



Embracing Open Science: Meeting requirements and unlocking benefits

Alicia Fátima Gómez
IE University. Library.

Madrid, October 30, 2024

What is Open Science?

Open Science is defined as a **set of practices** that aim to make scientific knowledge **openly available, accessible, and reusable for everyone**, increase **scientific collaborations** and sharing of information for the **benefits of science and society**, and open the processes of scientific research, from setting the research agenda, to conducting research, to the dissemination of research results.

Open Science aims to promote **transparency, accessibility, and reproducibility** in research processes.



<https://www.unesco.org/en/open-science/about>

The EC Open Science Pillars

- **Open Access** ([Open access policy](#))
- **Open Data** > FAIR DATA
- **New Generation Metrics:** New indicators to complement the conventional indicators for research quality and impact
- **Rewards:** Research career evaluation systems should fully acknowledge open science activities. ([Rewards, incentives and recognition for researchers practicing open science](#), 2017)
- **Research Integrity** ([Reproducibility of scientific results in the EU](#), 2020)
- **Education and Skills** ([Providing researchers with the skills and competencies they need to practise Open Science](#), 2017)
- **Citizen Science:** The general public should be able to make significant contributions and be recognised as science knowledge producers. ([Factsheet on citizen science](#))
- **European Open Science Cloud** ([EOSC](#))

Responsible Research & Innovation (RRI)

A concept adopted as a cross-cutting issue at H2020, that aligns research and innovation (R&I) processes with the values, needs, and expectations of society.

It promotes "**science by, for, and with society,**" emphasizing responsibility, inclusivity, and sustainability in scientific research and technological advancement.

Both Open Science and RRI aim to make science **more accessible and relevant to society**, fostering trust and collaboration between researchers and the public.



European Commission. (2012). Responsible Research and Innovation: Europe's ability to respond to societal challenges. Brussels: European Union. <https://doi.org/10.2777/11739>

The six keys of RRI:

Ethics

focuses on (1) research integrity: the prevention of unacceptable research and research practices; and (2) science and society: the ethical acceptability of scientific and technological developments.



Open Access

addresses issues of accessibility to and ownership of scientific information. Free and earlier access to scientific work might improve the quality of scientific research and facilitate fast innovation, constructive collaborations among peers, and productive dialogue with civil society.

Gender Equality

is about promoting gender balanced teams, ensuring gender balance in decision-making bodies, and considering always the gender dimension in R&I to improve the quality and social relevance of the results.



Public Engagement

fosters R&I processes that are collaborative and multi actor: all societal actors work together during the whole process in order to align its outcomes to the values, needs and expectations of society.

Governance

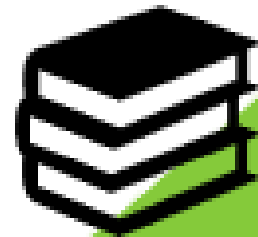
arrangements that lead to acceptable and desirable futures have to (1) be robust and adaptable to the unpredictable development of R&I (de facto governance); (2) be familiar enough to align with existing practices in R&I; (3) share responsibility and accountability among all actors; and (4) provide governance instruments to actually foster this shared responsibility.



Science Education

focuses on (1) enhancing the current education process to better equip citizens with the necessary knowledge and skills so they can participate in R&I debates; and (2) increasing the number of researchers (promote scientific vocations).

A change of paradigm



- * JOURNAL ARTICLES
- * JOURNAL BASED METRICS (JIF, quartiles and deciles)
- * CITATIONS and related (h index)



OPEN SCIENCE

- * More than journal articles: PREPRINTS, REPORTS, DATASETS
- * OBJECT LEVEL METRICS AND ALTERNATIVE METRICS

OPEN SCIENCE



What changes

CLOSED SCIENCE	OPEN SCIENCE
Based on publishing articles	Based on publishing any research outputs
Individualistic science	Collaborative science
Access to research outputs for a few researchers	Access to research outputs for the entire society
Vertical, specialized science	Horizontal, interdisciplinary science
Science without citizen participation	Citizen science, with and for Society
Credit system based on the impact of publications	Credit system based on the impact of the researcher
Journal metrics , Impact Factor and Citescore or similar	<u>New metrics and next generation metrics</u> , new indicators

Alonso-Arévalo, J. (2019) El conocimiento es de todos y para todos ¿Qué es y qué implica la Ciencia Abierta? Universo Abierto. <https://universoabierto.org/2019/09/30/el-conocimiento-es-de-todos-y-para-todos-que-es-y-que-implica-la-ciencia-abierta/>

Open Science at NASA

NASA is making a long-term commitment to building an inclusive open science community over the next decade. Open-source science is a commitment to the open sharing of software, data, and knowledge (algorithms, papers, documents, ancillary information) as early as possible in the scientific process.

Open Inclusive Science

Process and participants should welcome participation by and collaboration with diverse people and organizations.



Open Accessible Science

Data, tools, software, documentation, and publications should be accessible to all (FAIR).



Open Reproducible Science

Scientific process and results should be open such that they are reproducible by members of the community.



Open Transparent Science

Scientific processes and results should be open such that they are reproducible by members of the community.



Open Principles

The principles of open-source science are to make publicly funded scientific research transparent, inclusive, accessible, and reproducible. Advances in technology, including collaborative tools and cloud computing, help enable open-source science, but technology alone is insufficient. *Open-source science requires a culture shift to a more inclusive, transparent, and collaborative scientific process, which will increase the pace and quality of scientific progress.*

<https://science.nasa.gov/open-science/>

- **Limited reproducibility:
Data is often not made
available in publications**

Nature Genetics **41**, 149 - 155 (2009)
Published online: 28 January 2008 | doi:10.1038/ng.295

Repeatability of published microarray gene expression analyses

scientists. Here we evaluated the replication of data analyses in **18 articles on microarray-based gene expression profiling published in *Nature Genetics* in 2005–2006. One table or figure from each article was independently evaluated by two teams of analysts. We reproduced two analyses in principle and six partially or with some discrepancies; ten could not be reproduced. The main reason for failure to reproduce was data unavailability, and discrepancies were mostly due to incomplete data annotation or specification of data processing and analysis.**

- **URL does not resolve
(i.e., “rotten”): data are
not accesible anymore**

PLOS ONE | DOI:10.1371/journal.pone.0115253 December 26, 2014

RESEARCH ARTICLE

Scholarly Context Not Found: One in Five Articles Suffers from Reference Rot

Martin Klein^{1*}, Herbert Van de Sompel¹, Robert Sanderson¹, Harihar Shankar¹, Lyudmila Balakireva¹, Ke Zhou², Richard Tobin²

We analyze a vast collection of articles from three corpora that span publication years 1997 to 2012. For over one million references to web resources extracted from over 3.5 million articles, we observe that the fraction of articles containing references to web resources is growing steadily over time. We find one out of five STM articles suffering from reference rot, meaning it is impossible to revisit the web context that surrounds them some time after their publication. When only considering STM articles that contain references to web resources, this fraction increases to seven out of ten.

Research Policy 47 (2018) 924–935

Contents lists available at ScienceDirect

Research Policy

journal homepage: www.elsevier.com/locate/respol

Retraction statements and research malpractice in economics

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ABSTRACT

We draw on rational crime theory to help analyse 55 articles that have been retracted from 734 peer-reviewed journals in the field of economics. We highlight and discuss what these findings indicate regarding the nature and pattern of research malpractice in that discipline. Particular attention is given to exploring “no reason” retractions and the policy guidelines of publishers regarding retracted papers. We conclude that the frequent vagueness of retraction statements, and a reluctance to signal research malpractice, generally results in little damage to the reputation of caught, and known, offenders. Thus, a key deterrent to engaging in research malpractice is lacking. To reduce the incidence of research malpractice, we offer several recommendations for publishers and journal editors.

