policies ◇ [SHERPARoMEO](#)
3. Pick your publisher carefully and consider to publish in an open access journal ◇ [Directory of Open Access Journals](#)
4. Be careful of predatory Open Access journals ◇ [ScholarlyOpen Access](#)
5. Need Help? Ask the [Library Helpline](#) of Padua University



Credits

These slides are a reworking of :

“Scientific communication and research : evaluation Bibliometrics and Bibliometric Indicators” by Roberta Sato (Corso di dottorato in Bioscienze Information literacy in Biology 2016)

“Metodi bibliometrici per la valutazione della ricerca: non solo Impact Factor” by Micaela De Col

Open Access e mandati istituzionali a Padova, di Emanuela Canepa, 30 giugno 2016



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<http://legacy.earlham.edu/~peters/fos/brief.htm>

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An introduction to open access, by Stephen Carlton

<http://www.slideshare.net/LivUniLibrary/introduction-to-open-access-59722824>

Open Accss to Sholarly Literature: Which Side Are You On?, by Jill Cirasella

<http://tinyurl.com/OAwhichside>

What is open access?, Dutch National website <http://openaccess.nl/en/what-is-open-access>

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