ROSiE

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D2.4: Report on Social and Legal Implications and Challenges Related to OS

Project title: Responsible Open Science in Europe

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Consortium:

No.	Role	Name	Short Name	Country
1.	Coordinator	University of Oslo	UiO	Norway
2.	Partner	Austrian Agency for Research Integrity	OeAWI	Austria
3.	Partner	European Citizen Science Association	ECSA	Germany
4.	Partner	Eurec Office Gug	EUREC	Germany
5.	Partner	Eurosis Federation of Finnish Learned Societies	TSV	Finland
6.	Partner	High Council for the Evaluation of Research and Higher Education	HCERES	France
7.	Partner	National Research Institute for Agriculture, Food and Environment	INRAE	France
8.	Partner	National Technical University of Athens	NTUA	Greece
10.	Partner	University of Latvia	UL	Latvia
11.	Partner	University of Tartu	UT	Estonia
12.	Partner	University of South-Eastern Norway	USN	Norway
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In WP2, social and legal aspects of Open Science were investigated. Details are provided in D2.1, D2.2, and D2.3. The following is a summary of the main findings and recommendations:

Data protection law aspects of Open Science

- To assess whether the data is personal data, and thus whether the General Data Protection Regulation 2016/679 (GDPR) applies: Data identifiability must *inter alia* be assessed in light of data uniqueness, combination and specificity of variables, and the possibility of linkage with other datasets, combined with the planned total storage time, available resources and likely technological advances in this timeframe. The legal threshold for considering data anonymous/anonymized is very high, and the reidentification literature shows an increasing ability to identify individuals in research datasets. Data may have been deposited in research repositories at a time when it was anonymous, and it may now be considered identifiable and thus personal data.
- Personal data transfers outside the European Economic Area (EEA): Data transfer also includes the provision of remote data access. There are currently legal difficulties with transferring data to several countries, including some of the main research partner countries of EU researchers, such as the USA where both transfer to federal institutions and the use of US cloud providers is problematic. Similar challenges apply to data transfers to international organizations, including the United Nations.
- The principle of data minimization – that personal data shall be adequate, relevant, and limited to what is necessary in relation to the purposes for which they are processed – is challenging to reconcile with Open Science.
- Main recommendations:
    - Data identifiability must be assessed in light of the data in question, planned total storage time, available resources, technological advances, and the reidentification literature.
    - Compliance with the informed consent to research participation, (if applicable) the ethics approval, and a lawful basis for personal data processing must be ensured also for secondary use.
    - The principles of data protection (Article 5 of the GDPR) must be respected. Technical and organizational measures must be in place to protect against unauthorized or unlawful data processing and against accidental loss, destruction, or damage. Data subject rights must be respected also if data is deposited in a research repository or otherwise reused. If applicable, an incidental findings policy should also apply for the secondary use of the data.
    - Controlled access and using EEA-based repositories will alleviate several legal issues.
    - Technological solutions, such as blockchain and federated sharing/training, may assist in legal compliance.
    - Benefit sharing measures should be considered when private companies are new data user.
    - The legal challenges pertaining to data transfers to non-EEA countries must be solved on a legislative level in the EEA and the relevant non-EEA countries.

Intellectual Property Rights Aspects of Open Science

- The existing Intellectual Property Rights (IPRs) system can co-exist and even support the responsible practice of Open Science (OS). IPRs offer a very broad range of flexible tools, practices, and agreements, which can be adjusted to the ongoing initiatives of widening access to research and scientific results, while at the same time – protecting the valid rights of authors and creators.
- Stronger harmonization of IPRs on the EU level could facilitate the development of standardized procedures and tools for the responsible uptake of OS practices. However, the European Open Science Policy should not be a one-size-fits-all system, as such an approach will be highly detrimental to the multiple and very diverse research and innovation results and outcomes. Balancing these interactions will require a strategic and long-term perspective, one that will also incorporate sustainability, inclusion, and environmental considerations.
- There are many ongoing initiatives on the national and EU level, addressing the OS movement, with some dealing specifically with IPRs and the OS practice. Their work (like the European IP Helpdesk resources and training) should be

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better communicated and more visible. A more user-friendly and community-driven approach in the European Open Science Cloud management and initiatives would be recommended in the next operational framework as well.

