L’Open Science in Horizon 2020 e oltre…
Chi sono...
Chi sono

Trainer

Project Manager

H2020 NCP - Food Security, Sustainable Agriculture and Forestry, Marine, Maritime and Inland Water Research and the Bioeconomy (SC2)

H2020 NCP - Climate Action, Environment, Resource Efficiency and Raw Materials (SC5)

🔍 Bechelor Degree in Natural Science

🔍 Master Degree in Communication and Fundraising
i miei contatti

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🔗 https://www.facebook.com/matteo.dirosa

🔗 http://instagram.com/matteodrs

🔗 www.matteodirosa.it
Introduzione alla giornata
Di cosa parliamo oggi

• Il ruolo della comunicazione scientifica: Teoria e modelli
• Open Science: definizione e modelli
• I vantaggi dell’Open Science
• Comunicare la scienza in H2020: Differenze tra dissemination and Communication
• Open Access: le due vie
• Open Data
• Public Engagement e Citizen Science
• Open Science e Prospettive europee
Il ruolo della comunicazione scientifica: Teoria e modelli
Viviamo nell’epoca delle fake news

- All'interno della specie Homo sapiens esistono le razze
- L'acqua frizzante disseta di più
- L'ulcera da stress
- La Grande muraglia cinese è visibile dalla Luna
- Usiamo solo il 10% del nostro cervello
- L'acqua in uno scarico ruota in senso opposto nei due emisferi
- La Terra piatta
- I vaccini causano l'autismo
Contesto

Cambiato il modo di fare scienza
Mode 1 <-> Mode 2

<table>
<thead>
<tr>
<th>DIMENSION</th>
<th>MODE 1</th>
<th>MODE 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>KNOWLEDGE FOCUS</td>
<td>Produced considering interests of the scientific community</td>
<td>Produced considering the context of application</td>
</tr>
<tr>
<td>MODE OF KNOWLEDGE PRODUCTION</td>
<td>Expert-centered</td>
<td>Produced in network or with the interaction of diverse actors</td>
</tr>
<tr>
<td>CHARACTERISTICS</td>
<td>Disciplinary and hierarchical</td>
<td>Transdisciplinary and horizontal</td>
</tr>
<tr>
<td>RELEVANCE</td>
<td>Relevant to the scientific community</td>
<td>Relevant to society</td>
</tr>
<tr>
<td>DISSEMINATION</td>
<td>Through indexed journals</td>
<td>Diverse channels reaching a wider audience</td>
</tr>
<tr>
<td>QUALITY MARKER</td>
<td>Publication in an indexed journal</td>
<td>Quality review processes and research uptake/policy influence</td>
</tr>
</tbody>
</table>

Cambiate le interazioni fra i vari attori del «sistema ricerca»
Cambiato il peso nei rapporti fra i vari attori del «sistema ricerca»
Deficit Model

Caratteristiche

• Approccio top-down
• Flusso di informazioni unidirezionale
• Obiettivo di aumentare il grado di alfabetizzazione scientifica della società

I limiti

• Basato sul gap conoscitivo della società, ipotizzato ma non misurato
  • Rischio banalizzazione
• Alfabetizzazione scientifica influenza in minima parte come si formano le opinioni. Conta di più:
  • Ideologia
  • Identità religiosa
  • Appartenenza politica
• la tendenza a problematizzare, nel rapporto tra scienza e pubblico, soltanto il secondo termine della relazione, cioè il pubblico.
Roberto Burioni, Medico

Preso che questa pagina non è un luogo dove della gente che non sa nulla può avere un "civile dibattito" per discutere alla pari con me. E' una pagina dove io, che studio questi argomenti da trentacinque anni, tento di spiegare in maniera accessibile come stanno le cose impiegando a questo scopo in maniera gratuita il mio tempo che in generale viene retribuito in quantità estremamente generosa. Il rendere accessibili concetti richiede semplificazione: ma tutto quello che scrivo è corretto e, inserendone immancabilmente le fonti, chi vuole può controllare di persona la veridicità di quanto riportato. Però non può mettersi a discutere con me. Spero di avere chiarito la questione: qui ha diritto di parola solo chi ha studiato, e non il cittadino comune. La scienza non è democratica.
Dialogue e Conversation Model
(*Public engagement with science and technology*)

**Caratteristiche**
- Flusso bidirezionale della conoscenza
- Gap conoscitivo misurato e non ipotizzato
  - Non si corre il rischio della banalizzazione
  - L’opinione del pubblico serve a calibrare il messaggio
  - Il pubblico consultato e ingaggiato

**Caratteristiche**
- Partecipazione del pubblico attiva
- Il pubblico partecipa ed co-crea il futuro con la scienza
- Ruolo del pubblico attivo nel processo decisionale e agenda setting
- Citizen Science
Si comunicava già nel passato

**Galileo:** accusato dalla chiesa perché scriveva in volgare

**Faraday:** che ogni venerdì teneva delle conferenze alla Royal Istitution per raccontare i progressi della scienza
Ed oggi? I grandi comunicatori del nostro tempo

Richard Dawkins

Piero e Alberto Angela
«La verità è che: non c’è scienza senza comunicazione»

Pietro Greco - Vittorio Silvestrini
Open Science: definizioni
Open Science: 1 termine, 5 scuole di pensiero

• **Democratic school:** Believing that there is an unequal distribution of access to knowledge, this area is concerned with making scholarly knowledge (including publications and data) available freely for all.

• **Pragmatic school:** Following the principle that the creation of knowledge is made more efficient through collaboration and strengthened through critique, this area seeks to harness network effects by connecting scholars and making scholarly methods transparent.
Open Science: 1 termine, 5 scuole di pensiero

- **Infrastructure school:** This thread is motivated by the assumption that efficient research requires readily available platforms, tools and services for dissemination and collaboration.

- **Public school:** Based on the recognition that true societal impact requires societal engagement in research and readily understandable communication of scientific results, this area seeks to bring the public to collaborate in research through citizen science, and make scholarship more readily understandable through lay summaries, blogging and other less formal communicative methods.

