ROSiE

Disclaimer: *This deliverable has not yet been reviewed by the European Commission. Its content might therefore change as a result of the review process.*

D8.6.: Policy Brief

Author: Vana Stavridi
Editor: Rosemarie Bernabe

Project title:Responsible Open Science in Europe
Project Acronym: ROSiE

Grant Agreement no.: 101006430
Lead contractor for this deliverable: NTUA

Deliverable factsheet:

Project Number:	101006430
Project Acronym:	ROSiE
Project Title:	Responsible Open Science in Europe
Title of Deliverable:	Policy Brief
Work Package:	WP 8- D8.6
Due date according to contract:	M18-31/8/2022
Author(s):	Vana Stavridi
Contributor(s):	Signe Mežinska on behalf of WP2, 7,Francois Jost on behalf of WP4, Mathieu Rochambeau& Teodora Konach on behalf of WP5, Tom Lindemann (author of D3.3.&D3.4) Lisa Häberlein (author of D3.3.&D3.4), Philipp Hövel (author of D3.3& D3.4), (author of D3.4.), Eleni Spyrakou & Panagiotis Kavouras (NTUA)
Reviewed and approved by:	Costas Charitidis, Rosemarie Bernabe

ABSTRACT:	This document contains a concise summary of the outcomes of the mapping of the engagement activities of ROSiE project and recommendations on the best policy option for responsible Open Science. It is aimed at institutional and government policymakers, and others interested in formulating or influencing policy.
Keyword List:	Open Science, Citizen Science, Responsible Research and Innovation, Challenges, Policy gaps,Research Integrity, Policymaking, Recommendations

This project has received funding from the European Union's Horizon 2020 research and innovation programme under GA No 101006430

Consortium:

	ROLE	NAME	Short Name	Country
1.	Coordinator	UNIVERSITETIOSLO	UiO	Norway
2.	Partner	ÖSTERREICHISCHEAGENTURFÜR WISSENSCHAFTLICHEINTEGRITÄT	OeAWI	Austria
3.	Partner	VEREINDEREUROPÄISCHEN BÜRGERWISSENSCHAFTEN	ECSA	Germany
4.	Partner	EURECOFFICEGUG	EUREC	Germany
5.	Partner	TIETEELLISTENSEURAIN VALTUUSKUNNASTA	TSV	Finland
6.	Partner	HAUT CONSEIL DE L'EVALUATIONDE LARECHERCHEETDEL'ENSIEGNEMENT SUPERIEUR	HCERES	France
7.	Partner	L'INSTITUT NATIONAL DE RECHERCHEPOURL'AGRICULTURE,L'AMINE NTATION ETL'ENVIRONMENT	INRAE	France
8.	Partner	NATIONAL TECHNICALUNIVERSITYOF ATHENS	NTUA	Greece
9.	Partner	UNIVERSIDADECATOLICAPORTUGUESA	UCP	Portugal
10.	Partner	LATVIJASUNIVERSITATE	UL	Latvia
11.	Partner	TARTUULIKOOL	UT	Estonia
12.	Partner	UNIVERSITETETISOROST-NORGE	USN	Norway

Revision history:

VERSION	DATE	Revisedby	Reason
0.1	15 July2022	Vana Stavridi	1st draft of the policy brief
0.2	1 August 2022	Costas Charitidis, Eleni Spyrakou	Pre- final version
0.3	4 August 2022	Vana Stavridi	Revision based on review by Costas Charitidis, Eleni Spyrakou
0.4	26 August 2022	Rosemarie Bernabe	Final draft
0.5	29 August 2022	Vana Stavridi, Panagiotis Kavouras	Revision based on review by Rosemarie Bernabe
1.0	30 August 2022	Vana Stavridi	Final version

This project has received funding from the European Union's Horizon 2020 research and innovation programme under GA No 101006430

Table of contents

This project has received funding from the European Union's Horizon 2020 research and innovation programme under GA No 101006430

POLICY BRIEF

Towards fostering responsible Open Science in Europe.

What are the main challenges and policy gaps in the implementation of Open science and what are the best policy options for responsible Open Science in Europe?