1. Introduction

Growing concern about the substantial scale of research misconduct (Martin, 2013) has pointed to the need for additional empirical evidence regarding questionable research practices (henceforth, QRPs) in all disciplines. Biagioli and Kenney (2016, p.1944), for example, have called for more information regarding forms of “traditional misconduct – fabrication, falsification, and plagiarism ...[and]... new misconduct ... fake peer reviews and citation rings.”

There is clear evidence that academic economists engage in QRPs (Necker, 2014; Wible, 2016). Studies by Karabag and Berggren (2012, 2016) have analysed QRPs in 6 and 43 retracted papers in economics, respectively. However, knowledge of the frequency, nature and pattern of research malpractice within the discipline remains rudimentary. To address this, we analyse 55 articles that have been retracted from 734 peer-reviewed journals in economics. This is the largest evidential base of retractions analysed to date in peer-reviewed studies in the field of economics. Nonetheless, the results should be regarded as indicative, rather than exhaustive. They draw attention to problems of poor research practice in the field.

As Fanelli (2013, p.1) has argued, it is likely that the statistics obtained in studies of the type we conduct “are proportional not to the prevalence of misconduct but to the efficiency of the system that detects it.” Given the secretive and often shameful nature of research malpractice, a complete picture of its prevalence seems unlikely to be obtained. Therefore, we do not suggest that an increasing level of retractions can be equated with an actual rise in research malpractice. Rather, increased retractions seem likely to be caused by increased vigilance on the part of editors, publishers, reviewers and readers. Mindful of these caveats, we contend that the data analysed here offer valuable insight into the forms of malpractice that occur, even if their full extent is not fully documented. Our analysis also raises important issues about the high incidence of “no reason” retractions in economics journals.

We make three important contributions. First, we highlight the forms of malpractice that drive retractions in peer-reviewed journals in economics. In doing so, indicative data regarding the frequency and nature of research malpractice in the discipline are provided. We also explore the incentives that prompt (allegedly) “rational” researchers to use QRPs. This leads us to suggest ways of eliminating those incentives in order to improve the integrity of research. Second, we recommend some actions that publishers and journal editors should take to deal more effectively with research malpractice. The associated discussion highlights the incidence of “no reason” retractions, reviews publisher guidelines on retraction, and proposes ways of reducing the frequency with which journals retract papers without stating a clear reason. Third, we propose a global protocol for dealing with retracted papers.

We illuminate the incentives for research malpractice with a view to

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Available online 20 March 2018
0048-7233/© 2018 Elsevier B.V. All rights reserved.

<https://doi.org/10.1016/j.respol.2018.02.016>

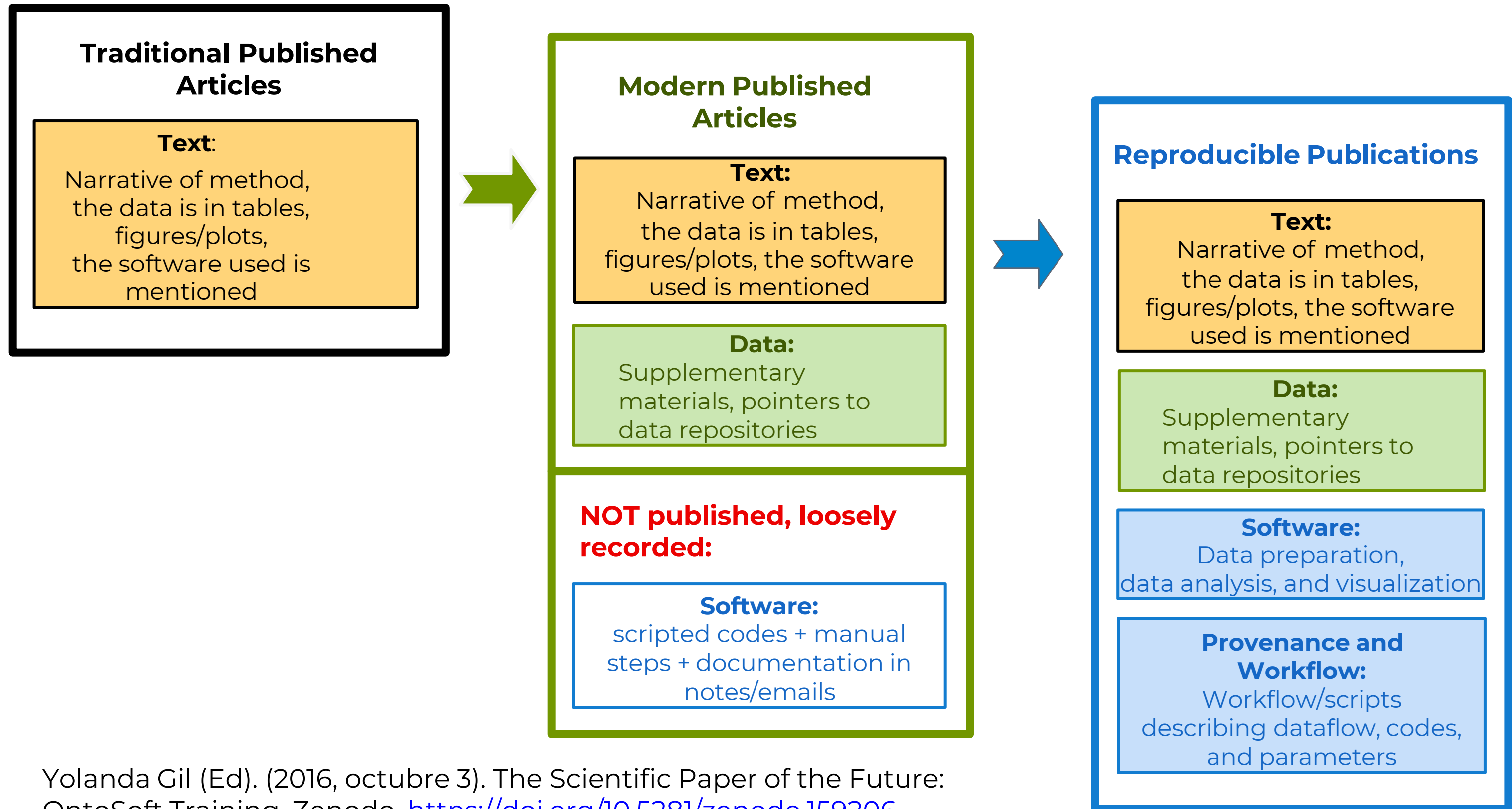
Table 2. Profile of retracted papers in economics.

Time to Retract	Citations		ABS/AJG Ranking		Scimago Quartile		Journal Impact Factor	
	n	Range	n	Rank	n	Quartile	n	Factor
<1	35	0–10	42	4*	1	Q1	11	0–0.99
2	6	11–20	9	4	1	Q2	41	1–1.99
3	11	21–30	2	3	12	Q3	1	2–2.99
4	0	31–40	0	2	38	Q4	1	3–3.99
5	2	41–50	0	1	3	Not	1	4–4.99
6 to 9	1	51–100	2					
≥10	0	>100	0					
Total	55		55					

Table 4. Economics journals by publisher.

