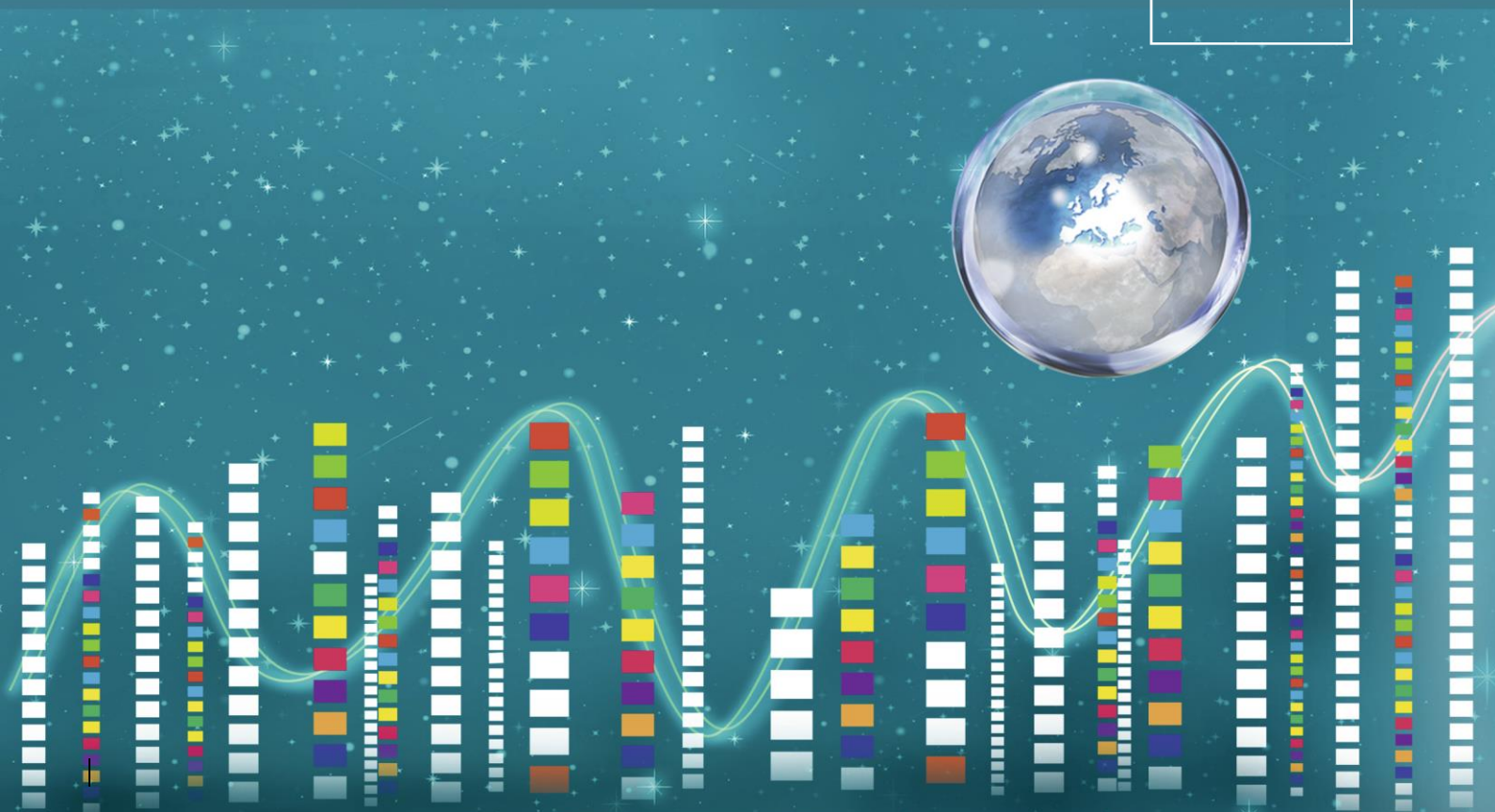


Enabling open science and societal engagement in research

Independent
Expert
Report



Enabling open science and societal engagement in research

European Commission

Directorate-General for Research and Innovation
Directorate A, ERA and Innovation

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Unit REA.C4— Reforming European R&I and Research Infrastructures

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Enabling open science and societal engagement in research

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Executive Summary

The European Commission has the ambition for open science to become the norm for research and innovation across the European Research Area. Universities and other research performing organisations are key locations for realising this aim. As part of its reflection on how universities can support this ambition, the European Commission DG Research and Innovation and the European Research Executive Agency convened a one-day workshop on 1 July 2021. The event was attended by the Science with and for Society (SwafS) 'Responsible Research and Innovation institutional change' portfolio of projects funded under Horizon 2020 and the initial group of European University Alliances under the European Universities Initiative¹ that received funding under the SwafS programme. This report documents insights from discussions and presentations made at the workshop.

