3 questions about Responsible Research & Innovation

The why, the what and the how

Qualifizierungsworkshop, 15.02.2020, Kiel

Helene Brinken

Nds. Staats- und Universitätsbibliothek Göttingen

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Abteilungen: Elektr. Publizieren, Dig. Bib., Software & Service. Entw.
Themen: Open Science, RDM, RRI

FAIRSFAIR
Fostering Fair Data Practices in Europe

onmerrit

FOSTER

FIT4RRI

RDA
RESEARCH DATA ALLIANCE EUROPE

Hybrid OA Dashboards

OAUNI

OpenAIRE

oafum

open access network

*metrics

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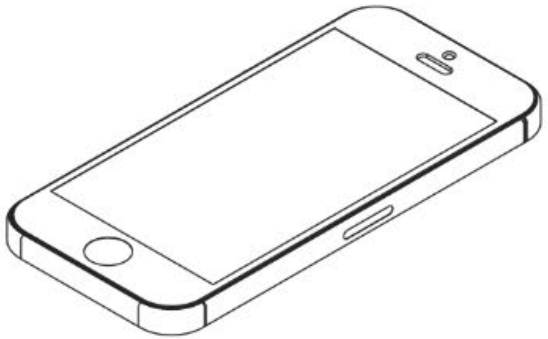

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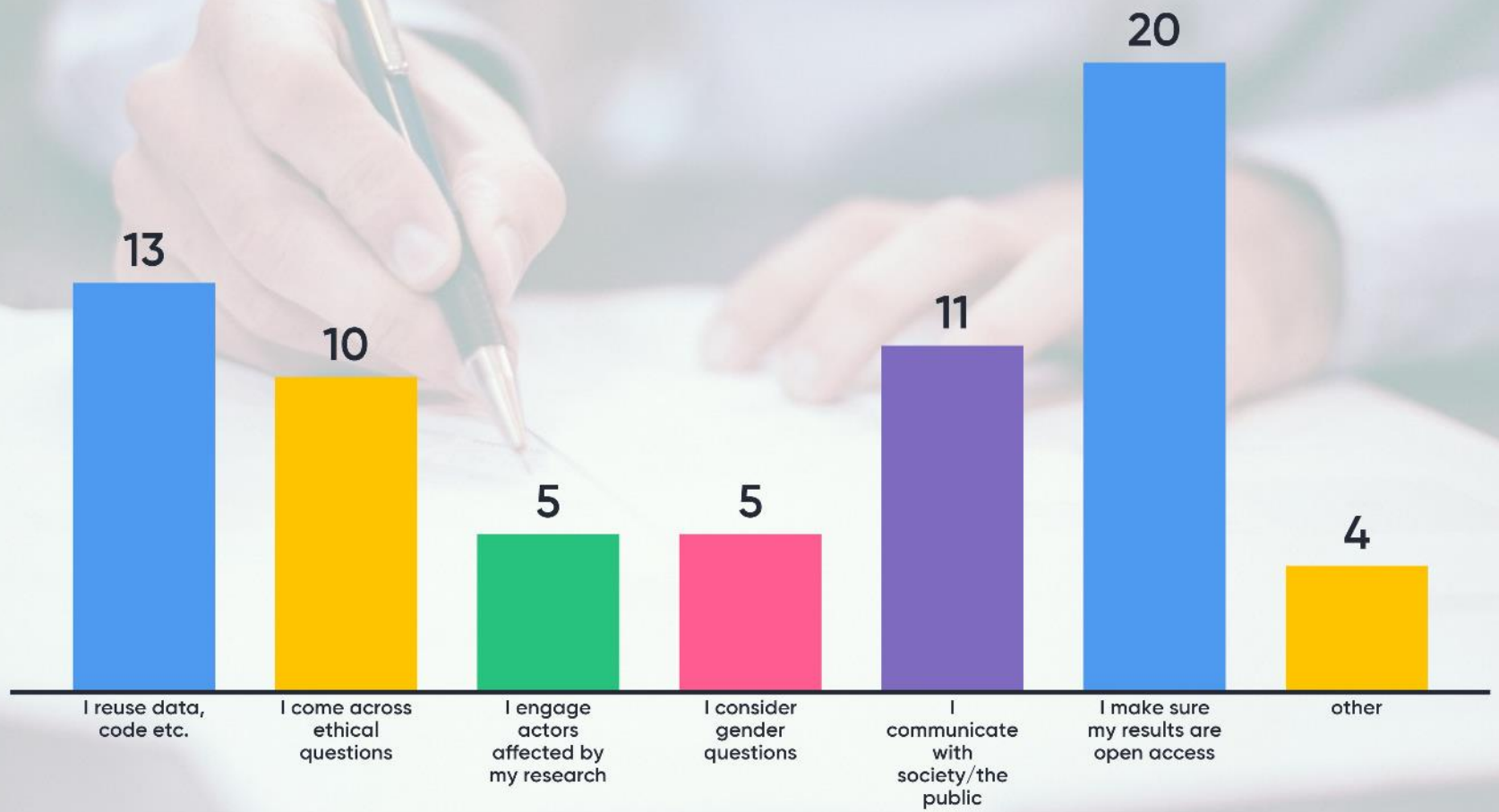
The key values of responsible and open research are...

20

In my project...



20

The why – Societal challenges

- **Health,** demographic change and wellbeing

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https://ec.europa.eu/programmes/horizon2020/en/h2020-section/societal-challenges

Societal challenges

- **Food** security, sustainable agriculture and forestry, marine and maritime and inland **water** research, Bioeconomy

https://ec.europa.eu/programmes/horizon2020/en/h2020-section/societal-challenges

Societal challenges

- Secure, clean and efficient **energy**

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https://ec.europa.eu/programmes/horizon2020/en/h2020-section/societal-challenges

Societal challenges

- Smart, green and integrated **transport**

https://ec.europa.eu/programmes/horizon2020/en/h2020-section/societal-challenges

Societal challenges

- **Climate** action, environment, resource efficiency and raw materials

https://ec.europa.eu/programmes/horizon2020/en/h2020-section/societal-challenges

Societal challenges

- Europe in a **changing world** - inclusive, innovative and reflective societies

https://ec.europa.eu/programmes/horizon2020/en/h2020-section/societal-challenges

Societal challenges

- Secure societies - protecting **freedom** & **security** of Europe and its citizens.