- Basic education in IPRs in the digital realm should be introduced, for students and researchers, but also – for people involved in research and research-like activities. The content should address only relevant topics (authorship, basic moral and economic rights, an overview of types of protections, etc.), offering an easy and user-friendly explanation, an overview of available tools and examples of best practices and institutions that can provide further information and support (ideally – on national and the EU level).
- Striking the balance between standards of OS rigour in publicly and privately funded research is needed, as research should contribute to society, regardless of the form of funding. Moreover, these kinds of standards should be negotiated globally, to secure the competitiveness of the EU research and scientific institutions.

Social Aspects of Open Science

- The questions on social aspects of Open Science that were answered during the research process were:
    - What are the attitudes towards Open Science in the scientific communities?
    - What social challenges are brought about by Open Science practices?
    - What social challenges arise by involving new actors in the scientific process?
    - What are the roles of different actors in the process of implementation of requirements of research ethics and research integrity in the context of Open Science?
- There are differences in attitudes towards Open Science between scientific disciplines which can be explained by differences in technical skills, traditions, data specificity (qualitative/quantitative/sensitive/personal, etc.), history of practicing Open Science in discipline, etc. Also, ethical issues in the case of human subject research may affect researchers' willingness and ability to share data, e.g., medical, and social science researchers performing human subject research may be reluctant to share research data because of privacy issues. The existing traditions in each field of science can also promote or limit Open Science practice.
- Focus group participants emphasized that willingness to share the data may differ depending on the scientific discipline. If data files are not large, researchers have fewer problems preparing and sharing them in open access, but if data files are large and data preparation requires a lot of additional work, researchers are more reluctant, especially if there is no additional funding or they are not sure that someone will really use the data.
- In focus groups some researchers expressed different attitudes towards specific practices of Open Science, e.g., open data sharing, open access publications, and open peer review. Those practices which have been experienced as personally helpful in everyday scientific work and allowed to do research easier, faster, or cheaper were valued positively. Some other practices may be assessed more negatively, e.g., a researcher may express a positive attitude towards open data sharing and data reuse, but a negative opinion about open peer review.
- There are different types of inequalities among researchers and inside scientific communities, mirroring inequalities in society (e.g., related to ethnicity, age, and disability) and influencing opportunities and willingness to practice Open Science. These inequalities may take the form of limited opportunities to practice Open Science, unequal access to funding, or an unfair payment system which in turn creates excessive competition. An open question is why and how gender inequalities impact practicing of Open Science and vice versa and this aspect still needs further research.
- The participants of focus groups emphasized global inequalities in Open Science practice between economically more developed and low- and middle-income countries (LMICs). Researchers from economically more developed countries reported much better access to Open Science infrastructures, funding, and Open Science training and support, e.g., an opportunity to get support from data stewards to prepare open data and metadata for sharing. Researchers from LMICs referred to a lack of infrastructure, funding, and training to promote Open Science practice.
- One way how cultural attitudes can be actively shaped and developed is by introducing Open Science policies, developing infrastructures, and training researchers. For example, information about existing Open Science infrastructures and practices is crucial for the successful implementation of Open Science. In some cases, the availability of infrastructure and additional costs to store data were recognized as a problem. Infrastructure needs long-term investments, otherwise, researchers do not see the reason to invest in preparing and sharing data.
- Some research studies show that researchers working for the industry may have less opportunities to practice Open Science, e.g., because of restrictions by industry sponsors who usually operate under a more closed model of data management.
- The problems regarding citizen science practice mentioned during focus group discussions were:

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  - Misrepresentation of certain groups and lack of diversity among citizen scientists that can impact the results
  - Citizen science means a large amount of additional work for researchers that are responsible for citizen engagement.
  - Not all costs that are related to citizen involvement can be refunded because it might not be allowed by existing funding rules.
  - Citizens may be misused and exploited as unpaid workers.
  - Ensuring the quality of data collected by citizen scientists.
- Main recommendations:
  - Identify and change cultural attitudes and elements of institutional culture that are potential barriers to the implementation of Open Science practices.
  - Provide researchers with the necessary resources and infrastructure to support responsible Open Science practices.
  - Recognise legitimate differences in attitudes and readiness to engage in Open Science between different fields of science.
  - Recognize the potential for global inequities in access to Open Science infrastructure and act to promote global justice and support the needs of researchers in low- and middle-income countries.
  - Re-evaluate current institutional and national level incentives and evaluation systems to align them with Open Science practices.
  - Recognize and reward researchers for their contributions to Open Science, such as data sharing, publication of preprints, citizen science, and open-access publications.
  - Analyse and address the potential for gender-, ethnicity-, age-, disability-related, and other biases in research and act to ensure that responsible Open Science practices promote equality and diversity.
  - Promote Open Science practices in the industry sector.

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