A key insight was that the dynamics between open science and those 'institutional logics'² that configure practices within universities will influence the extent, nature and success of its institutionalisation in these settings. It is therefore important to understand what these different logics are, reflect on how they align with open science and consider whether they should be reformed to help promote institutionalisation of open science in universities.

Universities in Europe tend to be configured by three logics as this relates to research: the first of these, the *ivory tower*, is grounded in the independence of researchers, who are free to pursue research with the primary goal of producing knowledge that contributes to understanding of the natural and social worlds. It can be thought of broadly as 'fundamental' or 'basic' research. Open science seems to align well with this logic and, if current European Commission open science initiatives are sustained, the prospects for its institutionalisation in universities seem strong.

A second logic, the *utilitarian university*, places emphasis on 'useful' knowledge, impact and external partnerships. It can be thought of broadly as 'applied research', innovation and research that is aimed at meeting strategic policy challenges (e.g. 'net zero'). Open science in its fullest sense seems to only partially align with this logic. Significantly, the diversity of external actors participating in applied research and innovation is limited, privileging corporate and industrial partners at the expense of civil society groups and citizens.

Additionally, and despite open science's ambition for research to have an ethical orientation, the extent to which processes of broad ethical reflection (i.e. beyond established research ethics approval processes) and debate are systematically integrated into research and innovation in universities is limited.

Open science also only partially aligns with a third important logic in universities, that of the *managed bureaucracy*. This is a logic that supports, manages, and resources the other two logics, emphasising bureaucracy, efficiency, centralisation and performance. It combines formal and informal elements that are both internal and external to the university. Workshop participants drew attention to this logic as being a significant area for reform. Insights from the workshop allow the following recommendations for reforms to be made:

1) Universities and other research performing organisations should make reforms to criteria, metrics and processes supporting researchers' recruitment and career progression in order to reward open science practices. As part of these reforms, the extent to which civil society organisations and citizens have been engaged and included in strategic or applied research and innovation should be specifically assessed. Likewise, the extent to which processes of broad ethical reflection and debate have been meaningfully integrated into research and innovation should be assessed and

¹ https://ec.europa.eu/education/education-in-the-eu/european-education-area/european-universities-initiative_en

² Institutional logics can be thought of as the taken-for-granted norms and rules that combine together to guide behaviours and practices within organisations.

rewarded. The European Commission should bring together and provide support for those universities that have begun to implement open science reforms to recruitment and career progression processes and learn from those universities that have taken the initiative to embed open science in their processes.

2) The European Commission, national research funders and national policy makers should consider the institutionalisation of open science in universities and other research performing organisations as a long term project for which they should provide leadership, co-ordination and sustained legitimation. This will require continued availability of resources for skills development, training, introduction or enhancement of enabling infrastructures and co-ordination at a European level.

3) The European Commission, national policy makers and research funders, universities and other research performing organisations should continue to make reforms to indicators, measures and processes utilised by them in project, programme, researcher and research unit evaluations to ensure these include assessment and evaluation of open science practices. These reforms should include assessment of the extent to which civil society organisations and citizens have been engaged and included in projects and programmes that are focused on strategic or applied research and innovation, as well as the extent to which processes of broad ethical reflection and debate have been meaningfully integrated into research and innovation.

4) The European Commission and national research funders should continue to improve criteria, metrics and methods that underpin research proposal evaluation processes³. Progress has already been made on this in Horizon Europe as regards “engagement of citizens, civil society and end users” within evaluations of methodology under the excellence criterion. Assessments of research proposals should additionally be adapted to include the extent to which there is integration of broad ethical reflection and debate within the core of research and innovation-oriented projects.

5) University ranking organisations should undertake substantial reforms to criteria, metrics and methods that underpin ranking systems for universities in order to reward open science practices.