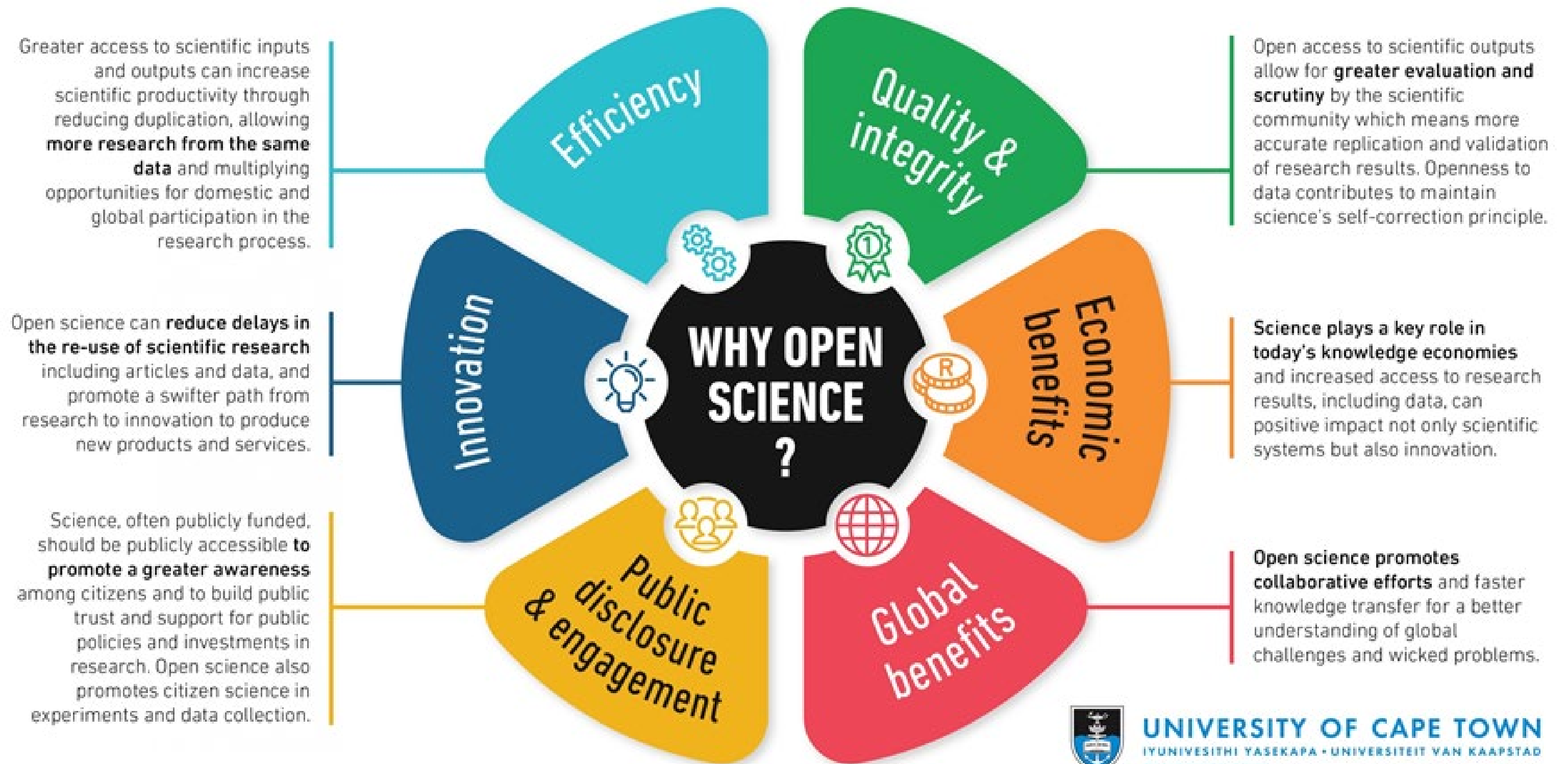
Publisher	n	%
Springer	93	12.7
Wiley	85	11.6
Elsevier	70	9.5
Taylor & Francis	60	8.2
De Gruyter	20	2.7
Oxford University Press	20	2.7
Sage	19	2.6
Cambridge University Press	18	2.4
Emerald	14	1.9
InderScience	13	1.8
Others: <1% share each	322	43.9
Total	734	100

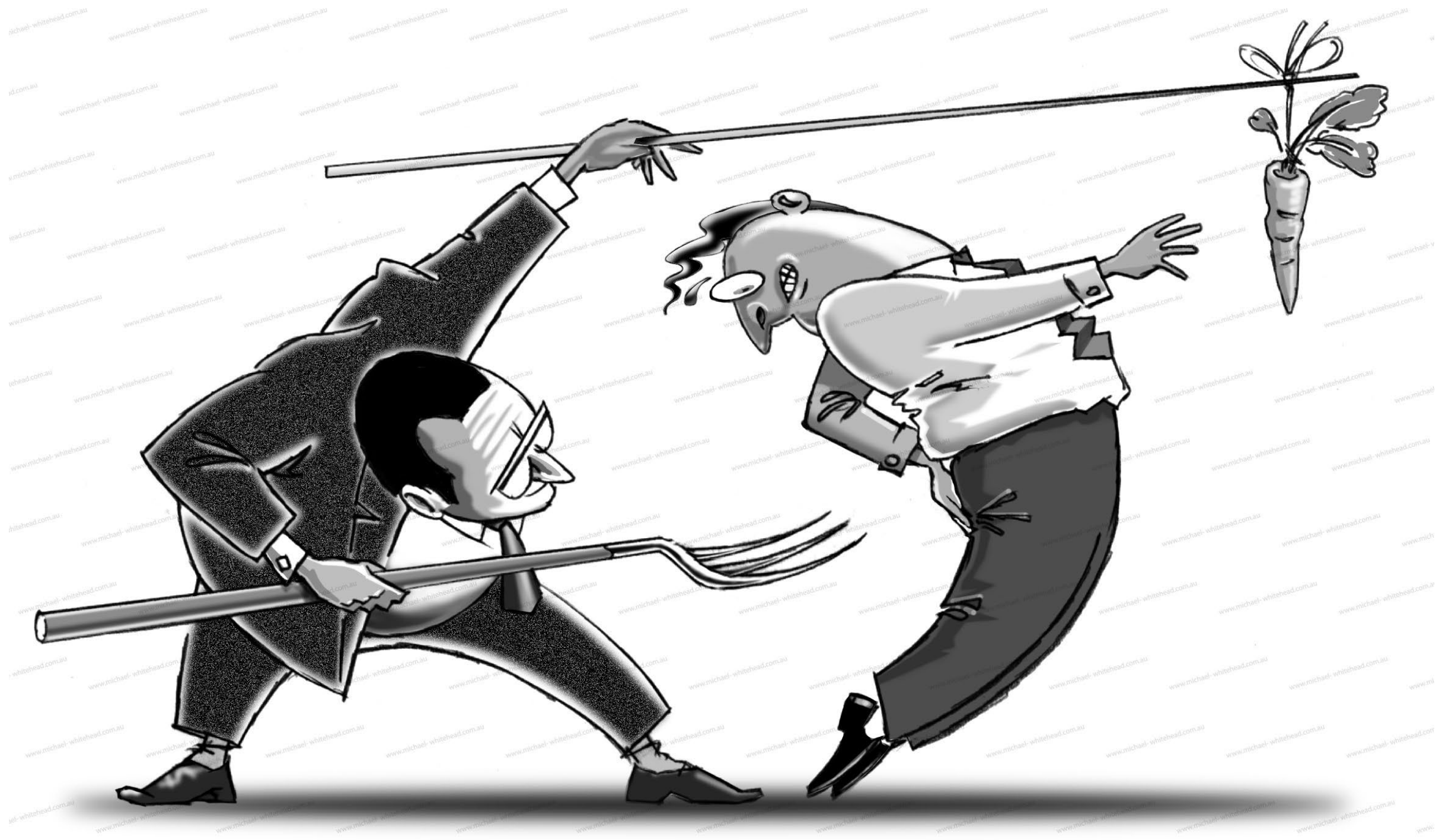
Traditional vs Modern and Reproducible Scientific Articles