https://ec.europa.eu/programmes/horizon2020/en/h2020-section/societal-challenges

Societal challenges seek science based solutions to solve these & to make science more engaged with societal and economic issues.

https://ec.europa.eu/programmes/horizon2020/en/h2020-section/societal-challenges

Horizon 2020 for Europe

- Biggest EU Research and Innovation programme ever
  - €80 billion of funding available (2014 to 2020)
- Objectives
  - achieve breakthroughs & discoveries
  - secure Europe's global competitiveness
- Reflecting policy priorities of the Europe 2020 strategy and addresses major concerns shared by citizens in Europe and elsewhere.

https://ec.europa.eu/programmes/horizon2020/en/what-horizon-2020

Science with and for society (Swafs) programme

- Different work programmes with different focuses, priorities to fund projects
- Objectives
  - build effective cooperation between science and society,
  - recruit new talent for science
  - pair scientific excellence with social awareness & responsibility.

https://ec.europa.eu/programmes/horizon2020/en/h2020-section/science-and-society

Science with and for society (Swafs) programme

- Allow societal actors to work together during the whole research and innovation process

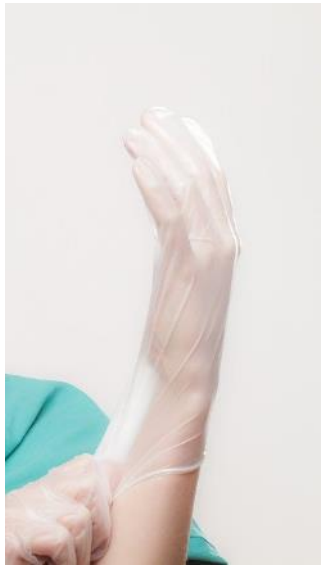
→ better align process & outcomes with values, needs and expectations of European society.

- Approach to research and innovation is called Responsible Research & Innovation (RRI).

https://ec.europa.eu/programmes/horizon2020/en/h2020-section/science-and-society

To make some examples – Plastic materials

- Solve many problems



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- But excessive & uncontrolled use lead to environmental consequences
  - Need for responsible research & innovation

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To make some examples - The engine and the motorised means of transport

- Overcome great distances & carry goods

- But created pollution problems, have a impact on landscape & urban architecture

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To make some examples - Medicines

- Reduce mortality
- But not exempt from side effects & complication

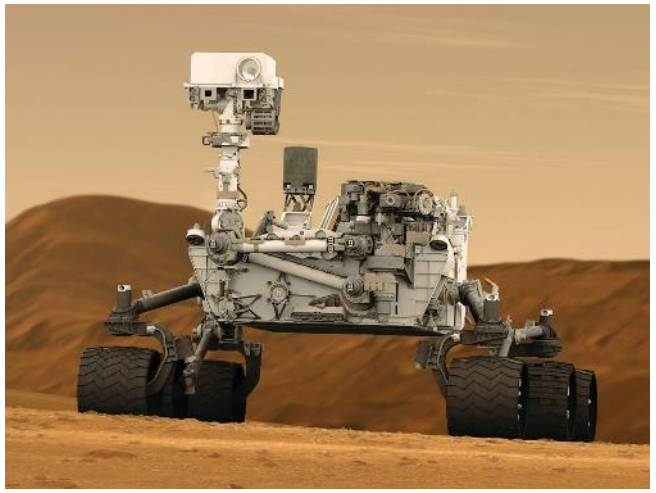
To make some examples - Telecommunications

- Made information & interaction barriers disappear
- But caused social challenges (digital-gap inequalities; excessive use)

To make some examples – Robotics and Artificial Intelligence

- Improve life standards
- But also pose security risks and impacts on jobs

- The list goes on…
  - Gene editing, drones, etc.



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The what - Responsible Research & Innovation

- Six key pillars form a framework for RRI practices. (last two key components added in 2015)
- In practice, RRI consists of designing and implementing R&I policy that will:
  - engage society more broadly in its research and innovation activities,
  - increase access to scientific results,
  - ensure gender equality, in both the research process and research content,
  - take into account the ethical dimension,
  - promote formal and informal science education, and
  - design governance settings to achieve implementation of the other five keys.

Public Engagement

- Bring together diverse actors for exchange and dialogues
- Initiate a two-way, iterative, inclusive and participatory process

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Gender

Photo Credit: https://pixabay.com/illustrations/trans-sexuality-transsexual-man-3554250/

- Address under-representation of women in both research process and content

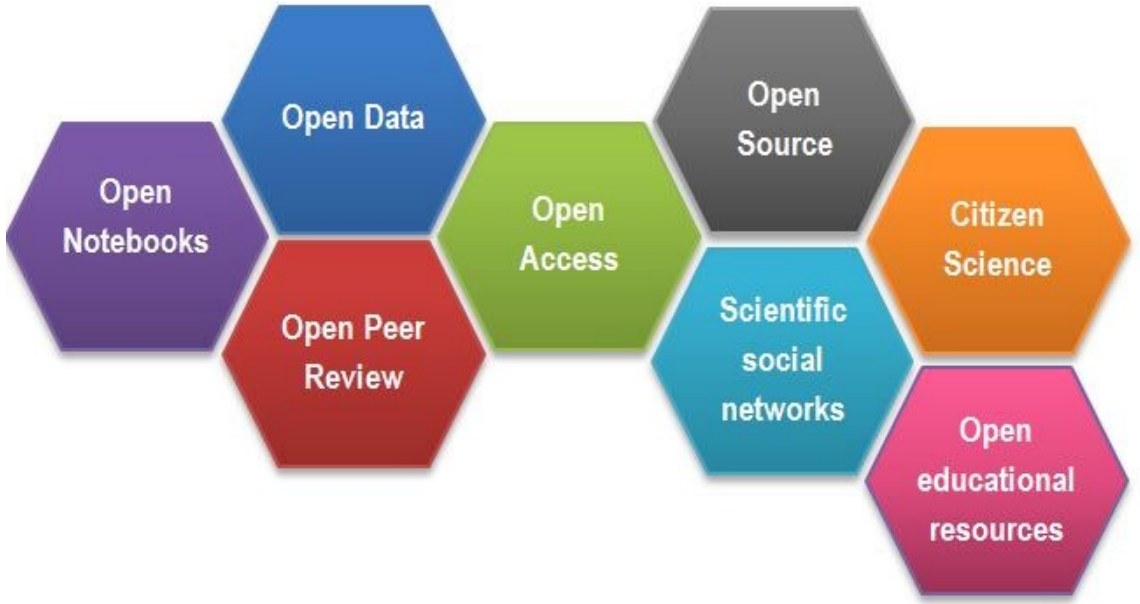
Science Education

- Communicate language and tools of science
- Enhance formal and informal science education inside research institutions and in society