³ Note that reforms to the research assessment system are the subject of significant policy discussion, with bilateral meetings ongoing between the Commission and stakeholders

1. Introduction: The vision for open science and societal engagement in research and innovation

The European Commission (EC) has a vision for open science in which research is undertaken in ways that are *collaborative* (sharing knowledge, data, workflows and other outputs), *open* (making outputs more visible, accessible and reusable), *responsive* (to the needs, challenges and values of European society) and *participatory* (engaging stakeholders and citizens across the entire research process). Open science aims to share knowledge and tools as early as possible between researchers in different disciplines and with society at large. It includes, but goes well beyond, the concept of open access and open data. In addition to making research cultures more open, it actively seeks to invite and engage stakeholders and citizens from beyond the academic realm into research and innovation processes, for example through public engagement and citizen science. Open science and societal engagement are key elements of the European Commission's vision for a new European Research Area⁴.

Open science is motivated by a desire to improve scientific robustness, validity and reliability (by making research findings and data more reproducible and open to scrutiny), improve research efficiency (by sharing results, making them reusable and leveraging societal capabilities) and increase creativity (through collective intelligence and open collaboration), fostering greater transparency and trust in science by society. It is also motivated by a desire to harness the benefits of digitally-enabled collaboration to catalyse research and innovation that addresses societal challenges and increases European competitiveness.

The European Commission has strong ambitions for open science and societal engagement in research to become common practice across the European Research Area. Universities and other research performing organisations are key locations for this. In order to understand how universities can better enable these ambitions, the European Commission DG Research and Innovation and the European Research Executive Agency convened a one-day workshop on 1 July 2021. The event was attended by delegates from the Science with and for Society (SwafS) 'Institutional Changes' projects funded under Horizon 2020 and the first group of European University Alliances under the European Universities Initiative⁵ funded through the SwafS programme.

The SwafS institutional change projects have piloted, studied and analysed factors that foster the institutionalisation of open science and Responsible Research and Innovation (RRI) in a large number of different research settings. By combining their knowledge and experiences with those of the University Alliances, the workshop aimed to understand how institutionalisation of open science could be enabled in universities. This report draws on discussions and presentations made at the workshop.

The workshop objectives were a) to set in motion networking and mutual learning between the SwafS institutional change projects and the European University Alliance projects; b) to inform the development of a forthcoming policy initiative⁶ of the Commission in support of the transformation of Europe's university sector and c) to provide input into the ERA action for improving the research assessment system⁷. A common underlying aim of these initiatives is to continue to support research performing organisations, including

⁴ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2020%3A628%3AFIN>

⁵ https://ec.europa.eu/education/education-in-the-eu/european-education-area/european-universities-initiative_en

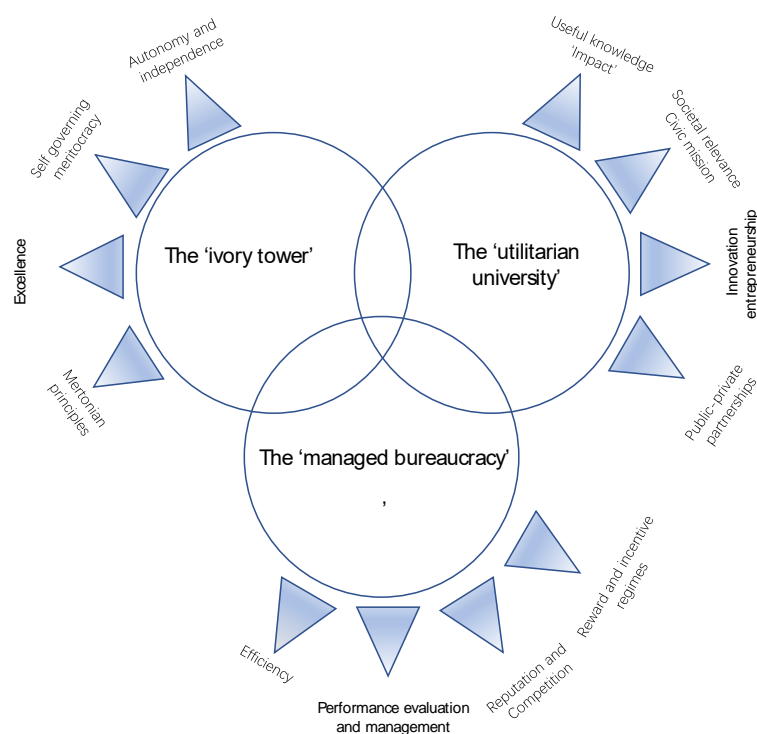
⁶ The policy initiative intends to reinforce synergies between the ERA and the European Education Area with reciprocal benefits for education and R&I, for example through strengthening universities' capacity to deliver high-quality outputs, enhancing the involvement of students and academic staff in research, mainstreaming open science practices, incentivising reforms of research and academic career assessments, promoting knowledge transfer, supporting better exploitation of research results into teaching and innovation and facilitating collaboration in transdisciplinary and intersectoral teams.