- **Measurement school:** Motivated by the acknowledgement that traditional metrics for measuring scientific impact have proven problematic (by being too heavily focused on publications, often only at the journal-level, for instance), this strand seeks "alternative metrics" which can make use of the new possibilities of digitally networked tools to track and measure the impact of scholarship through formerly invisible activities.
Cosa è l’Open Science

- *Open Science* riferisce a una cultura scientifica che è caratterizzata dalla sua apertura. I ricercatori condividono i risultati quasi immediatamente e con un pubblico estremamente vasto. (Bartling e Friesike, 2014)

- *Open Science* non è un dogma; è un'efficienza maggiore e produttività, maggiore trasparenza e una migliore risposta alle esigenze di ricerca interdisciplinare (Leru 2018)

- *Open Science* è un “movimento che ha lo scopo di rendere la ricerca scientifica, i dati e la diffusione accessibili a tutti i livelli di una società inquisitrice” (FosterOpenScience.eu)

- *Open science* è la pratica di rendere ciò che è nella fase di rilevamento del processo completamente e apertamente disponibile, creando trasparenza e spingendo ulteriori rivelazioni per consentire agli altri di costruire su esistenti lavoro (Watson, 2015)

- *Open Science* è la pratica della scienza in modo da altri possano collaborare e contribuire, dove i dati di ricerca, i notes dei laboratori e altri processi di ricerca sono gratuitamente disponibili, sotto condizioni che consentano la riuso, la redistribuzione e la riproduzione della ricerca e dei dati e metodi. In un resoconto, l’Open Science è una conoscenza trasparente e accessibile che è condivisa e sviluppata attraverso i network collaborativi (Vicente-Sáez e Martínez-Fuentes 2018).
Towards a definition of open science

1. Public accessibility and **full transparency** of scientific communication;
2. Public availability and **reusability of scientific data**;
3. **Transparency** in experimental methodology, observation, and collection of data;
4. Complete scientific **collaboration**.
Towards a definition of open science

Four essential needs

5. Strengthen **dialogue** between science and society;

6. **Linking** scientists to science policy making;

7. Developing proper **e-infrastructures**, digital tools and services for OS;

8. **Changing** legal tools and policy requirements for open science.
Towards a definition of open science

None of this is possible without taking the necessary steps to build the new structure of OS on solid foundation and values by:

• Preparing skilled people for openness;
• Demanding a responsible conduct to researchers, intrinsic to the values of research and the trust it engenders: Research Integrity.
I vantaggi dell’Open Science
Riproducibilità della ricerca

Incapacità a riprodurre i risultati pubblicati in una ricerca. Per alcuni settori un risultato su due non è replicabile. In altri casi i risultati raggiunti sono sovrastimati.

WHAT FACTORS CONTRIBUTE TO IRREPRODUCIBLE RESEARCH?

Many top-rated factors relate to intense competition and time pressure.

- Selective reporting
- Pressure to publish
- Low statistical power or poor analysis
- Not replicated enough in original lab
- Insufficient oversight/mentoring
- Methods, code unavailable
- Poor experimental design
- Raw data not available from original lab
- Fraud
- Insufficient peer review
- Problems with reproduction efforts
- Technical expertise required for reproduction
- Variability of standard reagents
- Bad luck

1,500 scientists lift the lid on reproducibility
Survey sheds light on the 'crisis' rocking research.
Monya Baker
25 May 2016 | Corrected: 28 July 2016
Riproducibilità della ricerca

- Study organized by Center for Open Science
- Collaborated with researchers all over the world
- 100 replications of studies in psychological science
- Only 36% of replications had significant results

Riproducibilità della ricerca

*NATURE | NEWS

Sluggish data sharing hampers reproducibility effort

An initiative that aims to validate the findings of key cancer papers is being slowed by an unexpected hurdle — problems accessing data from the original studies.

The Reproducibility Initiative: Cancer Biology consortium aims to repeat experiments from 50 highly-cited studies published in 2010–12 in journals such as *Nature*, *Cell* and *Science*, to see how easy it is to reproduce their findings. Although these journals require authors to share their data on
Effetto File Drawer

Si tende a pubblicare quello che funziona. Quello che non funziona finisce nel file drawer

La maggior parte delle riviste scientifiche, specialmente le più importanti, competono per pubblicare i risultati più "importanti", che sono in genere quelli con di grande effetto con descrizioni impreviste di comportamento sorprendenti o impreviste

Visione non reale della realtà

Falsi positivi

Costi di Accesso: Per le università

Harvard University says it can't afford journal publishers' prices

University wants scientists to make their research open access and resign from publications that keep articles behind paywalls

which bill the library around $3.5m a year
Costi di Accesso: Per le università

Overview of costs incurred by dutch universities for books and journals by publisher
Costi di accesso: per l’innovazione

• Ricercatori privi di abbonamento (Paesi poveri, centri di ricerca privati, start up)
• Grandi Aziende
• Piccole e medie imprese
• Pubblica amministrazione
• Studenti
• ONG e Associazioni
• Cittadini
Costi di accesso: per la comunità

- In UK We spend 1/3 of the total global research budget (~£59/175bn) on publishing & communicating results that 99% of people cannot access

- Quadruplo guadagno per le riviste
  - A 2005 Deutsche Bank report referred to it as a “bizarre” “triple-pay” system, in which “the state funds most research, pays the salaries of most of those checking the quality of research, and then buys most of the published product”

- Mettiamo in pratica sotto chiave il nostro futuro.

<table>
<thead>
<tr>
<th>Profit</th>
<th>Company</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>BMW</td>
<td>automobiles</td>
</tr>
<tr>
<td>23%</td>
<td>Rio Tinto</td>
<td>mining</td>
</tr>
<tr>
<td>25%</td>
<td>Google</td>
<td>search</td>
</tr>
<tr>
<td>29%</td>
<td>Apple</td>
<td>premium computing</td>
</tr>
<tr>
<td>35%</td>
<td>Springer</td>
<td>scholarly publishing</td>
</tr>
<tr>
<td>37%</td>
<td>Elsevier</td>
<td>scholarly publishing</td>
</tr>
</tbody>
</table>
Metriche: Impact factor

- Si è passati dal mantra ‘publish or perish’ a ‘publish and perish’
- si riferisce alla rivista e non al singolo articolo
- è la media (non misura nulla)
- coglie solo impatto dentro l’accademia
When in 2010 Italian universities incorporated citations in promotion decisions, self-citation rates among social scientists went up by 81-179%.
I vantaggi dell’Open Science

per gli autori:
1. - maggiore visibilità e impatto per i propri lavori *(fino al 300% in più in certe aree disciplinari);
2. possibilità di nuove metriche di valutazione dell’impatto alternative all’Impact Factor;
3. possibilità di una peer-review più trasparente ed efficace

per i ricercatori:
1. - maggiore facilità di accesso ai dati e ai risultati della ricerca rispetto agli articoli accessibili solo a pagamento;
2. - possibilità di sfruttare appieno nuove tecnologie quali il text-mining e il data-mining
I vantaggi dell’Open Science

• **per le biblioteche**: possibile risposta alla crisi dell’aumento vertiginoso dei prezzi degli abbonamenti, che, parallelamente alla diminuzione dei budget, riducono sempre più il numero dei titoli che è possibile offrire agli utenti;

• **per le Università**:  
  • maggiore visibilità per i propri ricercatori;  
  • possibili economie di scala sui costi degli abbonamenti;  
  • razionalizzazione dell’anagrafe della ricerca se collegata all’archivio istituzionale [link interno alla pagina IR]

• **per gli enti di finanziamento**: maggiore ritorno sugli investimenti garantiti dalla massima disseminazione dei risultati della ricerca

06/12/2019

http://wikimedia.sp.unipi.it/index.php/OA_Italia/Vantaggi
I vantaggi dell’Open Science

Vantaggi per la comunità scientifica:
• i risultati delle ricerche si vedono di più (migliore disseminazione), si vedono prima (grazie all'autoarchiviazione non si devono aspettare i tempi di stampa);
• grazie alla maggiore disseminazione si ottiene un maggiore impatto e una maggiore circolazione di idee
• ne guadagna la crescita complessiva e diffusa della conoscenza, che subisce una forte accelerazione
• la libera circolazione di risultati della ricerca e dei data sets contribuisce a ridurre il cultural divide
I vantaggi dell’Open Science

Vantaggi per le imprese:
• i risultati della ricerca accademica sono agevolmente e gratuitamente accessibili e riutilizzabili. L'Open Access favorisce l'innovazione.