Photo Credit: https://pixabay.com/photos/school-class-school-children-bali-401519/

Open Science

- Make research results as well as underlying processes and data accessible to everyone



Ethics

- Respect fundamental rights and follow highest ethical standards
- Don’t perceive Ethics as constraint, but as ensurance of high quality research

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Governance

Photo Credit: https://pixabay.com/photos/compass-dash-direction-navigation-691146/

- Design governance settings to achieve implementation of the other five keys

Additional key aspects

Social justice/Inclusion

- Avoid unfair exclusion of particular groups from either participation in research and/or access to benefits arising from research

Photo credit: https://pixabay.com/photos/hands-words-meaning-fingers-423794/

Sustainability

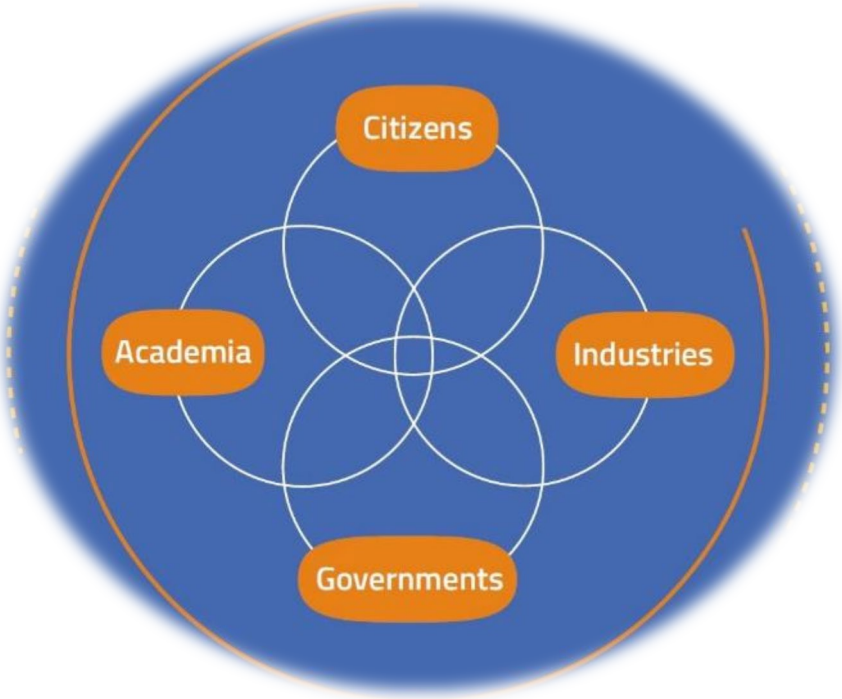
- Enable research programmes and RRI initiatives to contribute to sustainable growth according to EU 2020 strategy

Photo credit: https://pixabay.com/photos/hands-words-meaning-fingers-423794/

http://ec.europa.eu/research/swafs/pdf/pub_rri/rri_indicators_final_version.pdf

Responsible Research & Innovation

- Objective:
  - to bring research & innovation into the open & involve societal interest groups such as citizens, governments, industry and NGOs.
- We cannot predict but we can anticipate, reflect, engage and act to minimize potential negative impact of science and technology.

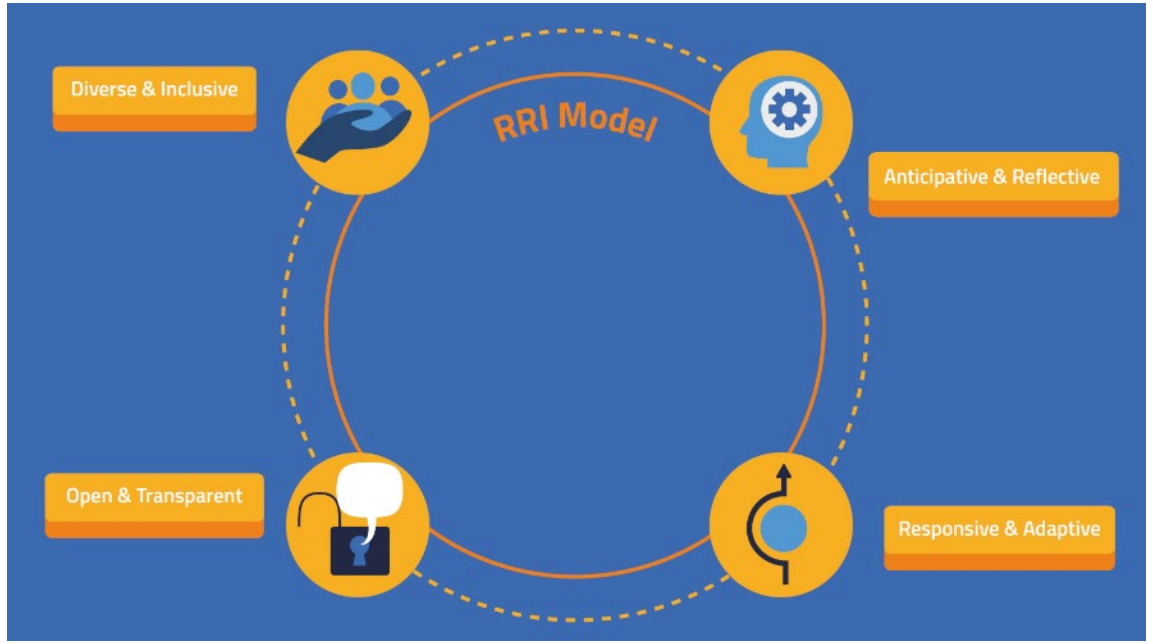


- Involve all stakeholders at all levels to minimize potential negative impact of R&I.

The RRI model – Process dimensions

Research practices need to be:

- Diverse & Inclusive
- Anticipative & Reflective
- Open & Transparent
- Responsive & Adaptive to change



In general terms, RRI implies anticipating and assessing potential implications and societal expectations with regard to research and innovation.