1. Executive Summary

Open Science (OS) is among the most discussed topics in current research and innovation policy. Sharing knowledge and data have a positive impact on both the scientific community and society, increasing the creativity of researchers and the trust of society in science. However, open science also raises questions about research ethics, integrity and misconduct. This ROSiE **policy brief** discusses these questions and challenges of implementing OS and provides strategic advice for integrating **Research Ethics** and **Research Integrity** in OS. Especially, it contains a concise summary of the most critical challenges and issues that have been identified through engagement activities, such as focus groups and interviews with a wide range of stakeholders, through discussions that have taken place in the context of a vibrant community of EU-funded projects related to OS and Citizen Science (Cross SwafS of Stakeholders Forum meeting), established by ROSiE project, and also through case study analysis and mapping exercise.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under GA No 101006430

The document concludes with strategic advice for the integration of Research Ethics and Research Integrity in OS and **recommendations** on the best option for responsible OS.

Key messages

- ◊ Only responsible research can make a positive impact on society.
- ◊ The opening of scientific processes, from planning and designing, to executing, sharing and valorizing, creates benefits for both the scientific community and society, but also brings some challenges.
- ◊ ROSiE proposes to contribute to research ethics and research integrity (RE/RI) support in an open research ecosystem in Europe.
- ◊ Specifically, ROSiE aims to prepare Europe for responsible open science (OS) by addressing OS' RE/RI, legal, and social challenges and, on this basis, assisting the Commission by establishing RE/RI guidance for OS and an OS RE/RI community of practice.
- ◊ ROSiE aims to facilitate the integration of RE/RI as structural components of OS.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under GA No 101006430

2. Introduction

OS is characterized by an unprecedented openness that allows not only easier and more democratic access to scientific results but also easier and more global scientific collaboration, the participation of the public in what used to be the silo of the scientist (citizen science), transparency and reproducibility of results, the higher probability of valorization of scientific findings, open peer reviews, the provision of different and potentially more nuanced metrics of academic achievement and societal impact (e.g. altmetrics, https://www.altmetric.com/), crowdfunding, avoidance of unnecessary repetition of data gathering and data analysis, the reuse of previously gathered data for related research, knowledge crowdsourcing, among others (Bartling & Friesike, 2014).

Mary Ritter (2017), writing for the European Commission, captures the essence of OS in the following description:

Open Science (OS) has four major goals:

- *Public accessibility and full transparency of scientific communication*
- *Public availability and reusability of scientific data*
- *Transparency in experimental methodology, observation, and collection of data*
- *Complete scientific collaboration.*

Four essentials needing to be closely linked to the previous four fundamental goals also fall into the boundaries of OS:

- *Strengthening dialogue between science and society*
- *Linking scientists to science policy making*

This project has received funding from the European Union's Horizon 2020 research and innovation programme under GA No 101006430

- *Developing proper e-infrastructures, digital tools and services for OS*
- *Changing legal tools and policy requirements for OS.*

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.*

Boundaries and challenges of OS's implementation determine the ROSiE project's mission. Towards fostering OS and its benefits for both society and science, ROSiE project proceeds in a systematic manner to ensure responsibility in the conduct of OS. ROSiE will develop guidelines for responsible OS, including a complement to the European Code of Conduct for research integrity and will provide a knowledge hub and training materials for RE/RI aspects of OS.

Necessary steps for ROSiE' s mission accomplishment.

EXPLORE: Provide a systematic inventory of ERI, social, and legal implications and challenges of OS; and of existing technologies and platforms that safeguard responsible OS.

ENGAGE: Conduct consultation and stakeholder engagement to create and sustain a community of practice involving all European stakeholders interested in OS and ERI.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under GA No 101006430