Vantaggi per i cittadini:
• i risultati della ricerca sono più facilmente accessibili e riutilizzabili per i cittadini che vogliano contribuire in prima persona all'avanzamento della scienza (c.s citizen science)
8 Pilastri dell’Open Science

- Altmetrics
- Rewards
- Research Integrity
- Future of Scholarly Communication
- EOSC (European Open Science Cloud)
- FAIR Data
- Skills

06/12/2019
Open Science nella tua attività di ricerca

You can make your workflow more open by ...

- adding alternative evaluation, e.g. with altmetrics
- communicating through social media, e.g. Twitter
- sharing posters & presentations, e.g. at FigShare
- using open licenses, e.g. CC0 or CC-BY
- publishing open access, ‘green’ or ‘gold’
- using open peer review, e.g. at journals or PubPeer
- sharing preprints, e.g. at OSF, arXiv or bioRxiv
- using actionable formats, e.g. with Jupyter or CoCalc
- open XML-drafting, e.g. at Overleaf or Authorea
- sharing protocols & workfl., e.g. at Protocols.io
- sharing notebooks, e.g. at OpenNotebookScience
- sharing code, e.g. at GitHub with GNU/MIT license
- sharing data, e.g. at Dryad, Zenodo or Dataverse
- pre-registering, e.g. at OSF or AsPredicted
- commenting openly, e.g. with Hypothes.is
- using shared reference libraries, e.g. with Zotero
- sharing (grant) proposals, e.g. at RIO

DOI: 10.5281/zenodo.1147005
First Law: All data are open and all ideas are shared.
Second Law: Anyone can take part at any level of the project.
Third Law: There will be no patents.
Fourth Law: Suggestions are the best form of criticism.
Fifth Law: Public discussion is much more valuable than private email.
Sixth Law: The project is bigger than, and is not owned by, any given lab.
• Dissemination
• Communication
• Exploitation
Differenze tra Disseminazione e comunicazione

<table>
<thead>
<tr>
<th>Disseminazione</th>
<th>Comunicazione (Outreach)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collegato solo ai risultati</td>
<td>Collegato ai risultati e al progetto</td>
</tr>
<tr>
<td>Audience che può usare il risultato</td>
<td>Audience multiplo</td>
</tr>
<tr>
<td>Target con un alto grado di alfabetizzazione scientifica</td>
<td>Target con conoscenza differente</td>
</tr>
<tr>
<td>Favorire lo sfruttamento dei risultati</td>
<td>Aumentare la visibilità del progetto e dei suoi risultati</td>
</tr>
<tr>
<td>Inizia con la produzione dei primi risultati</td>
<td>Parte sin da subito</td>
</tr>
<tr>
<td>G.A. art 29</td>
<td>G.A. art 38.1</td>
</tr>
</tbody>
</table>
Communication and Outreach

• **Outreach** implies an interaction between the sender and the receiver of the message, there is an engagement and a two-way communication between the researcher and the public

• **Communication**, on the other hand, only goes in one direction from the sender to the receiver.

- school presentations, workshops, public talks and lab visits
- articles in mainstream newspapers and magazines, or on TV and radio channels
Differenza tra dissemination and exploitation

<table>
<thead>
<tr>
<th>Dissemination</th>
<th>Exploitation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describing and <strong>making available results</strong> so that they can be used</td>
<td><strong>Making use of results</strong>, for scientific, societal or economic purposes</td>
</tr>
<tr>
<td>Audiences that <strong>may make use</strong> of results</td>
<td>Groups and entities that are making <strong>concrete use of results</strong></td>
</tr>
<tr>
<td><strong>All results which are not restricted</strong> due to the protection of intellectual property, security rules or legitimate interests</td>
<td><strong>All results generated during project</strong> Participant shall make best efforts to exploit the results it owns, or to have them exploited by another legal entity</td>
</tr>
<tr>
<td>Grant Agreement Art. 29</td>
<td>Grant Agreement art. 28</td>
</tr>
</tbody>
</table>

Source: [http://ec.europa.eu/research/participants/data/ref/h2020/other/events/2017-03-01/8_result-dissemination-exploitation.pdf](http://ec.europa.eu/research/participants/data/ref/h2020/other/events/2017-03-01/8_result-dissemination-exploitation.pdf)
What are project results?

Source: http://ec.europa.eu/research/participants/data/ref/h2020/other/events/2017-03-01/8_result-dissemination-exploitation.pdf
Disseminazione, Comunicazione e sfruttamento nel life-cycle del progetto
Open Access: le due vie
Open Access per la EU

Le politiche di accesso aperto sono volte ad assicurare ai ricercatori e alla popolazione in generale l'accesso gratuito a pubblicazioni scientifiche oggetto di valutazioni inter pares, dati di ricerca e altri risultati della ricerca in maniera trasparente e non discriminatoria quanto prima possibile nel processo di diffusione, nonché a consentire l'utilizzo e il riutilizzo dei risultati della ricerca scientifica.

RACCOMANDAZIONE (UE) 2018/790 DELLA COMMISSIONE del 25 aprile 2018 sull'accesso all'informazione scientifica e sulla sua conservazione
Scenario

Percentage of open access publications (gold and green) by year on total

Source: Consortium's own analysis of Scopus database

- Not OA
- Gold OA
- Green OA

Più nel dettaglio:

+OA: Astronomia e astrofisica; fertilità, medicina tropicale e embriologia.

-OA: Farmacia, chimica inorganica e nucleare, ingegneria chimica.

29.2 Open access to scientific publications
Each beneficiary must ensure open access (free of charge, online access for any user) to all peer-reviewed scientific publications relating to its results. […]

29.3 Open access to research data
Regarding the digital research data generated in the action (‘data’), the beneficiaries must:
(a) deposit in a research data repository and take measures to make it possible for third parties to access, mine, exploit, reproduce and disseminate
(b) provide information — via the repository — about tools and instruments at the disposal of the beneficiaries and necessary for validating the results
Definizione di scientific publication

The dominant type of scientific publication is the journal article.

Research data: data underlying publications and/or other data (such as curated but unpublished datasets or raw data).

Grant beneficiaries are also strongly encouraged to provide open access to other types of scientific publications including:

- monographs
- books
- conference proceedings
- grey literature (informally published written material not controlled by scientific publishers, e.g. reports).
Open Access manuale d’uso

Depositing publications in repositories
#machine-readable electronic copy #preservations #repository #post-print

Green Road
#self-archiving #embargo

Gold Road
#cost

Providing open access to publications.
(GOLD) immediately, if the publication itself is published ‘open access’ (i.e. if an electronic version is also available free of charge to the reader via the publisher) or (GREEN) within at most 6 months (12 months for publications in the social sciences and humanities).