Yolanda Gil (Ed). (2016, octubre 3). The Scientific Paper of the Future: OntoSoft Training. Zenodo. <https://doi.org/10.5281/zenodo.159206>

Benefits of Open Science

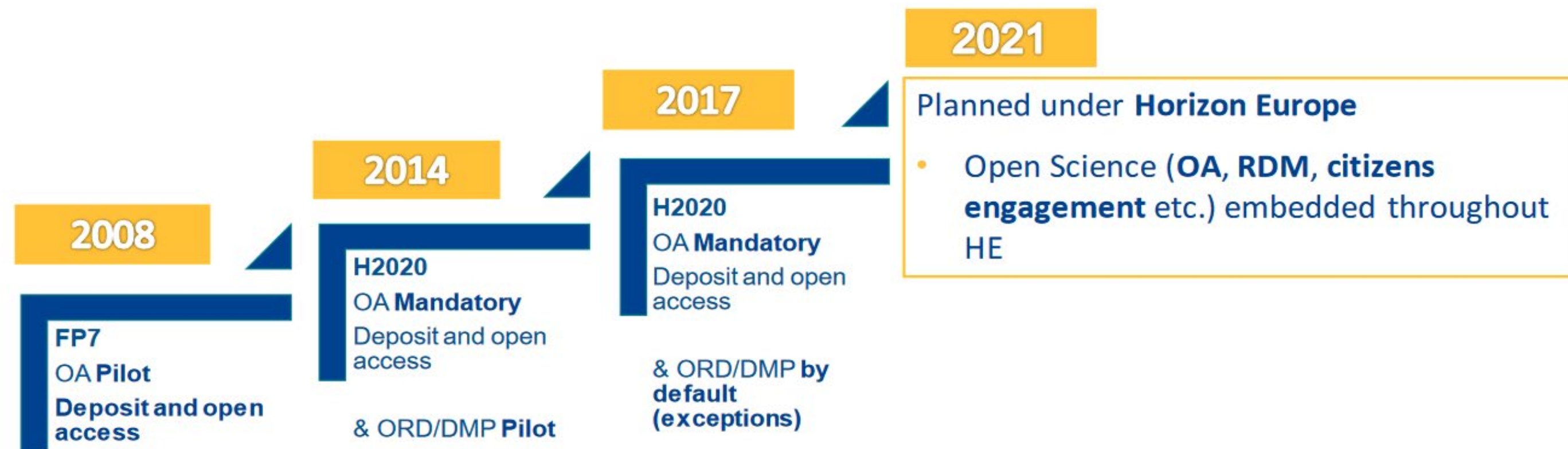




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From Open Access to Open Science in Europe

Evolution of open science policy across FPs



Research and innovation

[Home](#) > [Strategy on research and innovation](#) > [Strategy 2020-2024](#) > [Our digital future](#) > [Open Science](#)

Open Science

An approach to the scientific process that focuses on spreading knowledge as soon as it is available using digital and collaborative technology. Expert groups, publications, news and events.

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[Future of open science under Horizon Europe](#)

[Tracking open research trends - Open Science Monitor](#)

[Documents](#)

[Latest](#)

[Events](#)

The EU's open science policy

Open science is a policy priority for the European Commission and the standard method of working under its research and innovation funding programmes as it improves the quality, efficiency and responsiveness of research.

When researchers share knowledge and data as early as possible in the research process with all relevant actors it helps diffuse the latest knowledge.

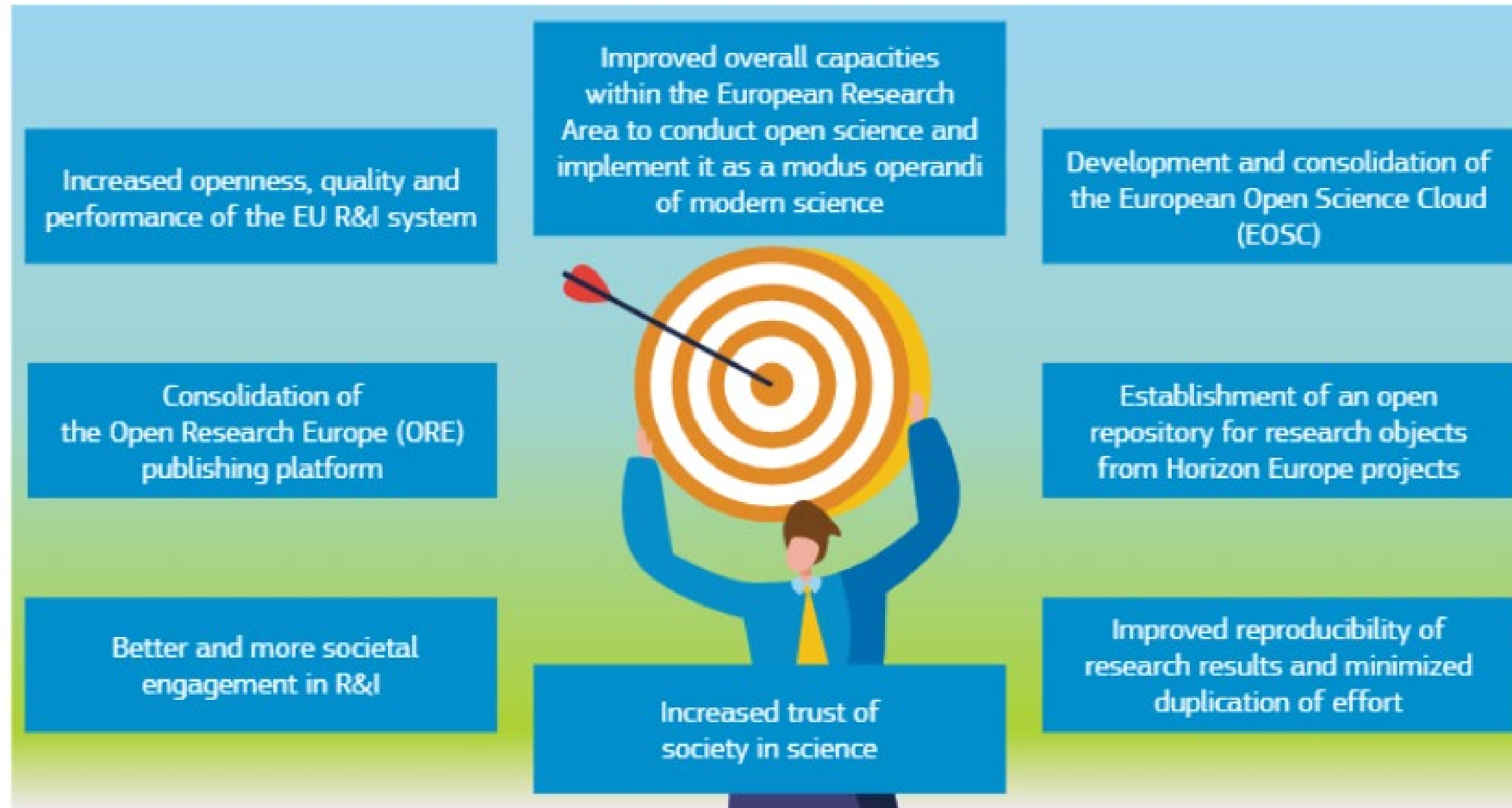
And when partners from across academia, industry, public authorities and citizen groups are invited to participate in the research and innovation process, creativity and trust in science increases.