3. Methodology

The 1st policy brief (M18) situates ROSiE in the on-going policy context and reports on insights and lessons learned from the first 18 project months. The authors of this policy brief followed a secondary analysis of data which were collected in the context of WP2, 3, 4 and 5 and an analysis of their results. More particularly, this policy brief is based on the overview of the mappings conducted in the context of WP2 and WP5 and on the results of engagement activities which have taken place during the implementation of WP3 and WP4. The conducted mapping in WP2 fed this document with the social implications and challenges related to OS by analyzing publicly available project research reports and scientific literature referenced in these reports. WP5 provided with an overview of good practices and gaps of existing responsible OS public policies in Europe at the national level in 22 selected countries. Through 12 semi-structured interviews with relevant stakeholders (researchers, research integrity officers (RIOs), research managers, research funding organisations (RFOs), research policymakers and science educators) and three focus groups, WP3 provided data regarding the stakeholders' views, attitudes and practice of responsible OS. In addition, it includes a number of key recommendations resulting of the analysis of the findings of stakeholder engagement activities that were utilized suitably by this document. From WP4, that incorporates the publicly available results of EU funded networks and research projects into the work of ROSiE by establishing a cooperation with these projects (SwafS Stakeholder Forum meeting), we utilized the results of discussions on ethical challenges raised in the context of OS and also, on issues regarding Data privacy and GDPR. Extensive input and in-depth analysis of the results of the aforementioned mappings and engagement activities

This project has received funding from the European Union's Horizon 2020 research and innovation programme under GA No 101006430

can be found in the corresponding reports, which have been produced in WP 2, 3, 4, and 5, and will be made publicly available on ROSiE's website after the completion of the 1st reporting period of the project (autumn of 2022).

4. Overview of the problem

OS is a real game-changer in accelerating research and innovation. However, the revolutionary scope of OS brings about novel **ethical** and **legal** issues, **societal** challenges as well as new forms of **misconduct** and **questionable research.** It is therefore important to identify and analyse the potential for misconduct in various areas of OS practice and in different scientific disciplines, and to identify and analyse current ethical, social and legal approaches to responding to questionable research. During the first 18 months, as part of the project's deliverables, a wealth of knowledge has been accumulated both about the new challenges OS raises and about stakeholder attitudes towards OS. Taking advantage of this knowledge, ROSiE project is ready to proceed to the next steps regarding the **development of guidelines** for responsible open science and the creation of the **knowledge Hub** and **training materials**.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under GA No 101006430

4.1. Challenges in the implementation of Open Science

Economic disparities between countries: For low and middle-income countries (LMICs), research data sharing is limited because of lack of power, older equipment, poor maintenance, a lack of technical support, lack of ICTs, lack of platforms, along with a lack of appropriate software for openly sharing research data.

Cultural differences: With regard to country differences but also difference between groups within the same country, there is a tension between values of openness and transparency vs. intellectual property and sensitivity of research data. Older supervisors who are less aware or more critical towards OS often maintain cultures of closed science in their settings (such as their labs, for example). Thus, their younger mentees are socialized with research practices that hamper the transition to OS.

Public trust in science: The existing gap between science and society creates a situation where science may be not sufficiently taken into account in the policy-making or decision-making process.

Gender inequalities (in some cases also ethnicity and age-related inequalities) and, in some cases, also **inequalities between researchers working in the industry and academia.**

This project has received funding from the European Union's Horizon 2020 research and innovation programme under GA No 101006430

Terminology of GDPR: Some provisions of the GDPR are written using terminologies that are somewhat opaque.

The distinction between disciplines in the context of Open Science policy: Open science policy and guidance, due to the terminology and concepts it uses, often risk inadvertently excluding the arts and humanities where, for instance, the practical meaning of concepts such as reproducibility is not evident.

Intellectual property law and patent requirements create challenges for open science: Patents sometimes cannot be granted if the mechanism underlying the patent was openly published before, even if only in a conference paper. Thus, research conducted with the ambition to apply for patents cannot easily be made open without significant strings attached; a challenge that seems particularly relevant in privately funded and industrial research.

4.2. Gaps in national policies andregulatory frameworks for Open Science.

Most European countries do,[1] at least officially and in principle, support OS and thus, despite disparities in terms of policies, legislations and structures, some governance structures are in place across the region (Rochambeau & Konach, 2022). The majority already have public policies and/or strategies at the national level but they are at very different stages of development when it comes to OS. This confirms policy and regulatory heterogeneity between countries.