Benefits of RRI – RRI can lead to…

- wider acceptability of science & technology outcomes
- creation of useful & high quality knowledge
- valuable insights, broader sources of expertise/ disciplines/ perspectives
- visibility & understanding of R&I
- strengthening of democracy
- anticipation of potential implications
- alignment of R&I with needs expressed by academia, citizens, governance and industry

The How - FIT4RRI Project - video

https://www.youtube.com/watch?v=MyTdNdujVko&t=57s

During the whole process of R&D&I, **multiple decisions** must be made:

Some questions affect the WHAT and WHEN → Scientific AGENDA.

What to research?

Which questions should be solved first?

What innovations should be promoted?

What is more urgent? What can wait?

What are the priorities?

How do we decide on the distribution of resources for R&D&I?

HEIRRI

Higher Education Institutions & Responsible Research and Innovation

https://www.rri-tools.eu/-/heirri_project

Other questions have to do with the HOW:

Do I reflect upon the **long term impact** of my research? And upon the impact of my field? Can **I anticipate and improve** said impact?

Apart from respecting legal and ethical principles, **do I consider other shared social values**, such as inclusiveness and sustainability?

Does my organisation or the S&T system have them in mind?

Do I share my research with experts from **other fields**? And with **end users** or different **stakeholders?** Do I consider other opinions?

https://www.rri-tools.eu/-/heirri_project

HEIRRI

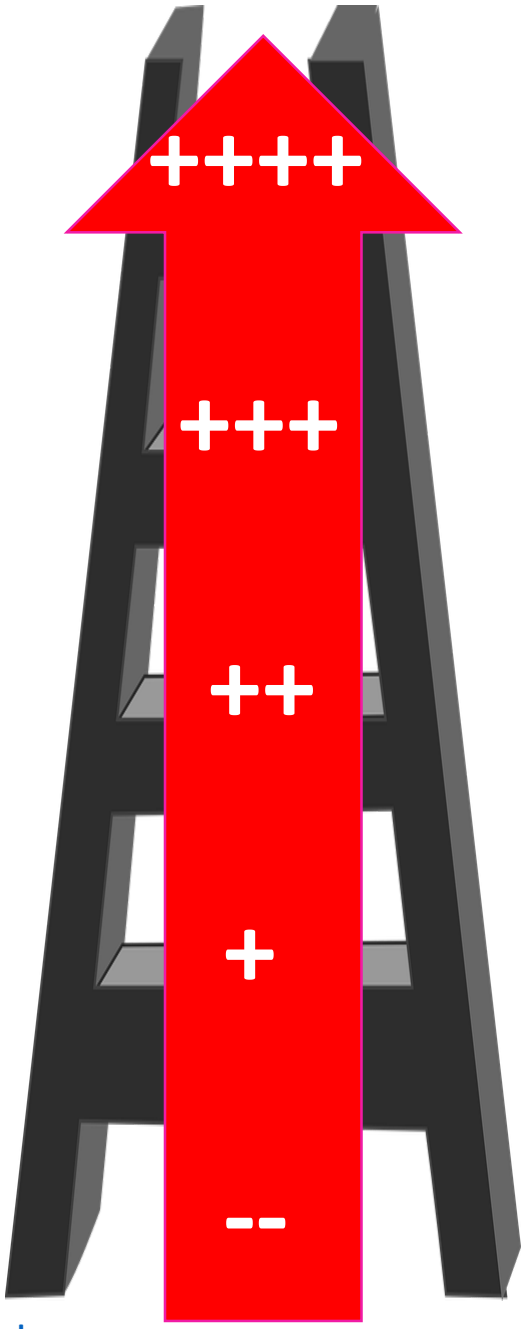
Higher Education Institutions & Responsible Research and Innovation

HEIRRI

Higher Education Institutions
& Responsible Research and Innovation

The ladder

of Science Communication, Public engagement and Public Participation in Science

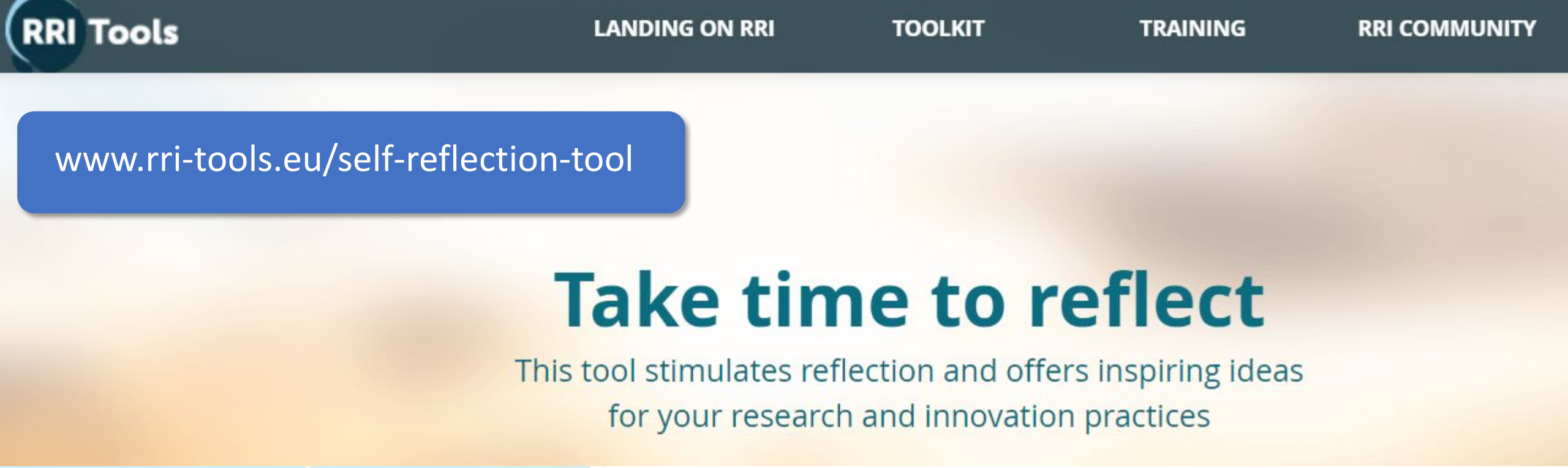


- **Citizen participation in experiments, data collection, experiences**... Citizen Science, Community Based Research, Science Shops, Living Labs
- **Formal Engagement** and Participation (Citizens Panel, referendum), Participative Technological Assessment (PTA), Public Consultation (surveys, focus groups)
- **Informal Public Engagement**: Mutual Mobilization and Learning Exercises (MML), Science Cafés, World Café, Decide Game, Role Play Activities, Makers and DIY actions...
- **Some dialogue:** social media
- Information and **one direction Science Communication**: media actions, website and newsletters, talks, open days, books, exhibitions…
- **No information**, no communication

https://www.rri-tools.eu/-/heirri_project

A strategy to implement RRI

1. What are the issues
   - Identify issues to be addressed - the cultural and the normative.
2. What are the objectives
   - Identify objectives to achieve (e.g., producing institutional change).
3. Which are the processes
   - Identify process to achieve your aims, e.g., action plan, introducing RRI-oriented criteria in research evaluation or research funding procedures; introducing new steps in the research process.
4. Who are the actors
   - Identify actors to be involved in the process of change. Consider hierarchies, dependencies, and group dynamics.
5. Which are the RRI pillars
   - Identify RRI pillars from where to start RRI journey. Where do you start to involve a wide range of actors to reflect and act?