That is why the Commission requires beneficiaries of research and innovation funding to make their publications available in open access and make their data as open as possible and as closed as necessary. It recognises and rewards the participation of citizens and end users.

Furthermore, the [European Open Science Cloud](#) EN will enable researchers across disciplines and countries to store, curate and share data.

The effective linking of open science practices to innovation and business models requires careful consideration of issues such as Intellectual Property Rights (IPR), licensing agreements, interoperability and reuse of data.

Expected results and impacts



<https://op.europa.eu/en/web/eu-law-and-publications/publication-detail/-/publication/9570017e-cd82-11eb-ac72-01aa75ed71a1#>






Obligations in Horizon Europe



- The **open access mandate extends to books** and other long-form publications.
- **Immediate open access**, no more embargoes, no refund of publication fees in hybrid places.
- Information **must be provided** on all other academic objects, tools and instruments necessary to **validate the conclusions of the publication**.
- Responsibly **open data sharing**.
- Emphasis on research **FAIR data management and DMPs**.
- **Open Research Europe**: a new open access publishing platform for H2020 / Horizon Europe grantees.

Main elements of Open Science in Horizon Europe

Horizon Europe Regulation

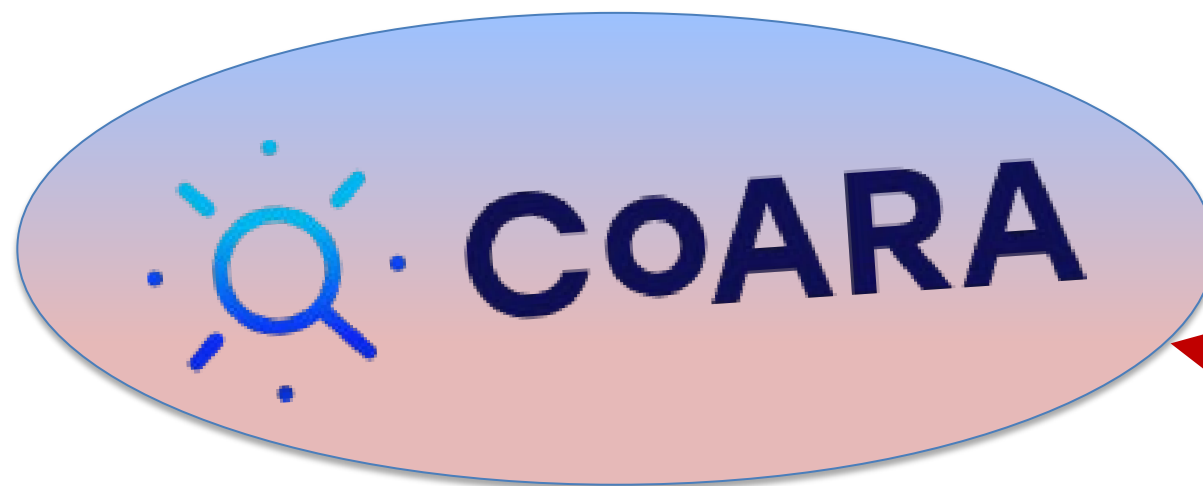
-  Open access to publications ensured (=no way around this! 😊)
-  Open access to research data: 'as open as possible as closed as necessary'
-  Responsible management of research data: Data Management Planning, FAIR data, long-term preservation of data
-  Open science practices promoted and encouraged; may provide additional incentives or obligations to adhere to open science practices
-  May require additional obligations to use EOSC for storing and giving access to research data
-  Authors/beneficiaries must retain enough rights for open access
-  Exceptions to open access for research data described

Conclusions OS in Horizon Europe

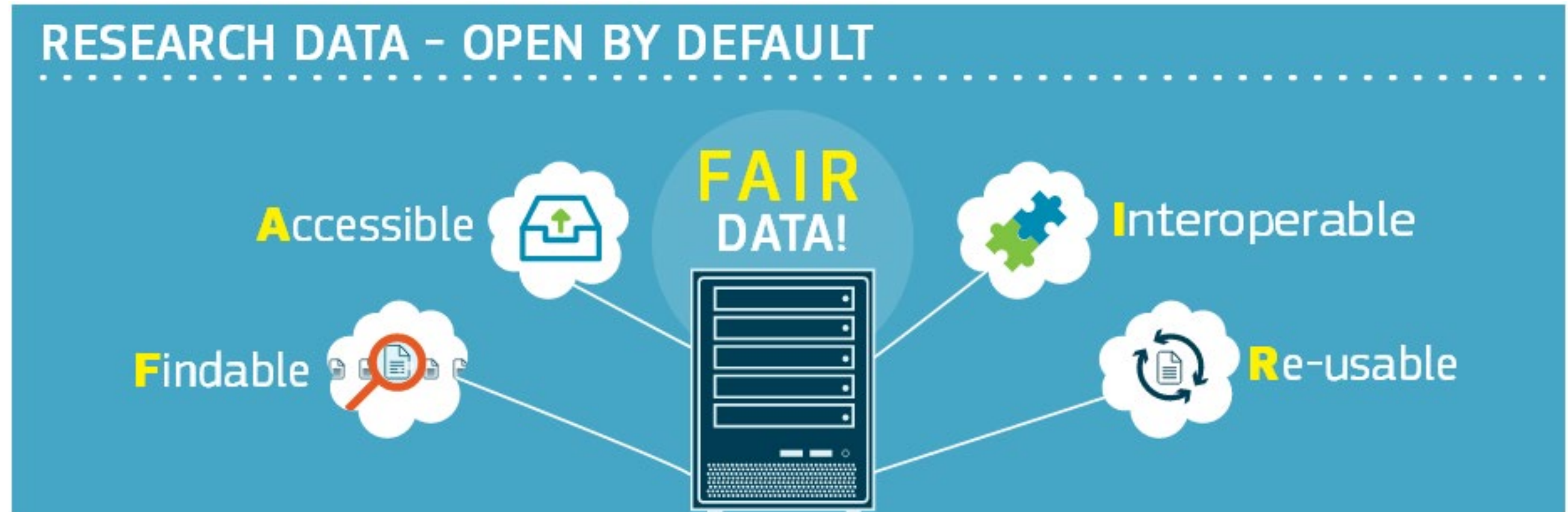
Horizon Europe Regulation

Open
Science
as *modus
operandi*

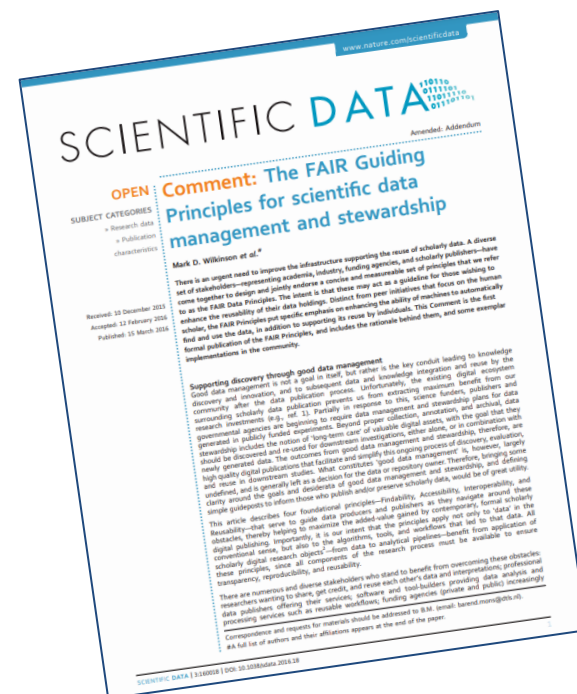
- Promote OS: science communication and citizen science, among others, e.g. through a combination of obligations and incentives (possibly also in the evaluation of proposals)
- Sanctions for those grant beneficiaries (e.g. not necessarily the same as researchers) that repeatedly and consistently fail to provide the required OA
- Appropriate metrics for better assessing the impact of research output and engagement in open science