[1] The findings for this section have emerged from a mapping exercise of 22 national policies that has been conducted in the context of WP5 during the first 18 months of the project.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under GA No 101006430

Heterogeneity between the national policies can create challenges in research collaborations, particularly in multi-center research projects with partners from different countries. What could be considered responsible OS policies in one context can thus not always be translated into another one without creating or emphasizing existing issues. This can also explain why most of the existing public policies are short and not very detailed (regarding discipline-related particularities for instance).

Regarding the regulatory framework for practices related to OS, there is the same heterogeneity with negative impacts on researchers. For instance, the extent to which data can actually be opened still differs between countries, even in the EU. Thus, researchers moving from one country to another sometimes are surprised about regulatory heterogeneity, while international consortia often need advice on which infrastructure to use for storing publications and data in a manner both compliant with pertinent regulation and conducive to open science (Lindemann, Häberlein & Hövel, 2022).

This heterogeneity confirms the uniqueness and diversity of each country and national system(s), with particular research and legislation cultures that have to be taken into account in the ongoing harmonization and standardization processes.

5. Recommendations

The **engagement activities** with key stakeholders, the **systematic cooperation** with EU projects related to OS and Citizen Science (Cross SwafS Stakeholder Forum meetings), and **mapping exercises** equipped ROSiE with a comprehensive understanding of challenges related to economic, social, cultural, technological, political and legal factors in the implementation of OS. Also, these activities

This project has received funding from the European Union's Horizon 2020 research and innovation programme under GA No 101006430

provided us with a number of recommendations and suggestions for **policy makers** which could contribute to maximizing the **benefits** of OS and support the integration of RE/RI as structural component of OS.

The following recommendations are proposed for consideration by institutional and government policymakers.

- Institutional policymakers at higher education institutions could Integrate OS into curricula from the undergraduate level onwards. This requires creating a sufficiently large pool of adequately qualified educators and training materials that will cover a broad range of topics, e.g., conflicts of interests in OS and citizen science; authorship, group authorship and contributorship in citizen science; data sharing and reanalysis; predatory publishing practices; open peer review; using social media data in the context of OS (Mežinska, Kalēja, Mileiko, Neiders, 2022).
- OS policy should provide sufficient funding for opening up research.
- Open data policies need to be sensitive and allow research participants control and judgment over the information that should be released for which specific incentives might be needed to encourage them to share their data.
- OS policy should consider that transitions are likely to follow uneven trajectories. Especially countries in the scientific periphery, where research environments are less well-developed and where less funding for research is available, will require more time to move to OS. Especially research not funded by flagship schemes, such as the Horizon Europe programme or the European Research Council, will take longer to open up. Thus, aims and benchmarks should be set at a realistic level and take into account that the barriers to implementing open science are higher in some settings than in others.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under GA No 101006430

- OS policy could aim to be inclusive and avoid framings that could evoke the impression to exclude the social sciences and the arts and humanities. Sensitivity to disciplinary differences is crucial to accomplish a full and genuine transition to open science (Lindemann, Häberlein & Hövel, 2022).

GENERAL RECOMMENDATION

A policy environment conducive to responsible OS requires aligned action on the European, national and institutional levels.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under GA No 101006430

6. References

Bartling, S. & Friesike, S. Opening Science: the evolving guide on how the internet is changing research, collaboration, and scholarly publishing. (SpringerOpen, 2014).

Lindemann, T., Häberlein, L., & Hövel, P. (2022). Report on interviews. ROSiE D3.3. Unpublished.Will be available at: https://cordis.europa.eu/project/id/101006430/results

Lindemann, T., Häberlein, L., & Hövel, P. (2022). D3.4: Recommendations resulting from the analysis of the consultation process ROSiE D3.4. Unpublished. Will be available at: https://cordis.europa.eu/project/id/101006430/results

Mežinska,S., Kalēja, J., Mileiko,I., Neiders,I. (2022). Didactic framework. ROSiE D.7.1. Unpublished. Will be available at:https://cordis.europa.eu/project/id/101006430/results

Rochambeau, M., Konach,T.,D5.1. Report on existing policies and guidelines ROSiE D5.1. Unpublished. Will be available at: https://cordis.europa.eu/project/id/101006430/results

This project has received funding from the European Union's Horizon 2020 research and innovation programme under GA No 101006430