Not an obligation to publish - Not at odds with patenting - OA publications go the same peer review process

06/12/2019
Recent uploads

**QSOFit: General-purpose IDL code for quasar spectral fits**

Shen, Yue

This is the IDL version of QSOFIT. You need to have IDLUTILS installed (http://www.sdss3.org/dr13/software/idlutils.php) if you wish to use the SFD dust maps for Galactic reddening correction, you need to download them separately. A python version (similar but not identical) is at Guo et al....

Uploaded on February 18, 2019
1 more version(s) exist for this record

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**Supporting data and code for: Longitudinal Study on Shiga Toxin-producing Escherichia coli and Campylobacter jejuni on Finnish Dairy Farms and in Raw Milk**

Jaakkonen

Supporting data and code for the article, ‘Longitudinal Study on Shiga Toxin-producing Escherichia coli and Campylobacter jejuni on Finnish Dairy Farms and in Raw Milk’.

Uploaded on February 18, 2019
1 more version(s) exist for this record

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**MAPNET Population Genomics Workshop Content: Whole genome sequencing of Bactericera cockerelli**

Frampton, Rebekah; Dohmen-Vereijssen, Jessica; Drayton, Gabrielle; McCallum, John

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**Abstract**

**Objective**: To investigate the relationship between temperament and the clinical course of bipolar disorder.

**Methods**: A cross-sectional study of patients with bipolar disorder (N=100) and matched controls (N=100). Temperament was measured using the Temperament and Character Inventory (TCI). Clinical course was assessed using the Young Mania Rating Scale (YMRS) and the Young Mania Waiver (YMRS). Regression analyses were used to identify predictors of clinical course.

**Results**: Patients with bipolar disorder had higher scores on the novelty seeking and harm avoidance dimensions of the TCI compared to controls. In the patient group, higher novelty seeking was associated with higher YMRS scores.

**Conclusion**: Temperament plays a role in the clinical course of bipolar disorder. Novelty seeking, in particular, may exacerbate the risk of manic episodes.

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**Keywords**: Bipolar disorder, temperament, clinical course, novelty seeking, harm avoidance.
Open Data

the 'underlying data' (the data needed to validate the results presented in scientific publications), including the associated metadata (i.e. metadata describing the research data deposited), as soon as possible

any other data (for instance curated data not directly attributable to a publication, or raw data), including the associated metadata, as specified and within the deadlines laid down in the DMP – that is, according to the individual judgement by each project/grantee
Alcuni miti da sfatare

• Il costo per OA è troppo alto:
  • Circa il 70% delle riviste OA non ha un costo di pubblicazione
  • Molte riviste OA hanno costi bassi
  • Molte riviste OA hanno esenzioni fiscali
  • Alcune istituzioni hanno membership con riviste OA
  • Alcune istituzioni hanno fondi per l’OA
  • Molti finanziatori coprono i costi per l’OA
Alcuni miti da sfatare

• Correlazione tra carriera e OA:
Dark Open Access: Come ottenere il pdf senza abbonamento

SCI-HUB
...to remove all barriers in the way of science

Read research papers for free.
Click the green tab and skip the paywall on millions of peer-reviewed journal articles. It's fast, free, and legal.
Open Data: Manuale d’uso

STEP 1
The project must deposit the research data preferably in a research data repository.

STEP 2
as far as possible as closed as necessary, projects must then take measures to enable third parties to access, mine, exploit, reproduce and disseminate (free of charge for any user) this research data.

Data Management Plan D M6
- the handling of research data during & after the end of the project
- what data will be collected, processed and/or generated
- which methodology & standards will be applied
- whether data will be shared/made open access and
- how data will be curated & preserved (including after the end of the project).

OPT OUT
- during the application phase
- during the grant agreement preparation (GAP) phase and
- after the signature of the grant agreement.

RDM and research: the primary benefits

RDM helps preserve, protect and proliferate the data behind scientific (research) discoveries and claims – first and foremost it is a QUALITY issue...

• When research data is managed actively and responsibly, the evidence that underpins research can be made open for anyone to scrutinise, and attempt to replicate findings. This leads to a more robust scholarly record, and helps discourage and identify academic fraud

A secondary benefit is PROTECTION: the rights and legitimate interests of data subjects and IP owners are mindfully protected

Active and responsible data management reduces the chances of inadvertent data leaks or loss
Other Benefit

It also has other benefits...

• **EFFICIENCY**: Data collection can be funded once, and used many times for a variety of purposes

• **ACCESSIBILITY**: Interested third parties can (where appropriate) access and build upon publicly-funded research outputs with minimal barriers to access

• **SPEED**: The research process becomes faster

• **IMPACT and LONGEVITY**: Data linked to publications receive more citations, over longer periods

• **DURABILITY**: Simply put, fewer important datasets will be lost
Risks of not doing this, or getting this wrong

- **LEGAL** – sensitive data is protected by law (and contracts) and needs to be protected
- **FINANCIAL** – non-compliance with funder policies can lead to reduced access to income streams
- **SCIENTIFIC** – potential discoveries may be hidden away in drawers, on USB sticks or non-networked drives
- **OPPORTUNITY COST** – reduced visibility for research > lost opportunities for collaboration
- **QUALITY** – the scholarly record becomes less robust
- **REPUTATIONAL** – responsible data management is increasingly considered a core element of good scholarly practice in the 21st century
Findable
The first step in (re)using data is to find them. Metadata and data should be easy to find for both humans and computers. Machine-readable metadata are essential for automatic discovery of datasets and services, so this is an essential component of the FAIRification process.

- F1. (Meta)data are assigned a globally unique and persistent identifier
- F2. Data are described with rich metadata
- F3. Metadata clearly and explicitly include the identifier of the data they describe
- F4. (Meta)data are registered or indexed in a searchable resource
FAIR principles

Findable

F1. (Meta)data are assigned a globally unique and persistent identifier

What does this mean?
In creating FAIR digital resources, metadata can (and should) be generous and extensive, including descriptive information about the context, quality and condition, or characteristics of the data. Rich metadata allow a computer to automatically accomplish routine and tedious sorting and prioritising tasks that currently demand a lot of attention from researchers. The rationale behind this principle is that someone should be able to find data based on the information provided by their metadata, even without the data’s identifier. As such, compliance with F2 helps people to locate your data, and increase re-use and citations. Rich metadata implies that you should not presume that you know who will want to use your data, or for what purpose. So, as a rule of thumb, you should never say ‘this metadata isn’t useful’; be generous and provide it anyway!
Findable

• F3. Metadata clearly and explicitly include the identifier of the data they describe

What does this mean?
This is a simple and obvious principle, but of critical importance to FAIR. The metadata and the dataset they describe are usually separate files. The association between a metadata file and the dataset should be made explicit by mentioning a dataset’s globally unique and persistent identifier in the metadata. As stated in F1, many repositories will generate globally unique and persistent identifiers for deposited datasets that can be used for this purpose.
Findable

• F4. (Meta)data are registered or indexed in a searchable resource

What does this mean?
Identifiers and rich metadata descriptions alone will not ensure ‘findability’ on the internet. Perfectly good data resources may go unused simply because no one knows they exist. If the availability of a digital resource such as a dataset, service or repository is not known, then nobody (and no machine) can discover it. There are many ways in which digital resources can be made discoverable, including indexing. For example, Google sends out spiders that ‘read’ web pages and automatically index them, so they then become findable in the Google search box. This is great for most ordinary searchers, but for scholarly research data, we need to be more explicit about indexing. Principles F1-F3 will provide the core elements for fine-grained indexing by some current repositories and future services.
FAIR principles

Accessible

Once the user finds the required data, she/he needs to know how can they be accessed, possibly including authentication and authorisation.

