

# Responsible Research and Innovation & Open Science

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*Data Archiving and Networked Services*

**DANS**



Is nanotechnology dangerous? “We need to know”, says Renzo Tomellini (Euractiv, 2003)

‘You should have seen this note’: US meteorologists harassed for reporting on climate crisis (The Guardian, 9 Jul 2023)



RESEARCH ARTICLE

A darkening spring: How preexisting distrust shaped COVID-19 skepticism

J. Hunter Priniski<sup>1\*</sup>, Keith J. Holyoak<sup>1,2</sup>

What are the most pressing dangers of AI?  
Stanford University, 2021

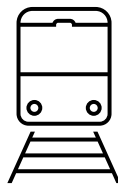
## Horizon 2020 societal challenges



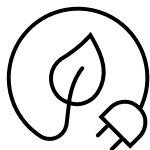
health



food



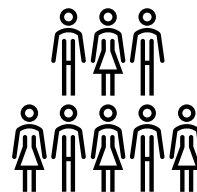
transport



energy



environment



society

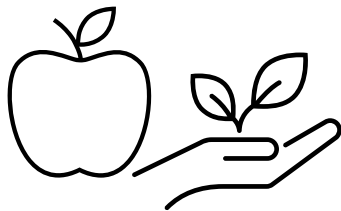


security

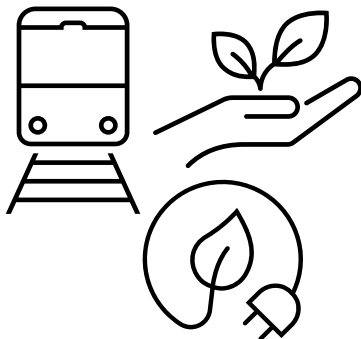
# Horizon Europe global challenges & European Industrial Competitiveness clusters



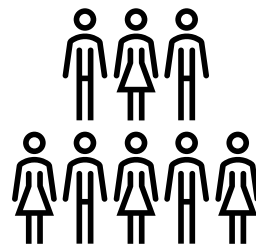
Health



Food, bioeconomy,  
natural resources,  
agriculture and  
environment



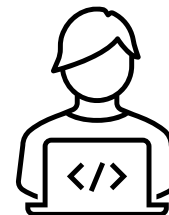
Climate,  
energy and  
mobility



Culture,  
creativity and  
inclusive society



Civil security  
for society

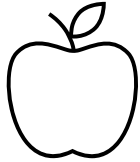


Digital, industry  
and space

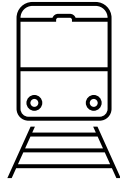
## Horizon 2020 societal challenges



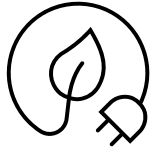
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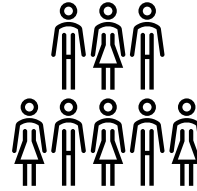
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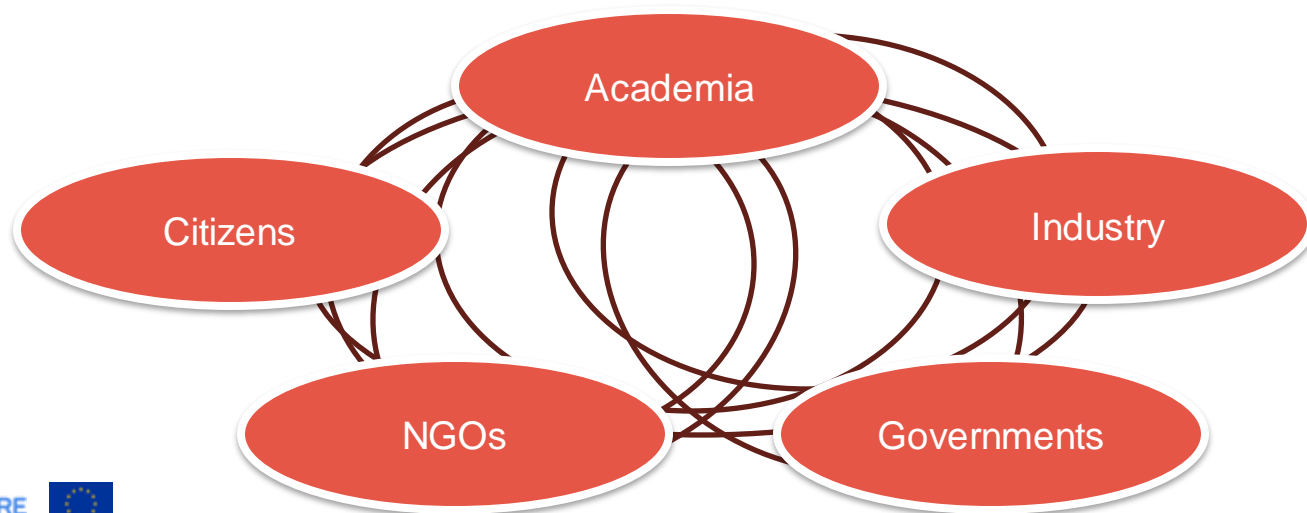