FAIR Data



FAIR infographic by OpenAIRE for Horizon 2020
<https://www.openaire.eu/how-to-make-your-data-fair>



Wilkinson, M., Dumontier, M., Aalbersberg, I. et al. The FAIR Guiding Principles for scientific data management and stewardship. *Sci Data* **3**, 160018 (2016).
<https://doi.org/10.1038/sdata.2016.18>



Findable

- Unique and persistent identifiers for (meta)data
- Rich set of metadata describing the datasets
- (Meta)data indexed within a centrally available catalog/server



Reduce time wasted searching for and finding relevant data



Accessible

- (Meta)data are retrievable through the unique identifiers (see findable)
- Authentication and authorization procedures ensure compliance
- Accessible ≠ open



Foster sharing of data within and across institutions, respecting patients and IP



Interoperable

- (Meta)data follow a common format/structure and terminology
- (Meta)data is represented by FAIR vocabularies
- Vocabularies are mapped against industry standards



Reduced time to integrate data across entities/ projects and create new insights



Reusable

- Provenance information is sufficiently available and linked to source data
- Domain experts are able to understand and work with data without additional explanation

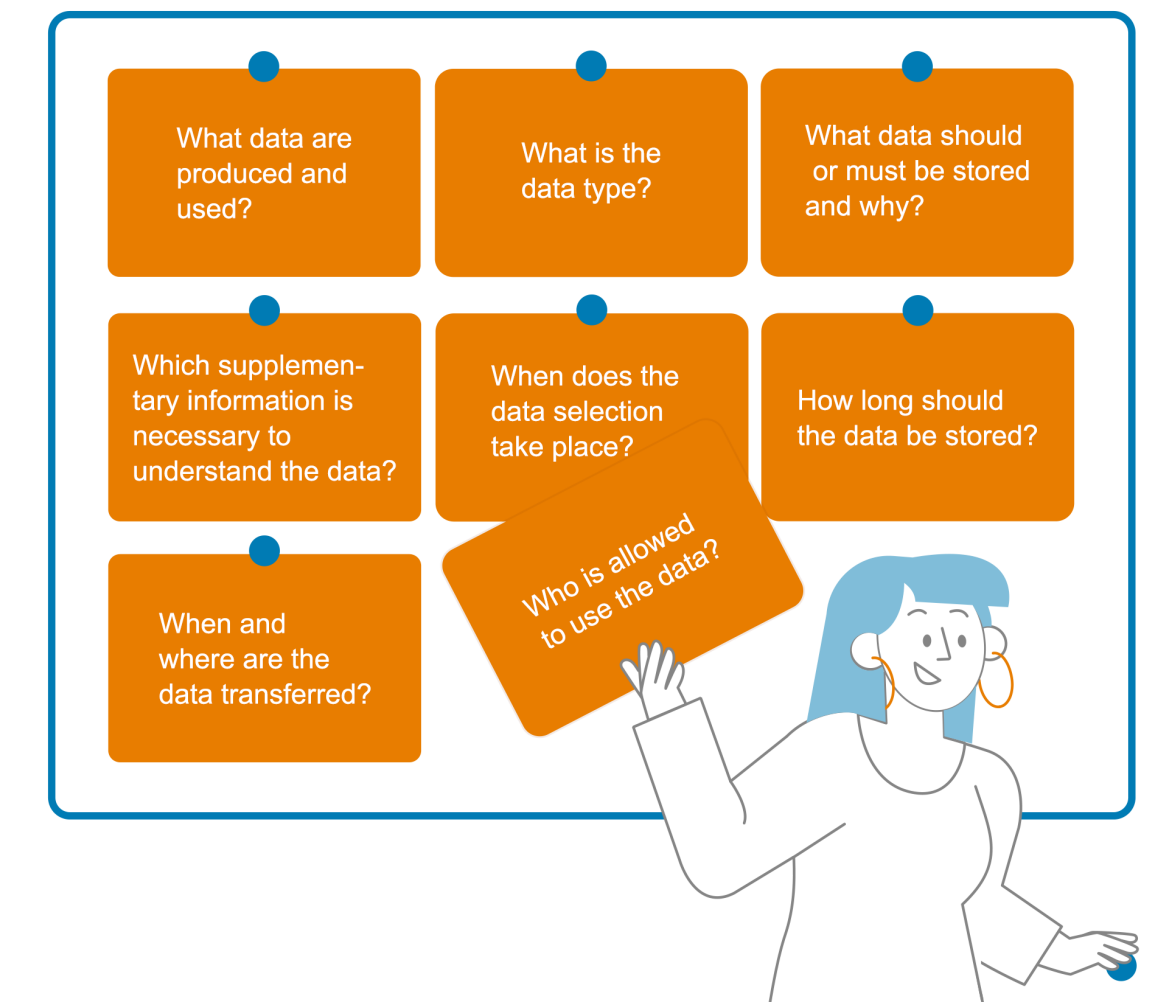


Reduce spend in data generation

Research Data Management Plan (DMP)

- A formal document that outlines how data are to be handled during a research project, and after the project is completed.
- It's a live instrument, it must evolve and gain in precision. New version every time there are important changes in the project (at least one intermediate and one final review).
- The DMP addresses aspects related to the FAIR data and indicates which data will be open and which will not, and why.

Data Management Plan THE ELEMENTS



AS OPEN AS POSSIBLE, AS CLOSED AS NECESSARY

Grantees have the right to opt-out, but need to say **why**



Top three reasons for opt-out:

privacy

intellectual property rights

might jeopardise project's main objective

DATA MANAGEMENT PLAN (DMP)



HR2020 templates: Data management plan v1.0 – 13.10.2016

TEMPLATE HORIZON 2020 DATA MANAGEMENT PLAN (DMP)

- > Instructions and footnotes in blue must not appear in the text.
- > For options [in square brackets]: the option that applies must be chosen.
- > For fields in [grey in square brackets] (even if they are part of an option as specified in the previous item): enter the appropriate data.

Introduction

This Horizon 2020 DMP template has been designed to be applicable to any Horizon 2020 project that produces, collects or processes research data. You should develop a single DMP for your project to cover its overall approach. However, where there are specific issues for individual datasets (e.g. regarding openness), you should clearly spell this out.

Guidelines on FAIR Data Management in Horizon 2020 are available in the Online Manual.

FAIR data management

In general terms, your research data should be 'FAIR', that is findable, accessible, interoperable and re-usable. These principles precede implementation choices and do not necessarily suggest any specific technology, standard, or implementation-solution.

This template is not intended as a strict technical implementation of the FAIR principles, it is rather inspired by FAIR as a general concept.