• A1. (Meta)data are retrievable by their identifier using a standardised communications protocol
  • A1.1 The protocol is open, free, and universally implementable
  • A1.2 The protocol allows for an authentication and authorisation procedure, where necessary
• A2. Metadata are accessible, even when the data are no longer available

FAIR principles

Accessible

• A1. (Meta)data are retrievable by their identifier using a standardised communications protocol

What does this mean?
Most users of the internet retrieve data by ‘clicking on a link’. This is a high-level interface to a low-level protocol called tcp, that the computer executes to load data in the user’s web browser. (Note that http(s) or ftp, which form the backbone of modern internet, are built on tcp, and make requesting and providing digital resources substantially easier than other communication protocols.) Principle A1 states that FAIR data retrieval should be mediated without specialised tools or communication methods. So, clearly define who can access the actual data, and specify how.
What does this mean?
Datasets tend to degrade or disappear over time because there is a cost to maintaining an online presence for data resources. When this happens, links become invalid and users waste time hunting for data that might no longer be there. Storing the metadata generally is much easier and cheaper. Hence, principle A2 states that metadata should persist even when the data are no longer sustained. A2 is related to the registration and indexing issues described in F4.
Interoperable
The data usually need to be integrated with other data. In addition, the data need to interoperate with applications or workflows for analysis, storage, and processing.

• I1. (Meta)data use a formal, accessible, shared, and broadly applicable language for knowledge representation.

• I2. (Meta)data use vocabularies that follow FAIR principles

• I3. (Meta)data include qualified references to other (meta)data
FAIR principles

Accessible

- I1. (Meta)data use a formal, accessible, shared, and broadly applicable language for knowledge representation.

What does this mean?
Humans should be able to exchange and interpret each other’s data (so preferably do not use dead languages). But this also applies to computers, meaning that data that should be readable for machines without the need for specialised or ad hoc algorithms, translators, or mappings. Interoperability typically means that each computer system at least has knowledge of the other system’s data exchange formats. For this to happen and to ensure automatic findability and interoperability of datasets, it is critical to use (1) commonly used controlled vocabularies, ontologies, thesauri (having resolvable globally unique and persistent identifiers, see F1) and (2) a good data model (a well-defined framework to describe and structure (meta)data).
What does this mean?
The controlled vocabulary used to describe datasets needs to be documented and resolvable using globally unique and persistent identifiers. This documentation needs to be easily findable and accessible by anyone who uses the dataset.
What does this mean?
A qualified reference is a cross-reference that explains its intent. For example, *X is regulator of Y* is a much more qualified reference than *X is associated with Y*, or *X see also Y*. The goal therefore is to create as many meaningful links as possible between (meta)data resources to enrich the contextual knowledge about the data, balanced against the time/energy involved in making a good data model. To be more concrete, you should specify if one dataset builds on another data set, if additional datasets are needed to complete the data, or if complementary information is stored in a different dataset. In particular, the scientific links between the datasets need to be described. Furthermore, all datasets need to be properly cited (i.e., including their globally unique and persistent identifiers).
FAIR principles

Reusable
The ultimate goal of FAIR is to optimise the reuse of data. To achieve this, metadata and data should be well-described so that they can be replicated and/or combined in different settings.

• R1. Meta(data) are richly described with a plurality of accurate and relevant attributes
  • R1.1. (Meta)data are released with a clear and accessible data usage license
  • R1.2. (Meta)data are associated with detailed provenance
  • R1.3. (Meta)data meet domain-relevant community standards
FAIR principles

Accessible

• R1. Meta(data) are richly described with a plurality of accurate and relevant attributes

What does this mean?

It will be much easier to find and reuse data if there are many labels are attached to the data. Principle R1 is related to F2, but R1 focuses on the ability of a user (machine or human) to decide if the data is actually USEFUL in a particular context. To make this decision, the data publisher should provide not just metadata that allows discovery, but also metadata that richly describes the context under which the data was generated. This may include the experimental protocols, the manufacturer and brand of the machine or sensor that created the data, the species used, the drug regime, etc. Moreover, R1 states that the data publisher should not attempt to predict the data consumer’s identity and needs. We chose the term ‘plurality’ to indicate that the metadata author should be as generous as possible in providing metadata, even including information that may seem irrelevant.

Some points to take into consideration (non-exhaustive list):

• Describe the scope of your data: for what purpose was it generated/collection?
• Mention any particularities or limitations about the data that other users should be aware of.
• Specify the date of generation/collection of the data, the lab conditions, who prepared the data, the parameter settings, the name and version of the software used.
• Is it raw or processed data?
• Ensure that all variable names are explained or self-explanatory (i.e., defined in the research field’s controlled vocabulary).
• Clearly specify and document the version of the archived and/or reused data.
Dataset licensing

Horizon 2020 guidelines point to:

https://ufal.github.io/public-license-selector/
“Personal data” means any information relating to a natural person who is either identified or who could be identifiable by that data.

Anonymisation of personal research data is the effective solution to comply with the data protection legislation and the requirements of the Open Research Data Pilot.
Data Management Plan


http://bit.ly/2CTgITU

https://dmponline.dcc.ac.uk/about_us

Dear Prof. XYZ,

Our records show that, for the project in reference and of which you are coordinator the reported peer-reviewed publication indicated below still appear as non-available in open access:

Publication1

Publication2

I would like to remind you that, each beneficiary must ensure open access (free of charge, online access for any user) to all peer-reviewed scientific publications relating to its results generated in a Horizon 2020 action, in accordance with the conditions set out in Article 29.2 of Horizon 2020 Grant Agreement. If a beneficiary breaches this obligation, the grant may be reduced (see Article 43 of the Grant Agreement). Such a breach may also lead to any other measures described in Chapter 6.

I would therefore like to ask you to take immediate action to ensure that the beneficiaries concerned provide open access to the peer-reviewed articles mentioned above. Please reply to this letter within 30 calendar days by indicating whether the non-compliance has been remedied, or in case of continued non-compliance provide the reasons for non-compliance.

For more information about open access to peer-reviewed scientific publications (and in particular, the obligation to deposit publications in repositories and to provide open access to these publications), please visit the section on Open Access available on the Funding & Tenders Portal or check the Annotated Grant Agreement (art 29).