# RRI: Responsible Research and Innovation

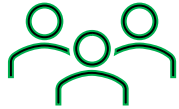
# RRI: Responsible Research and Innovation

*“Responsible Research and Innovation (RRI) implies that societal actors (researchers, citizens, policy makers, business, third sector organisations, etc.) work together during the whole research and innovation process in order to better align both the process and its outcomes with the values, needs and expectations of society.”*

[European Commission, Horizon 2020 – Responsible Research and Innovation](#)



# RRI pillars / key components



## Public engagement

Bring together diverse actors

# RRI pillars / key components

**Gender equality**



**Social justice and  
inclusion**



# RRI pillars / key components



## Ethics and research integrity

Ethics of scientific outputs: how is research designed and what societal consequences does this have?

Ethics of researchers: Adherence to ethical principles and professional standards.

# RRI pillars / key components



Pexels / Mart Production, CC0

## Science education

Promote problem-solving and  
critical thinking

Empower students to take part in  
science

# RRI pillars / key components



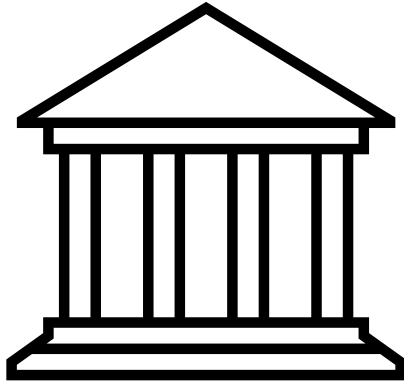
Pexels / Pixabay, CC0

## Open science

Conduct and share research as  
openly as possible

Free of charge access

# RRI pillars / key components



## Governance

Act at governance level to realise RRI, put in place relevant arrangements

# RRI pillars / key components

Public  
engagement

Gender

Social justice  
and  
inclusion

Open  
Science

Ethics

Governance

Science  
education

Sustaina-  
bility

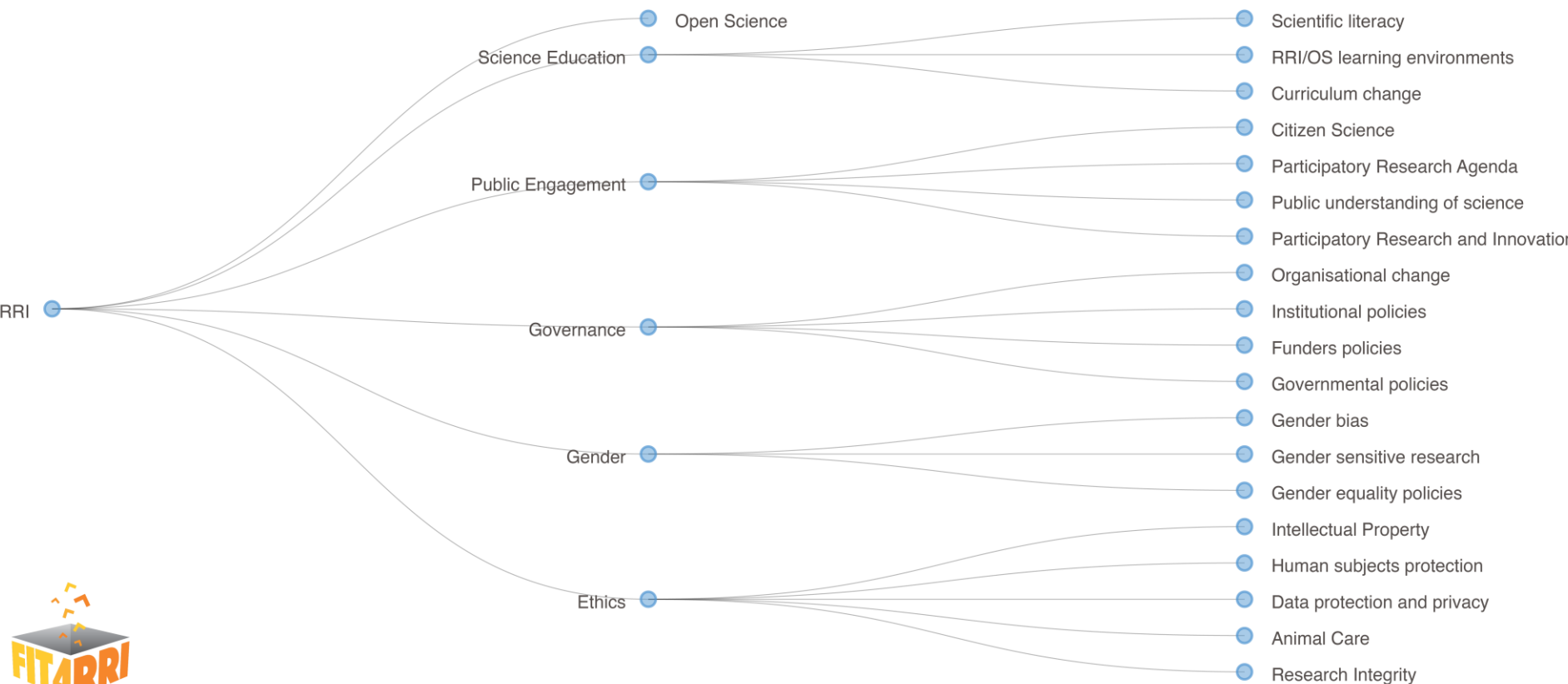
# Four RRI Process Dimensions

- Diverse and Inclusive
- Anticipative and Reflective
- Open and Transparent
- Responsive and adaptive to change