More information about FAIR:

[FAIR data principles \(FORCE11 discussion forum\)](#)

[FAIR principles \(article in Nature\)](#)

Structure of the template

The template is a set of questions that you should answer with a level of detail appropriate to the project.

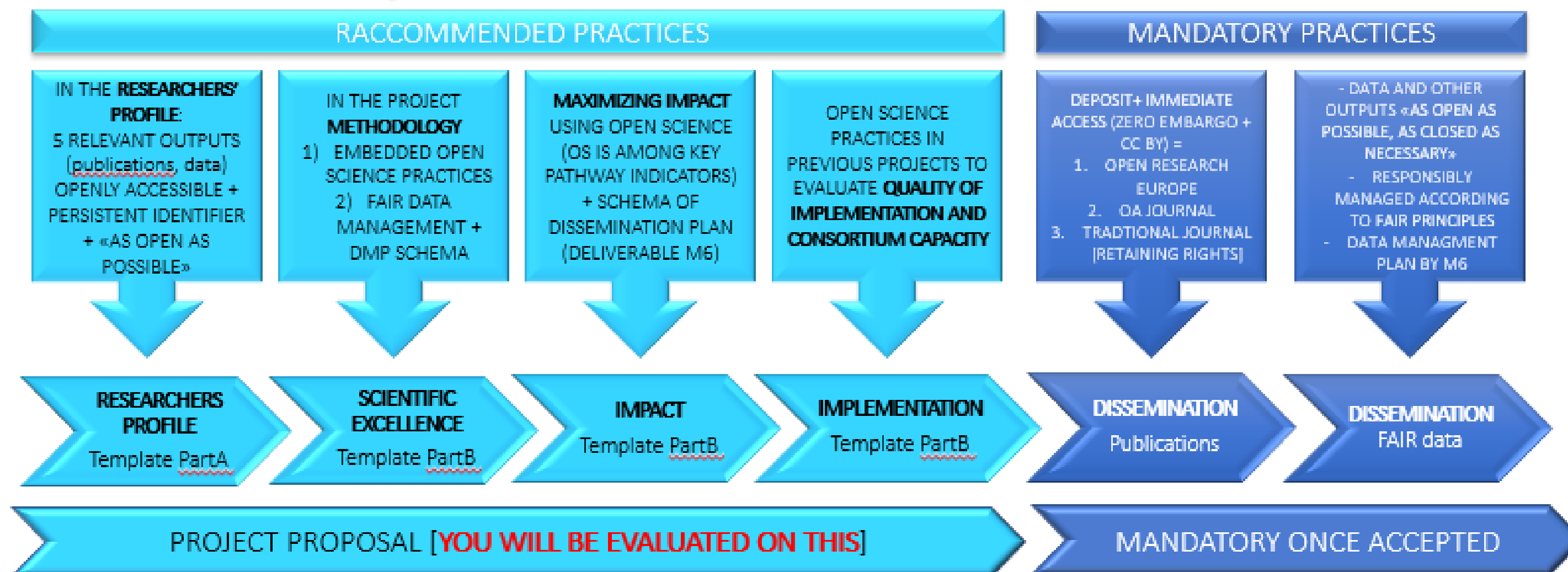
It is not required to provide detailed answers to all the questions in the first version of the DMP that needs to be submitted by month 6 of the project. Rather, the DMP is intended to be a living document in which information can be made available on a finer level of granularity through updates as the implementation of the project progresses and when significant changes occur. Therefore, DMPs should have a clear version number and include a timetable for updates. As a minimum, the DMP should be updated in the context of the periodic evaluation/assessment of the project. If there are no other periodic reviews envisaged within the grant agreement, an update needs to be made in time for the final review at the latest.

In the following the main sections to be covered by the DMP are outlined. At the end of the document, Table 1 contains a summary of these elements in bullet form.

This template itself may be updated as the policy evolves.

Open Science in Horizon Europe

IN THE METHODOLOGY YOU NEED TO ADDRESS BOTH:
1) HOW YOU WILL COMPLY WITH THE **MANDATORY PRACTICES**
2) HOW YOU WILL ADOPT **RACCOMENDED PRACTICES**



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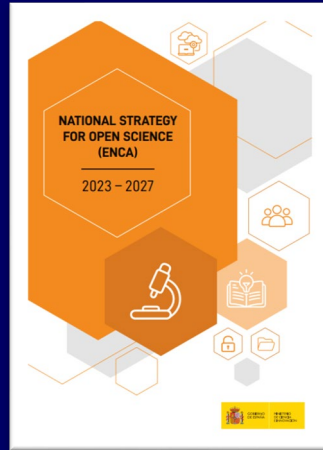
Giglia, E. (2021). Open Science in Horizon Europe Guide (Versión 1). Zenodo. <https://doi.org/10.5281/zenodo.5534111>

Ley 17/2022, de 5 de septiembre, por la que se modifica la Ley 14/2011, de 1 de junio, de la Ciencia, la Tecnología y la Innovación.

Uno de los objetivos generales de esta ley es precisamente “Impulsar la ciencia abierta al servicio de la sociedad y promover iniciativas **orientadas a facilitar el libre acceso a los datos, documentos y resultados generados por la investigación**, desarrollar infraestructuras y plataformas abiertas, y **fomentar la participación abierta de la sociedad civil en los procesos científicos**”.

“Se impulsará que se haga difusión de los resultados de la actividad científica, tecnológica y de innovación, y que los resultados de la investigación, incluidas las publicaciones científicas, **datos, códigos y metodologías, estén disponibles en acceso abierto**. El acceso gratuito y libre a los resultados se fomentará mediante el desarrollo de repositorios institucionales o temáticos de acceso abierto.”