For more information about how to encode or update the data of your peer-reviewed publications in the continuous reporting, please check the H2020 online manual.
Public Engagement e Citizen Science
And there is also a large consensus that changes are needed throughout the R&I system.

Certain key issues (or policy agendas) need to be taken into account:

- **GENDER EQUALITY**
  - Human resources, decision bodies and research dimension

- **ETHICS**
  - Research integrity and ethical acceptability of the R&I outcomes

- **GOVERNANCE**
  - Structural changes to include all these issues in the R&I system

- **OPEN ACCESS**
  - To results from publicly funded research, privacy issues and even more: open science

- **PUBLIC ENGAGEMENT**
  - Towards a more open and inclusive R&I

- **SCIENCE EDUCATION**
  - Provide competences for the responsible citizens society needs

Il PE è un elemento del RRI
La società odierna sta affrontando alcune importanti sfide...

- Health, demographic change, and wellbeing
- Food, agriculture and forestry, and water
- Secure, clean and efficient energy
- Smart, green and integrated transport
- Climate action, environment, and resources
- Europe in a changing world: inclusive, innovative and reflective societies
- Secure societies: freedom and security of Europe and its citizens
All'interno del sistema R&I ci sono stati esempi di polemiche e insuccessi nell'adempiere alle aspettative della società:

- GMOs
- fracking
- food safety
- affordable medication among others...

... in parte perché non tutti gli attori del sistema erano stati ingaggiati:
RRI ha lo scopo: di includere tutti gli attori, e considerare tutte le dimensioni degli aspetti e dei processi chiave.
Why PE?

- Gauging public opinion on a particular science project/issue or a new technology;
- Assessing a new technological application;
- Getting the public and experts to co-create knowledge or co-produce innovation;
- Having a representative sample of people make judgments or decisions that might inform policy making;
- Helping researchers gather data for a given project;
Who should be engaged?

Researchers, research institutions and public authorities have traditionally led PE activities. However, the third sector, or social sector, has been increasingly involved at different levels of R&I and policy making, giving access to their interests, viewpoints and experiential knowledge. The current trend is to also engage the fourth sector, an emerging sector composed of actors or groups of societal actors that cooperate through hybrid networking.

**POLICY MAKERS**
Public engagement can help bring decisions on R&I policies closer to society, making them more robust and legitimate.

**RESEARCH COMMUNITY**
Engaging citizens in research practices can lead to more effective R&I processes more suited to meet their needs and expectations.

**EDUCATION COMMUNITY**
Empowering young students and lifelong learners to engage in R&I and R&I decision making is key for RRI success.

**BUSINESS AND INDUSTRY**
Industry should engage stakeholders in the implementation of responsibility measures in their end-products and industrial processes.

**CIVIL SOCIETY ORGANISATIONS**
The engagement of CSOs in RRI processes is necessary to introduce the voice of society, make R&I more democratic and enhance public accountability.
When to conduct PE?

<table>
<thead>
<tr>
<th>Before starting the R&amp;I process</th>
<th>During the R&amp;I process</th>
<th>Project execution: Co-developing R&amp;I</th>
<th>After implementing the R&amp;I process</th>
</tr>
</thead>
</table>
| Program definition: Setting the R&I agenda | Project definition: Defining the R&I process with permanent adjustments  
• Engagement activities should be designed to give citizens the opportunity to contribute their specific knowledge through deliberative processes through methods such as open innovation and structures such as living labs | Examples of engagement processes within this phase include community based research and citizen science projects where the involvement is not restricted to data collection. | Supporting participatory policy development  
• These practices and analyses are aimed at gauging the risks, benefits, and ethical, legal, environmental and socio-economic impacts of new technologies. |
## How to conduct PE 1/2

<table>
<thead>
<tr>
<th>PE CATEGORY</th>
<th>DESCRIPTION</th>
<th>INFORMATION EXCHANGE</th>
<th>METHOD EXAMPLES*</th>
</tr>
</thead>
</table>
| **PUBLIC COMMUNICATION** | One-way communication to inform and educate citizens. No mechanisms for handling public feedback. | From sponsors to public                                    | • Public hearings  
• Public meetings  
• Awareness raising activities |
| **PUBLIC CONSULTATION** | One-way communication to inform decision makers of public opinions on certain topics. No dialogue. Decision makers may or may not act upon the information. Two-way communication to facilitate group deliberation on policy issues. Outcomes may have an impact on decision making. Dialogue is facilitated. | Opinions sought by sponsors                              | • Citizens’ advisory panels  
• Planning for Real  
• Focus groups |
| **PUBLIC DELIBERATION** |                                                                                   | Between sponsors and public representatives                | • Consensus conferences  
• Citizen juries  
• Deliberative opinion polling |
## How to conduct PE 2/2

<table>
<thead>
<tr>
<th>PE CATEGORY</th>
<th>DESCRIPTION</th>
<th>INFORMATION EXCHANGE</th>
<th>METHOD EXAMPLES*</th>
</tr>
</thead>
</table>
| PUBLIC PARTICIPATION   | Two-way communication to assign part or full decision-making power to citizens. Dialogue is facilitated. | Between sponsors and public representatives                                              | • Co-governance
• Direct democracy mechanisms such as participatory budgeting, youth parliaments and citizen’s assembly
• Science Shops
• Community-based participatory research
• Citizen science
• Citizen advisory panels
• Open innovation |
| PUBLIC ACTIVISM         | One-way communication to inform decision makers and create awareness in order to influence decision-making processes. | From citizens (initiators) to sponsors                                                 | • Demonstrations, protests, awareness raising activities
• Public meetings |
Citizen Science: Definizioni

• **Citizen Science** refers to the general public engagement in scientific research activities when citizens actively contribute to science either with their intellectual effort or surrounding knowledge or with their tools and resources. *(White paper on Citizen Science)*

• **Citizen Science** is “scientific work undertaken by members of the general public, often in collaboration with or under the direction of professional scientists and scientific institutions.” *(Oxford English Dictionary List of New Words, 13.09.2014)*

• **Citizen Science** [...] covers a range of different levels of participation: from raising public knowledge about science, encouraging citizens to participate in the scientific process by observing, gathering and processing data, right up to setting scientific agenda and co-designing and implementing science-related policies. *(EC, Horizon 2020, Science with and for society Work Programme 2018-2020, p.30)*
Citizen Science: Definizioni

- **Citizen Science** is “the collection and analysis of data relating to the natural world by members of the general public, typically as part of a collaborative project with professional scientists.” *(Oxford English Dictionaries)*

- **Citizen science** describes the engagement of people in scientific processes who are not tied to institutions in that field of science. Participation can range from the short-term collection of data to the intensive use of leisure time in order to delve deeper into a research topic together with scientists and/or other volunteers. Although many volunteer scientists do have a university degree, this is not a prerequisite for participating in research projects. However, it is important that scientific standards are adhered to. This pertains especially to transparency with regard to the data collection methodology and the open discussion of the results. *(Green Paper CS Strategy 2020 for Germany, p. 13)*
Perché Citizen Science

1. **Citizen Science increases scientific literacy and critical faculties**, so the public can discern between fake news and scientific facts like climate change or evolution, or contribute to increased consciousness among citizens of social conditions that influence their life and well-being.