# But (why) is it relevant to us?

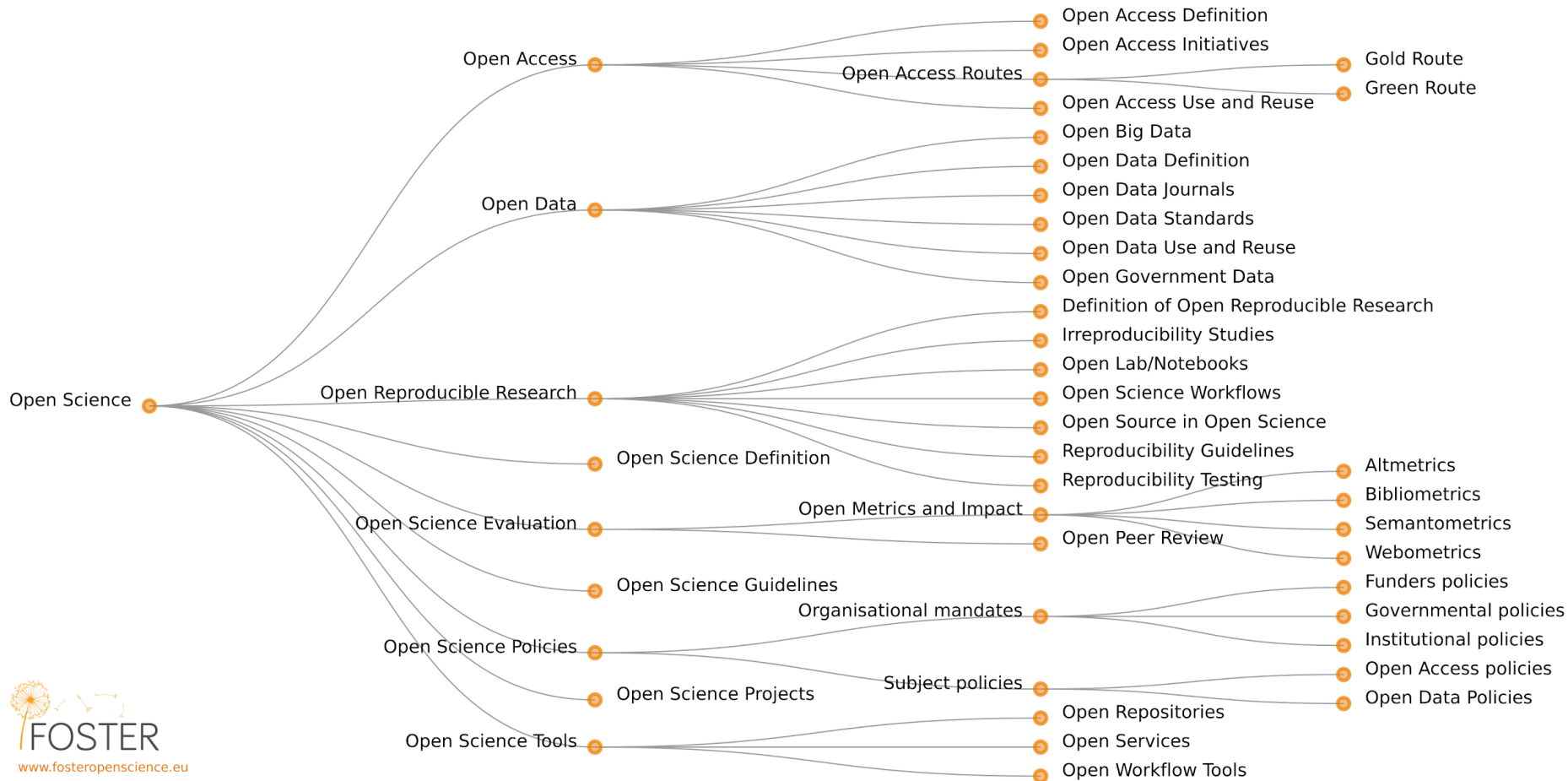
- Except for being funder's requirements...
- Diverse stakeholders involved: Makes research more **relevant** ('impact'), broadens expertise, gives different perspectives
- Ethics applied: Research outcomes more likely **accepted** in society
- Being open and transparent: high quality, verifiable, reproducible, and reusable knowledge