https://boe.es/diario_boe/txt.php?id=BOE-A-2022-14581

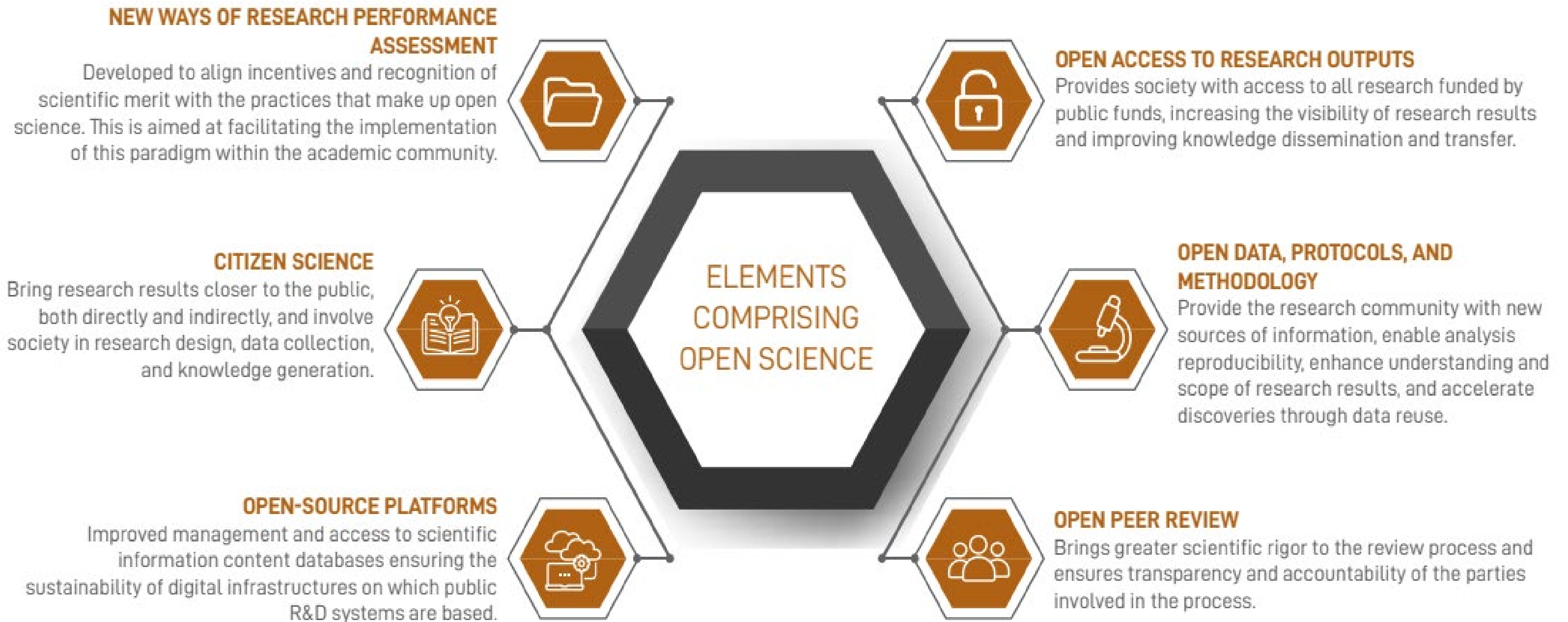


National Open Science Strategy (ENCA) 2023-2027

Strategic **lines of action** and objectives:

- **Digital infrastructure for open science** → Ensure the existence of sufficiently robust and well-articulated interoperable digital infrastructures.
- **Management of research data following FAIR principles** → Promote the proper management through FAIR principles (Findable, Accessible, Interoperable, Reusable).
- **Open access to scientific publications** → implement open and free access by default to scientific publications and results.
- **Incentives, recognition and training** → Establish new research evaluation mechanisms and an incentives and recognition system aimed at promoting open science practices.

<https://www.ciencia.gob.es/en/Estrategias-y-Planes/Estrategias/ENCA.html>



Elements comprising open science. Source: Adapted from Gallagher, R.V., Falster, D.S., Maitner, B.S. et al. Open Science principles for accelerating trait-based science across the Tree of Life. *Nat Ecol Evol* 4, 294–303 (2020). <https://doi.org/10.1038/s41559-020-1109-6>. In: https://www.ciencia.gob.es/dam/jcr:e5b759a4-d756-4af9-89b0-a8cf5fd28e20/ENCA_EN_acc.pdf

Accreditations and six-year periods evaluation

In April 2023, ANECA joined the [San Francisco Declaration on Research Assessment \(DORA\)](#) and the [Coalition for Advancing Research Assessment \(CoARA\)](#). In particular, the Agency adheres to DORA because it shares the need to address the quality assessment of scientific articles - and not only the journals in which they are published -, to consider the value and impact of all research outputs (including data and software) and to consider the societal impact of research from a broader perspective (including qualitative indicators, such as the influence on scientific policy and/or practice).



Si ya tengo una publicación en acceso abierto en una editorial o revista, ¿debo depositarla además en un repositorio?

Sí. La acción de publicar es distinta a la acción de depositar y la publicación en abierto en una editorial científica no exime el depósito de la misma en un repositorio institucional o temático. Las revistas y los repositorios son plataformas distintas. El Criterio 5 de la [Resolución de 5 de diciembre de 2023, de la Comisión Nacional Evaluadora de la Actividad Investigadora, por la que se publican los criterios para la evaluación de la actividad investigadora](#) no entra a regular el primero de los procesos (la publicación), sino que obliga al segundo (el depósito) según lo dispuesto en el artículo 37.2 de la Ley 17/2022 de la Ciencia, la Tecnología y la Innovación.

Artículo 37.2. El personal de investigación del sector público o cuya actividad investigadora esté financiada mayoritariamente con fondos públicos y que opte por diseminar sus resultados de investigación en publicaciones científicas, deberá depositar una copia de la versión final aceptada para publicación y los datos asociados a las mismas en repositorios institucionales o temáticos de acceso abierto, de forma simultánea a la fecha de publicación.

IE REPOSITORY

Search the repository ...

🔍 SEARCH

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Welcome to IE University Repository, an open access platform that collects, manages, and preserves the academic and research output of our university. This Repository aims to enhance the visibility and impact of our research community while fulfilling open access mandates from funding agencies and institutional policies, such as Law 17/2022 on Science, Technology, and Innovation, in addition to the National Agency for Quality Assessment and Accreditation (ANECA) for accreditations and sexenios (recognition of six-year research period).

COMMUNITIES



RESEARCH



DOCTORAL THESES



TEACHING MATERIAL



INSTITUTIONAL

<https://repositorio.ie.edu>

IE REPOSITORY

ACCESS HERE

IE UNIVERSITY INSTITUTIONAL OPEN REPOSITORY

IE repository is an **open access platform that collects, manages, and preserves the academic and research output** of our university and our users (researchers, professors and staff). This Repository aims to enhance the visibility and impact of our research community while fulfilling open access mandates from funding agencies and institutional policies.

Open Access is essential for enhancing visibility and impact in your fields and is a requirement by the Spanish law and the most of research funding organisations. This approach not only promotes transparency but also accelerates the dissemination of knowledge, allowing researchers to contribute more effectively to global challenges. Embracing Open Science aligns with the university's commitment to innovation and excellence, empowering researchers to make a meaningful difference in both academia and society.

How to publish your scientific work

This service is designed for staff, doctoral candidates, researchers, and faculty members.

- 1 Register to the IE Repository**
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OPEN SCIENCE & OPEN ACCESS

WHAT IS OPEN SCIENCE?

"An inclusive construct that combines diverse movements and practices in order to make scientific knowledge openly available and accessible to all, as well as reusable by all, increasing scientific collaborations and the exchange of information for the benefit of science and society, and the processes of creation, evaluation and communication of scientific knowledge are opened to social agents beyond the traditional scientific community." (UNESCO, 2021)

WHAT IS THE IMPLICATION OF OPEN SCIENCE?

- It's based on the publication of any kind of research
- It's a collaborative science
- Everyone has access to the research
- It's an interdisciplinary science
- It's a citizen science
- Credit science based in researcher's impact
- New metrics

OPEN ACCESS

Open Access (OA) provides free online access to all available scientific information (articles, monographs, research data...) under a license so that it can be used and exploited by everyone. Open Access mainly covers two types of scientific information: **publications resulting from research** (journal articles, conference papers, reports, theses and academic papers, etc.) and **research data**.

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Open Science: A New Paradigm for Economic Growth

Restricting access to scientific knowledge bottlenecks urgently needed innovation and global economic growth. It's comparable to throttling internet speed or reducing global penetration.

This year's G20 summit brought looming low economic growth into sharp focus, while G20 chief scientists reminded us that with collective ingenuity we can tackle existential threats. Powered by new scientific knowledge, we can boost prosperity by building a sustainable global economy that is climate positive and reduce inequality. The commitments they made to open knowledge sharing are a cause for optimism¹.

Business can demand that governments open this market. Open science is just a single policy away. It is funded with public money, it belongs to society and it benefits businesses. (...). Only open science can spur innovation at the scale and speed required, while increasing return on investment, reducing risk, and amplifying social impact.

<https://www.ft.com/partnercontent/frontiers/open-science-a-new-paradigm-for-economic-growth.html>

THANK YOU!

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