RRI Tools
LANDING ON RRI
TOOLKIT
TRAINING
RRI COMMUNITY
www.rri-tools.eu/self-reflection-tool
Take time to reflect
This tool stimulates reflection and offers inspiring ideas for your research and innovation practices
oes your organisation have a gender quality plan?
How do you address gender stereotypes?
How do you involve stakeholders and the public in your work?
What channels do you use to enable stakeholder participation in the R&I process?
How does your organisation approach open access policies?
hat are your organisation's gender quality practices regarding staff and working conditions?
How is gender equality evaluated within your organisation?
At which stage of the R&I process is it most effective for you to engage stakeholders, and why?
What does public engagement in the decision-making process mean in your work or organisation?
How transparent is the ownership of your work outcomes?

Fostering Improved Training Tools for Responsible Research & Innovation

Assumption

- Gap between potential and actual impact of RRI and Open Science in RFPOs

Objective

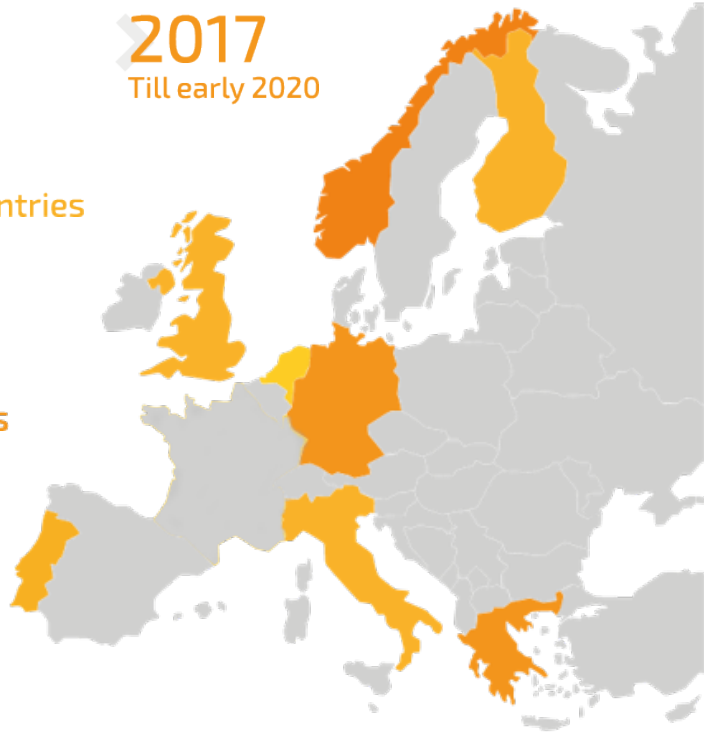
- Activate institutional change with training & governance settings

3 Years
project duration

2017
Till early 2020

9
Countries

12
Partners



FIT4RRI

Sapienza Università di Roma · NTNU Norwegian University of Science and Technology · University of Liverpool · Maastricht University · Ciência Viva · K&I Knowledge and Innovation · Universidade do Minho · ISQ · The Open University · University of Helsinki · SEERC · Georg-August-Universität Göttingen

1 Understanding – Literature Review & Analysis

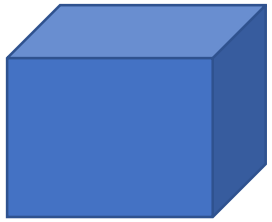
- Sectorial Analysis
  - National settings: less important
  - Sectors : substantial variation (type of research & stakeholder relationship as well as novelty / establishment of sector

e.g. self-protection, quality, opportunity, democracy, communication

- Literature Review
  - Analysis of
    - trends,
    - barriers,
    - drivers,
    - values & interests
  - of RRI & Open Science

e.g. hypercompetition, increasing mobility, pressure and task diversification, shrinking of research funds

e.g. political, social, economic, technological, environmental



e.g. related to awareness, relevance, effectiveness and sustainability

https://zenodo.org/record/2268891#.Xke9smhKhPZ

2 Testing – Co-creation experiments

1 ISQ RRI model

Develop an ISQ RRI model & implement it in R&D unit

2 Photonics (Optical Monitoring)

Embed RRI principles into current ethics & science education practices

3 Material Science

Implement a reponsible governance in a new research center

4 Text & Data Mining

Investigate machine accessibility of non-open access publications

3 Sharing – training & guidelines

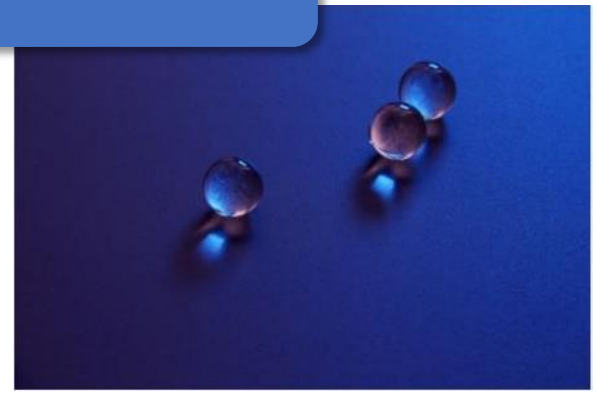
- New training tools &
- Evidence-based guidelines on governance settings to activate institutional change