# Responsible Research and Innovation Taxonomy

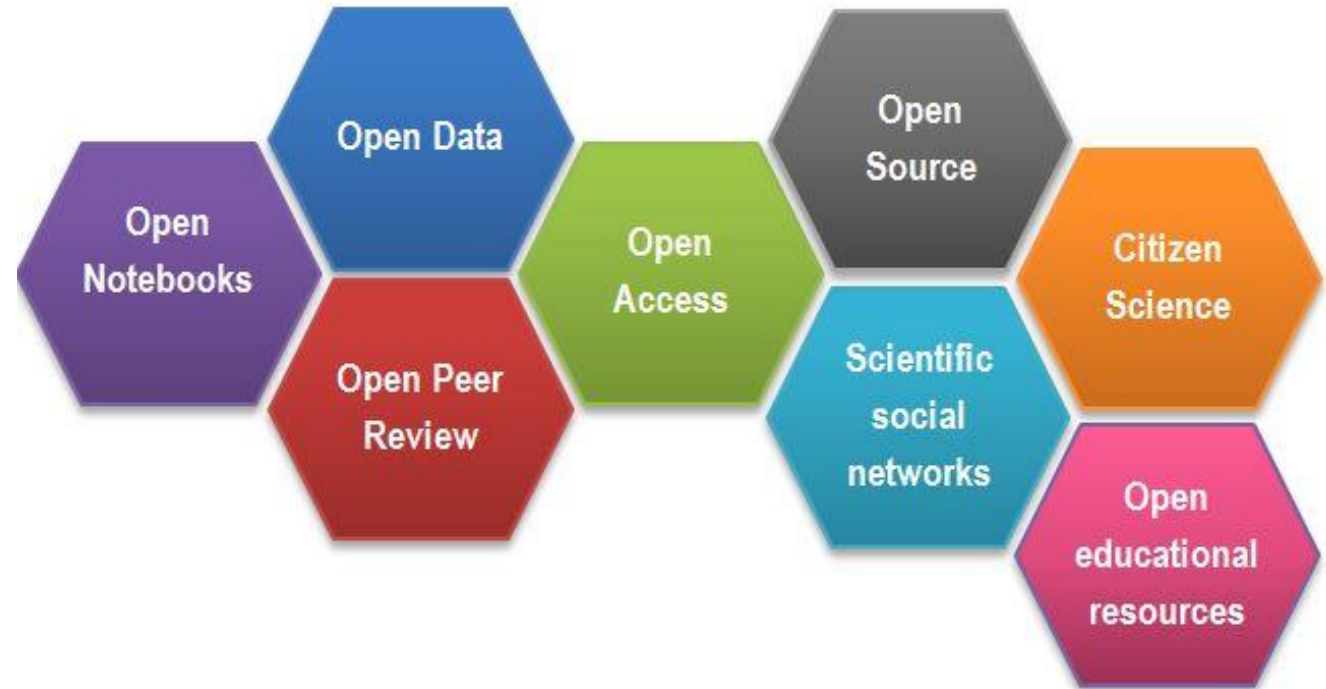




# Open Science Taxonomy



# Open Science



Bueno de la Fuente, FOSTER

# Training on RRI and Open Science

Where to start?

- What is needed -> objectives
- Who is your audience?
- Which RRI pillars or key components will you address?

# Training on RRI: challenges

RRI is the end of true science

RRI is about much more than just research

It is too demanding

My data can't be open

My research is not interesting to society/  
people won't understand

Citizens do not have enough knowledge to participate in science

My research is not suitable for 'impact'

Ethics forms are just ticking a box



# Answering questions on RRI

What is it, and why is it important?

Is science not responsible already?

Don't we already do RRI, just not called like that?

How to find the time?

How do I apply RRI?



# Some resources on RRI

- RRI Toolkit: <https://rri-tools.eu/>
  - <https://rri-tools.eu/training/resources>
- FOSTER
  - <https://www.fosteropenscience.eu/resources>
    - [Introduction to Responsible Research and Innovation](https://www.fosteropenscience.eu/node/2750)  
<https://www.fosteropenscience.eu/node/2750>
    - Openness in Science and RRI by Fit4RRI  
<https://www.fosteropenscience.eu/learning/openness-in-science-and-rri/#/id/5e3740c53ccdf1010dbc6f20>
- <https://the-turing-way.netlify.app/ethical-research/ethical-research>
- Coming in 2024-2025: PATTERN project resources

# Some resources on Open Science

- FOSTER
  - <https://www.fosteropenscience.eu/resources>
    - [https://open-science-training-handbook.github.io/Open-Science-Training-Handbook\\_EN/](https://open-science-training-handbook.github.io/Open-Science-Training-Handbook_EN/)
- FORRT
  - <https://forrt.org/nexus/#>
- Turing Way <https://the-turing-way.netlify.app/index.html>
- FAIR training handbook <https://fairsfair.gitbook.io/fair-teaching-handbook/>

# But what do you think?

Why do you advocate Open Science (or why not..?)

Why do you find openness important?

Do you know when to share data and when not?