2. **Citizen Science can democratise the research process.** By conceptualising Citizen Science as part of Open Science and therefore interlinked with Open Innovation and Open to the World (3Os), over the coming years, citizens will be playing an expanded role in scientific research and will contribute more actively to defining the research agenda, and can contribute to strengthen the social voices of the most vulnerable, stigmatized and often marginalized citizens in public policy, effectively helping to democratise science.
Perché Citizen Science

3. **Citizen Science generates new knowledge and enables new forms of research.** As a method of “crowdsourcing research” by using “idle brains” of the citizens Citizen Science offers new potential in areas where it would be impossible to get all the information/data, for example by collecting data “for free” in an unconceivable amount and providing perspectives and experiences professional scientists otherwise would not have.

4. **Citizen Science can motivate young people to follow scientific careers.** When pupils get in touch with science at an early age they are more likely to continue being interested and willing to intervene in science when it comes to choosing their careers.
Perché Citizen Science

5. **Citizen Science can expand the skill set of researchers.** By engaging with citizen scientists (academic) scientists will learn a range of new skills especially in the area of science communication.
I 10 Principi della Citizen Science

1. I progetti di Citizen Science coinvolgono attivamente i cittadini in attività scientifiche che generano nuova conoscenza o comprensione.

2. I progetti di Citizen Science producono un risultato scientifico originale.

3. Sia gli scienziati professionisti sia i cittadini coinvolti traggono vantaggio dal prendere parte a progetti di Citizen Science.

4. Le persone coinvolte in progetti di Citizen Science possono, se vogliono, prendere parte a più fasi del processo scientifico.

5. Le persone coinvolte in progetti di Citizen Science ricevono feedback.
I 10 Principi della Citizen Science

6. La Citizen Science è considerata una metodologia di ricerca come qualunque altra, con limiti e margini di errore che devono essere considerati e tenuti sotto controllo.

7. Dati e metadati provenienti da progetti di Citizen Science sono resi pubblicamente disponibili e, ove possibile, i risultati sono pubblicati in un formato di libero accesso (open access).

8. Il contributo delle persone coinvolte in progetti di Citizen Science viene riconosciuto ufficialmente nei risultati dei progetti e nelle pubblicazioni.

9. I programmi di Citizen Science vengono valutati per il loro risultato scientifico, per la qualità dei dati, l’esperienza dei partecipanti e l’ampiezza dell’impatto sociale e sulle politiche di settore.

10. I responsabili di progetti di Citizen Science prendono in considerazione aspetti legali ed etici relativi a copyright, proprietà intellettuale, accordi sulla condivisione dei dati, confidenzialità, attribuzione e impatto ambientale di ogni attività.
Citizen Science: perché è importante

“Citizen Science can contribute to the Commission’s goal of Responsible Research and Innovation, as it reinforces public engagement and can redirect research agendas toward issues of concerns to citizens.”

“This kind of Citizen Science is increasingly on the agenda and it is planned that future work programmes of Horizon 2020 will continue to support relevant initiatives at EU level.”

[EC, Strategy on 3 O’s: Open Innovation/Open Science/Open to the World – a vision for Europe]
### Models of Citizen Engagement in Science

<table>
<thead>
<tr>
<th>Values</th>
<th>Attributes</th>
</tr>
</thead>
</table>
| **Open** (culture) | • Trusted  
                    • Transparent  
                    • Global     |
| **Social** (by all/for all) | • Engaging  
                      • Self-learning  
                      • Accessible |
| **Digital** (infrastructure) | • Reusable  
                        • Participatory  
                        • Collaborative |
| **Research** (innovative) | • Co-created  
                          • Amateur  
                          • Scattered |
|                 | • Collective  
                    • Democratic active  
                    • Public assessment |
|                 | • Creative  
                    • Inclusive |
|                 | • Powerful  
                    • Ubiquitous  
                    • Pervasive  
                    • Massive |
|                 | • Immediate  
                    • Traceable interactions  
                    • Networks |
|                 | • Devices  
                    • Empowerment  
                    • Effective |
|                 | • Unexplored  
                    • Inspiration for innovations  
                    • Transdisciplinary |
|                 | • Innovative  
                    • Educational  
                    • Common  
                    • Responsible |
|                 | • Sustainable  
                    • Skilled  
                    • Experimental |
**Formats**
- Research driven / socially driven
- Online / offline
- Amateur / Professional
- Formal / Informal
- One-day / permanent
- Local / global

**Impacts**
- Scientific
- Inspirational
- Educational
- Social
- Economic
- Environmental
- Political
Open Science e Prospettive europee
Open Access in Horizon Europe

Article 10
Open access and open data

1. Open access to scientific publications resulting from research funded under the Programme shall be ensured in accordance with Article 35(3). Open access to research data shall be ensured in line with the principle 'as open as possible, as closed as necessary'. Open access to other research outputs shall be encouraged.

2. Responsible management of research data shall be ensured in line with the principles ‘Findability’, ‘Accessibility’, ‘Interoperability’ and ‘Reusability’ (FAIR).

3. Open science practices beyond open access to research outputs and responsible management of research data shall be promoted.
## Evaluation of Research Careers fo EC

### Open Science Career Assessment Matrix (OS-CAM)

<table>
<thead>
<tr>
<th>Open Science activities</th>
<th>Possible evaluation criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RESEARCH OUTPUT</strong></td>
<td></td>
</tr>
<tr>
<td>Research activity</td>
<td>Pushing forward the boundaries of open science as a research topic</td>
</tr>
<tr>
<td>Publications</td>
<td>Publishing in open access journals</td>
</tr>
<tr>
<td></td>
<td>Self-archiving in open access repositories</td>
</tr>
<tr>
<td>Datasets and research results</td>
<td>Using the FAIR data principles</td>
</tr>
<tr>
<td></td>
<td>Adopting quality standards in open data management and open datasets</td>
</tr>
<tr>
<td></td>
<td>Making use of open data from other researchers</td>
</tr>
<tr>
<td>Open source</td>
<td>Using open source software and other open tools</td>
</tr>
<tr>
<td></td>
<td>Developing new software and tools that are open to other users</td>
</tr>
<tr>
<td>Funding</td>
<td>Securing funding for open science activities</td>
</tr>
<tr>
<td><strong>RESEARCH PROCESS</strong></td>
<td></td>
</tr>
<tr>
<td>Stakeholder engagement / citizen science</td>
<td>Actively engaging society and research users in the research process</td>
</tr>
<tr>
<td></td>
<td>Sharing provisional research results with stakeholders through open platforms (e.g. Arxiv, Figshare)</td>
</tr>
<tr>
<td></td>
<td>Involving stakeholders in peer review processes</td>
</tr>
<tr>
<td>Collaboration and Interdisciplinarity</td>
<td>Widening participation in research through open collaborative projects</td>
</tr>
<tr>
<td></td>
<td>Engaging in team science through diverse cross-disciplinary teams</td>
</tr>
<tr>
<td>Research integrity</td>
<td>Being aware of the ethical and legal issues relating to data sharing, confidentiality, attribution and environmental impact of open science activities</td>
</tr>
<tr>
<td></td>
<td>Fully recognizing the contribution of others in research projects, including collaborators, co-authors, citizens, open data providers</td>
</tr>
<tr>
<td>Risk management</td>
<td>Taking account of the risks involved in open science</td>
</tr>
<tr>
<td><strong>SERVICE AND LEADERSHIP</strong></td>
<td></td>
</tr>
<tr>
<td>Leadership</td>
<td>Developing a vision and strategy on how to integrate OS practices in the normal practice of doing research</td>
</tr>
<tr>
<td></td>
<td>Driving policy and practice in open science</td>
</tr>
</tbody>
</table>
The central message from this report is that in order to change to full automatic engagement of researchers in Open Science, a radical change of culture and mind-set in the research community and stakeholders is required. To effect this change will require a comprehensive, multi-faceted approach, which will include:

- Updated, embedded, iterative and ongoing training and professional development in Open Science (including training of a new specialised cohort of data stewards, information professionals and data scientists). This should involve a blended approach of core skills provision with active, independent, problem-based learning.

- Reinforcement through the availability of an adequate technical and support infrastructure.

- Improved rewards and recognition for researchers doing Open Science by alternate metrics.

- Implementing a system of clear benefits for compliance and clear disadvantages for noncompliance of Open Science practices.

- Ongoing advocacy and leadership of Open Science at all levels.

- Policy alignment, strategic implementation and provision of funding for Open Science.

- Renewed focus on societal engagement in Open Science and the impact agenda.

- Monitoring and reinforcement of funder and institutional mandates, which should be amended to include mandated accredited Open Science skills training.

Providing researchers with the skills and competencies they need to practise Open Science

Open Science Skills Working Group Report

Written by the Working Group on Education and Skills under Open Science
July 2017

https://ec.europa.eu/research/openscience/pdf/os_rewards_wg
Nuove metriche

Metrics can play two roles in support of open science:

• Monitoring the development of the scientific system towards openness at all levels;

• Measuring performance in order to reward improved ways of working at group and individual level.
Nuove metriche

These goals require the development of new indicators, as well as prompting the use of existing metrics in a more responsible fashion.

There have been a number of high profile recent efforts to address these issues, including:

- *The San Francisco Declaration on Research Assessment (DORA)*, which called in 2012 for research to be assessed on its own merits and for ending the use of journal impact factors in funding, hiring and promotion decisions. By January 2017, DORA has over 800 organisational and 12,500 individual signatories;

- *The Leiden Manifesto*, which was published in 2015 by a group of leading scientometricians, and which sets out ten principles for the use of quantitative indicators in research evaluation (Hicks et al., 2015);

- *Science in Transition*, a movement established in 2013 by researchers in the Netherlands, with the aim of tackling systemic problems in research and university culture, which “has become a self-referential system where quality is measured mostly in bibliometric parameters and where societal relevance is undervalued” (Dijstelbloem et al., 2014);

- *The Metric Tide (2015)*: the report of an independent review of the role of metrics in research assessment and management in the UK system, which set out a framework and targeted recommendations for responsible metrics (Wilsdon et al., 2015).

These initiatives have informed the European Commission’s Expert Group on Altmetrics, which was set up in 2016.2
“After 1 January 2020 scientific publications on the results from research funded by public grants provided by national and European research councils and funding bodies, must be published in compliant Open Access Journals or on compliant Open Access Platforms.”
PlanS

• No riviste ibride
• Tetto alle APC
• APC pagate sempre da istituzioni
• Autori mantengono copyright, licenze cc by

IN ADDITION:

• Authors retain copyright of their publication with no restrictions. All publications must be published under an open license, preferably the Creative Commons Attribution Licence CC BY. In all cases, the license applied should fulfill the requirements defined by the Berlin Declaration;

• The Funders will ensure jointly the establishment of robust criteria and requirements for the services that compliant high quality Open Access journals and Open Access platforms must provide;

• In case such high quality Open Access journals or platforms do not yet exist, the Funders will, in a coordinated way, provide incentives to establish and support them when appropriate; support will also be provided for Open Access infrastructures where necessary;

• Where applicable, Open Access publication fees are covered by the Funders or universities, not by individual researchers; it is acknowledged that all scientists should be able to publish their work Open Access even if their institutions have limited means;

• When Open Access publication fees are applied, their funding is standardised and capped (across Europe);

• The Funders will ask universities, research organisations, and libraries to align their policies and strategies, notably to ensure transparency;

• The above principles shall apply to all types of scholarly publications, but it is understood that the timeline to achieve Open Access for monographs and books may be longer than 1 January 2020;

• The importance of open archives and repositories for hosting research outputs is acknowledged because of their long-term archiving function and their potential for editorial innovation;

• The ‘hybrid’ model of publishing is not compliant with the above principles;

• The Funders will monitor compliance and sanction non-compliance.
EOSC – European Open Science Cloud

The EOSC will allow for universal access to data and a new level playing field for EU researchers

• By 2020, all European researchers need to be able depositing, accessing and analyzing European scientific data through the EOSC. EOSC and FAIR research data are closely related and the EC is working out phases for implementing EOSC and action plans to make data FAIR.
  • to develop research infrastructures for Open Science and a common European framework to improve data storage, access, analysis, re-use and governance of research data;
  • to mainstream and further promote open access to research data (and metadata), as well as data management practices aiming at making these data Findable, Accessible, Interoperable and Re-usable (FAIR).
The EOSC will allow for universal access to data and a new level playing field for EU researchers

- Easy access through a universal access point for ALL European researchers
- Cross-disciplinary access to data unleashes potential of interdisciplinary research
- Services and data are interoperable (FAIR data)
- Data funded with public money is in principle open (as open as possible, as closed as necessary)
- EOSC will help increase recognition of data intensive research and data science
The Vienna Declaration

The Vienna Declaration on the European Open Science Cloud
Vienna, 23 November 2018

We, Ministers, delegates and other participants attending the launch event of the European Open Science Cloud (EOSC):

1. Recall the challenges of data driven research in pursuing excellent science as stated in the “EOSC Declaration” signed in Brussels on 10 July 2017.

2. Reaffirm the potential of the European Open Science Cloud to transform the research landscape in Europe. Confirm that the vision of the European Open Science Cloud is that of a research data commons, inclusive of all disciplines and Member States, sustainable in the long-term.

3. Recognise that the implementation of the European Open Science Cloud is a process, not a project, by its nature iterative and based on constant learning and mutual alignment. Highlight the need for continuous dialogue to build trust and foster cooperation.
2 importanti pubblicazioni
The Go FAIR initiative follows a bottom-up open implementation strategy for the technical governance and funding needed to establish the first phase of the EOSC as part of a broader global Internet of FAIR data and services. The activities of the GO FAIR initiative focus on FAIR data and services, technology, training and certification.