Coming soon

RRI toolkit

Introduction to RRI

Engaging the Public



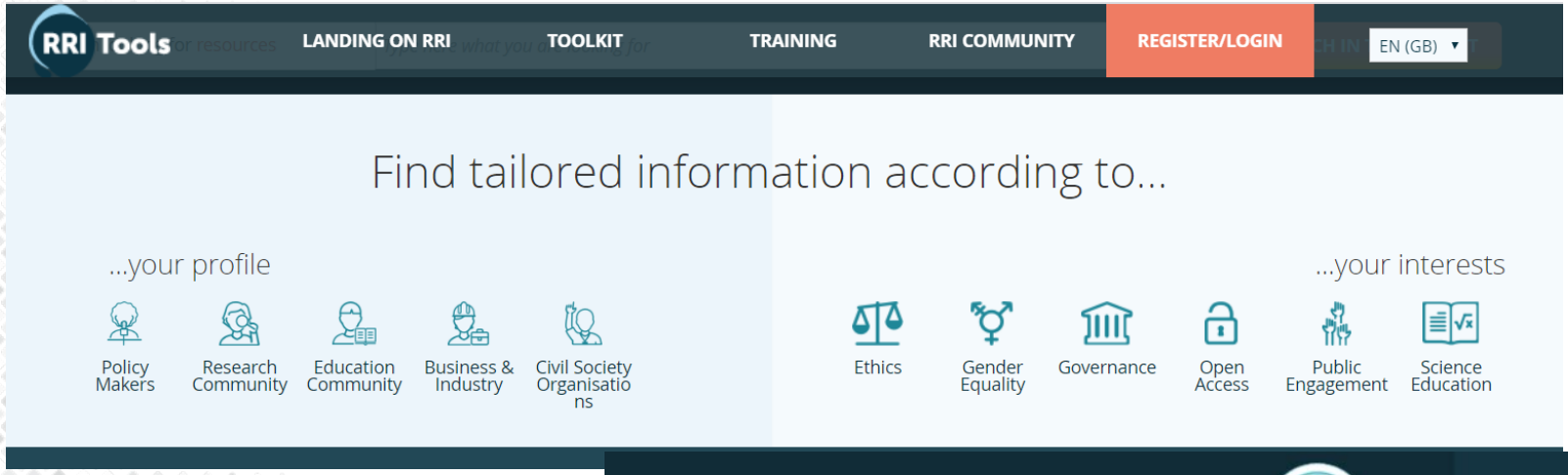
Ethics in RRI

RRI for Companies

www.fosteropenscience.eu/rritoolkit

Some resources

www.rri-tools.eu



ORION open science

Menu of Co-creation Tools

https://www.orion-openscience.eu/activities/co-creation/201711/menu-co-creation-tools

Method Type	Method Name(s)	Objective	Audience Size	Audience Type	Event Time	Total Time	Budget (€-€€€€)	Case Study	Action Catalogue Method
Deliberative	Citizens Hearing	To inform and create discussion among citizens	20-25	Citizens, experts, decision-makers	1D	7M	€€€	Regional Development in Copenhagen, Danish Board of Technology Foundation, 2016	7395
	Citizens Summit / Assembly	To find out the citizens' attitudes about political priorities and possible courses of action provided on an informed basis	200-5000	Anyone	1D	Var	€€€€	EU Project Surprise, 2013-2015	7403
	Civic Dialogue	To encourage innovation, trust and confidence to facilitate the creation of a legitimate roadmap for moving forward in a particular direction	Var	CSOs, policy-makers, researchers	Var	Var	€€€	High-level dialogue on International Migration and Development, UN, 2013	7404
	Deep Democracy / The Lewis Method	To access and bring out the wisdom within a group, and particularly to release the creative potential that results from conflict	Var	Anyone	1-2 D	Var	€€	Conversation Across the Socio-Economic Divide (Deep Democracy in Action)	7406
	Deliberative Mapping	To provide a more robust, democratic and accountable decision making which better reflects public values	~ 60	Citizens, experts	6D	4M-1Y	€€€€	Appraising options for addressing the 'kidney Gap', Sussex University (WT), 2003	7386
	Democs Card Game / Play Decide	To enable small groups of people to engage with complex public policy issues	4 to 8	Citizens	1-4 D	Var	€	Public engagement on synthetic biology: development of a 'Democs' tool, ESRC Genomics Policy & Research Forum, 2009	7389
	Distributed Dialogue	To develop ongoing, embedded discussions around a topic	>5000	Researchers, citizens	2-5 D	>1Y	€€€	Bioenergy Dialogue, BBSRC/Sciencewise, 2013	7390
	Expert Panel	To synthesise a variety of inputs on a specialised topic and produce recommendations	~ 100	Researchers, citizens, policy makers	1-2 H	6M	€€	Translating Research into Practice, Massachusetts Women's Health Network, 2008	N/A
	Interdisciplinary Work Groups	To take professional stock of the situation and partly to propose possible courses of action to ensure, initiate, promote or check development in the area	15-30	CSOs, policy-makers, researchers	2-5 D	8M	€€	Opening up the Human Brain Project to the neuroscience community, Danish Board of Technology, 2015	7417
	Multi Criteria Decision Analysis (MCDA)	To rank a set of options from the most preferred to the least preferred option; policy formulation, programme development	Var	CSOs, researchers, citizens	4D	1Y	€€	PorGrow - Policy options for responding to the growing challenge of obesity, Sussex Uni, 2006	7393
	Planning Cells / Citizens Jury	To develop a set of solutions to a problem delegated to the participants by a commissioning body	25	Citizens	4-5 D	5M	€€€€	Citizens jury on Water Management, Free University of Amsterdam	7430
	Q Methodology	To gain insight into the diversity of perspectives	50-100	CSOs, policy-makers, researchers	3M	6M	€€	Biomass Dialogue, Institute for Environmental Studies (NL), 2009	7436
	Scenario Building Exercise	To plan and prepare for an uncertain future; vision building	Var	Anyone	2-5 D	6M	€-€€€	Research Agenda Scenario for the future of Europe, CIMULAT, April 2016	N/A
	World Café & Science Café	To provide a means for public debates about societal issues of science and technology	<50	Anyone	40' - 2 H	1-2M	€	www.Sciencecafes.org	7439
Participative	Community-Based Participatory Research (CBPR)	To involve CSOs members in all stages of the research process, from setting the questions, to framing and doing the research, interpreting the results and communication	Var	CSO members	1M - open ended	Var	€€	Echo: Cancer Screening Project, Centre for Community Based Research (CA)	7421
	Participatory Action Research (PAR)	To engage citizens in a practical and transformative way by involving them in the scientific exploration of their living conditions and everyday problems in order to induce a change in these conditions	Var	Anyone	2H - open ended	Var	€€	Saca la Lengua (Stick Out Your Tongue), Centre for Genomic Regulation	7428
	Crowd Wise	To encourage consensus-based decisions	15-1500	CSOs, policy-makers, researchers	3 -+H	6M	€€	Understanding the barriers to raising population wellbeing, New Economics Foundation, 2011	7405
	Demand Driven Research in Curriculum	To place research projects for CSOs in the curriculum	Var	CSOs, researchers	N/A	6M-1Y	€€	Science Shops	7422
	Focus Groups	To determine the preferences of people or to evaluate strategies and concepts	Var	Anyone	2H - 1D	1M	€	Smart Water Management, Telecommunication Standardization Sector, 2015	7409
	Open Space Technology	To enrich programme development, project definition, policy formulation and research activity and generate political empowerment among citizens	5-1000	CSOs, policy-makers, researchers	2H - 1D	1M	€-€€€	Nasa's Asteroid Initiative, ECAST, 2015	7401
	Perspective Workshop	To explore possible myths, generate new perspectives, and put forward guidelines on a given technology or technological development	40-50	researchers, CSOs, citizens, industry	1SD	6M	€€€	RFID – Risks and Opportunities, Danish Board of Technology Foundation, 2006	7418
	Public Dialogue	To gather social intelligence to inform policy, anticipate regulation, exchange opinion or raise awareness	<20	Citizens, experts	1D	<1Y	€€€€	The Use of Hybrid and Chimera Embryos in Research, The Human Fertilisation and Embryology Authority (UK), 2006	7388
	Public Participation in Developing a Common Framework for the Assessment and Management of Sustainable Innovation	To develop priorities in research programmes	25	CSOs, researchers, citizens	2D	14M	€-€€€€	EU Project 'Public Participation in Developing a Common Framework for the Assessment and Management of Sustainable Innovation (CASI)	7412
	User committee / Valorisation panels	To involve users and other stakeholders in the formal monitoring and steering of the research and innovation process	10	CSOs, researchers, users, industry	Var	Var	€€	Dutch Platform for RRI	7441
Conferences / Forums	**Consensus Conference**	To enrich and expand a debate on a socially controversial topic	10-30	Citizens with support of experts	3 weekends 3-4 D	12M	€€€	Gene Therapy, The Danish Board of Technology Foundation, 1995	7413
	Future Search Conference	To encourage participants to think about a problem or conflict in a new way	60-80	CSOs, policy-makers, researchers	3D	6M	€€€	Future Search, The Method	7416
	Online Forums	To provide some form of consensus and collective decision	N/A	Anyone	1-2H - open ended	Var	€	AMA (reddit)	7407
Surveys	Deliberative Polling	To get both a representative and an informed (deliberative) view of what the public thinks and feels about an important public issue	100-500	Citizens with support of experts	1D	8M	€€€€	Europolis: Deliberative Polling on the European Union, Center for Deliberative Democracy, 2012	7398
	Delphi Method	To enable anonymous, systematic refinement of expert opinion with the aim of arriving at a combined or consensual position	Var	CSOs, experts	Var	~1Y	€€€	NISTEP Delphi, Science and Technology Foresight Center Japan	7399
	Group Delphi	To consolidate expert opinion in a short time period	Var	CSOs, researchers, industry	1-2D	~6M	€€€	Sound Exposure and risk assessment of wireless network devices (SEAMND), Dialogik, 2012	7400
Prizes	Challenge Prizes	To define a project, incentivise innovation, focus attention on a particular issue and unlock financing and other resources	Var	Citizens	N/A	long term	€€€€	Smart Ageing Prize, Nesta, 2016	7384

Resources

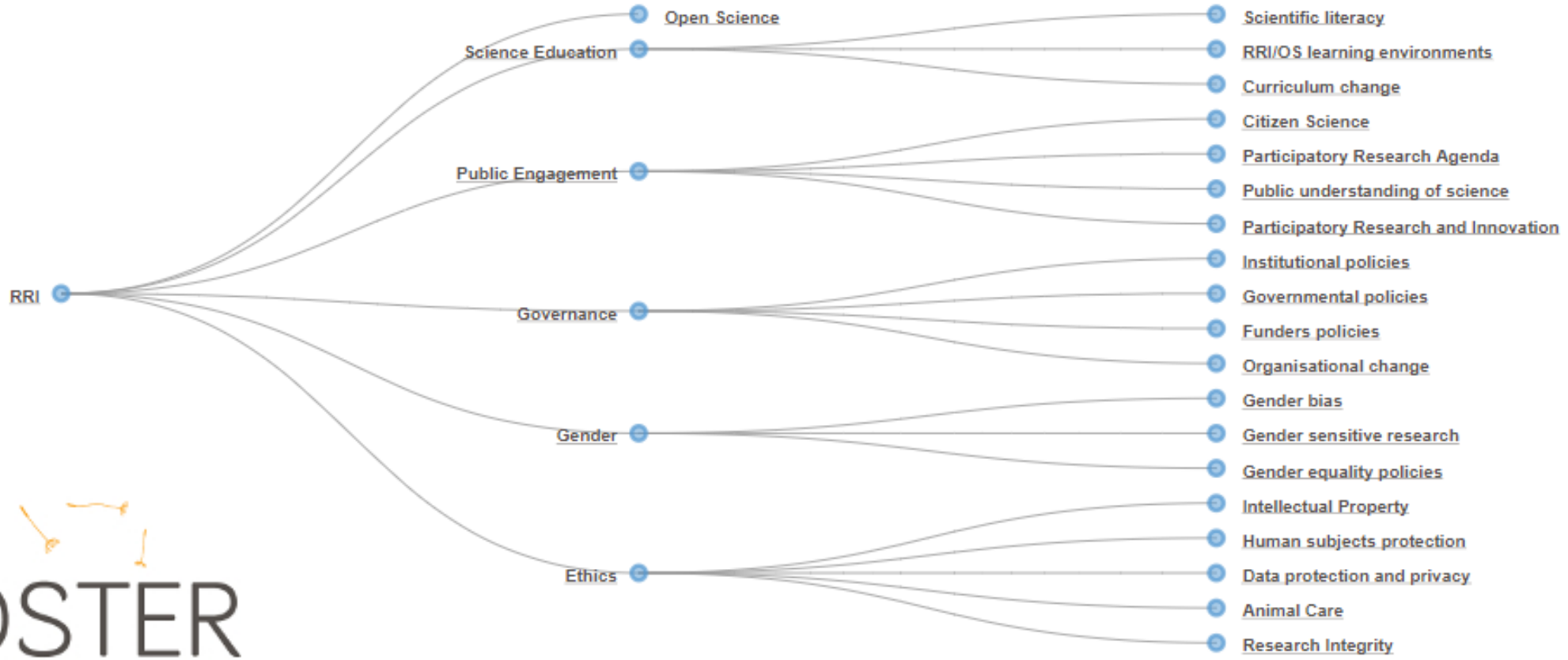
www.fosteropenscience.eu

Help us promote Open Science and contribute training content.

This tree displays the coverage of the resources for each topic.

Click to download taxonomies

Open Science | Research Data Management | Legal Issues | Text And Data Mining | TDM Methods | Research Workflow | RRI



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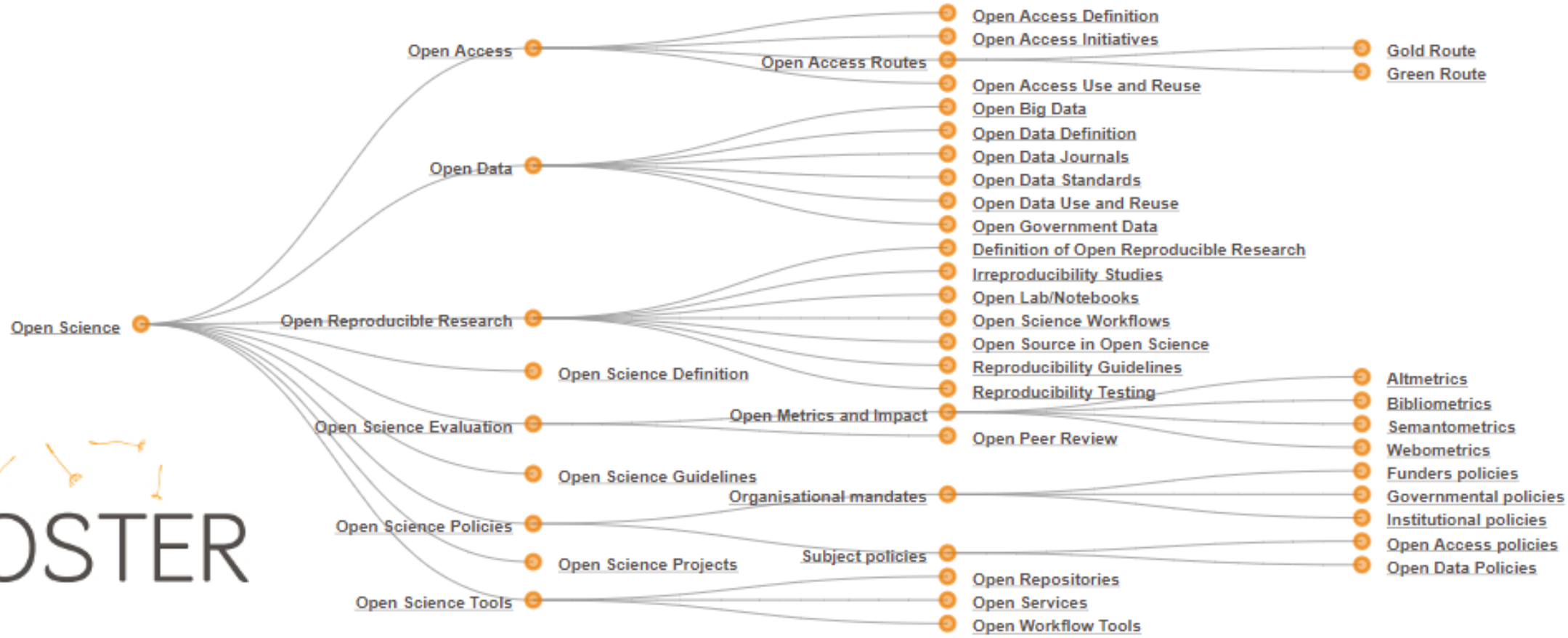

FOSTER

Open Science Training Courses

The FOSTER taxonomy defines Open Science as the movement to make scientific research, data and dissemination accessible to all levels of an inquiring society.

Sounds good but what does Open Science (OS) mean in a practical sense? These courses answer some of the most common questions you might have about putting open science into practice. Each course takes about 1-2 hours to work through and you'll receive a badge upon completion. The courses include practical tips on getting started with OS as well as providing information on discipline specific tools and resources you can use. There is no specified order through the courses – just explore topics that you want to learn more about at your own pace.

fosteropenscience.eu/toolkit

What is Open Science?

Spanish version available

This introductory course will help you to understand what open science is and why it is something you should care about.

Best Practices

Spanish version available

This course introduces some practical steps for opening up your research practices and how to meet expectations relating to openness from funders, publishers and peers.

Managing and Sharing Research Data

Spanish version available

In this course, you'll focus on which data you can share and how you can go about doing this most effectively.

OSS and Workflows

Spanish version available

This course introduces Open Source Software (OSS) and workflows as an emerging but critical component of Open Science.

Open Access Publishing

Spanish version available

This course will help you become skilled in making your publications openly accessible in line with funders' requirements and in the wider context of Open Science.

Sharing Preprints

Spanish version available

This course introduces the practice of sharing preprints and helps you to see how it can support your research.

FOSTER

Data Protection and Ethics

Spanish version available

This course helps you to get to grips with responsible data sharing.

Open Licensing

Spanish version available

This course helps you to find the best open license for your open research outputs.

Open Peer Review (OPR)

Spanish version available

This course will introduce you to OPR and let you know how you can get started with it.

Open Science and Innovation

This course will show you how Responsible Research and Innovation is accelerated through Open Science.

www.book.fosteropenscience.eu

The Open Science Training Handbook

A group of fourteen authors came together in February 2018 at the TIB (German National Library of Science and Technology) in Hannover to create an open, living handbook on Open Science training. quality trainings are fundamental when aiming at a cultural change towards the implementation of O Science principles. Teaching resources provide great support for Open Science instructors and train The Open Science training handbook will be a key resource and a first step towards developing Ope Access and Open Science curricula and andragogies. Supporting and connecting an emerging Oper Science community that wishes to pass on their knowledge as multipliers, the handbook will enrich training activities and unlock the community's full potential.

Registration open

www.fit4rri.eu/rri4real

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