⁷ The ERA action on research assessment aims to facilitate and speed up changes so that the quality, performance and impact of research and researchers are assessed on the basis of appropriate criteria and processes that include rewarding open science practices leading to increased quality, efficiency and trust.

universities and other higher education institutions, to transition towards open science becoming the new normal through new and updated institutional arrangements.

2. Alignment of open science with institutional logics in universities

A key insight from the workshop was that the prospects for institutionalising open science are likely to be greater if it aligns with those institutional logics that are present in universities. Participants suggested that if it does not, it may be viewed as being an additional burden, may encounter resistance, or may even present risks for academics (e.g. jeopardising career promotion).



Institutional logics can be thought of as the taken-for-granted norms and rules guiding behaviours and practices within organisations.

A 'logic' usually combines formal elements, such as regulations and reward and recognition policies, with those that are more informal, such as disciplinary publication cultures. In combination these legitimise particular behaviours, cultures and ways of conducting research and innovation that can, over time, become routine and habitual. The dynamics between open science and those logics that are present in universities will influence the extent, nature and success of its institutionalisation.

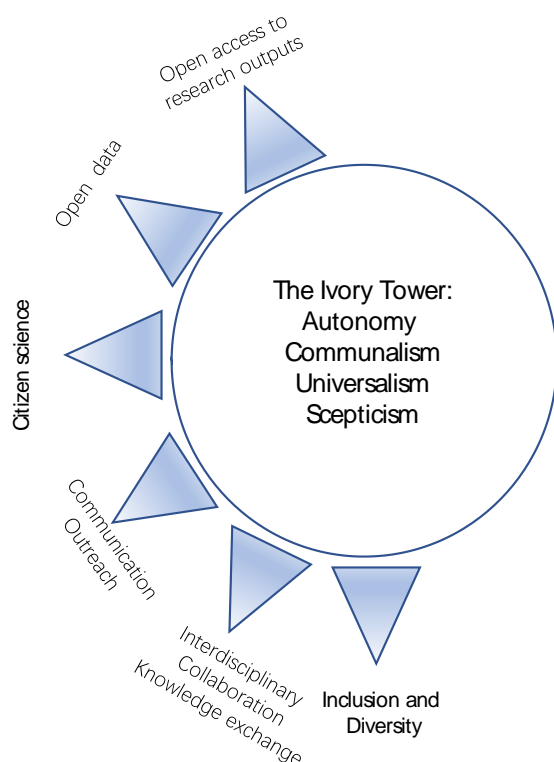
What logics are present in universities and how do these align with open science? Three broad logics can be identified that co-exist in universities in Europe as this relates to research and innovation (Figure above)⁸. These overlap with each other and will vary across different countries in terms of their specifics and emphasis.

2.1 Alignment of open science with the logic of the ivory tower: insights from the workshop

The first of these, the logic of the *ivory tower*, is well known and well established in universities. It is grounded in autonomy and the independence of researchers, who are free to pursue research with the primary aim of producing new knowledge that contributes to our understanding of the natural and social worlds. It can be thought of as 'basic' or 'fundamental' research. Rooted in Mertonian principles⁹, it combines both formal and informal elements that include: the principle of peer review; scrutiny and evaluation through publication; use of impact factors and publication in highly ranked disciplinary journals as proxies for excellence; and codes of conduct, ethics and integrity to ensure robustness, reproducibility and credibility.

⁸ Three logics configuring research and innovation practices in research intensive universities (Figure author's own, adapted from Lepori, (2016) and Shields and Watermeyer, 2018). See also outputs from RES-AGORA, JERRI and RRI Practice projects. Note there is often considerable overlap between these logics. The translation of fundamental, 'basic' research into innovation is for example a major pre-occupation of universities, which have commercial partnership and technology transfer offices and formal mechanisms for spinning out and commercialising new ideas.

⁹ Communalism, Universalism, Disinterestedness, Organised Scepticism



Open science appears to have relatively strong alignment with this logic (Figure opposite). Its motivation to increase scientific robustness and reliability aligns with the existing practice of dissemination through publication to render knowledge open to scrutiny and peer analysis. Open science furthers the Mertonian principle of scepticism – that scientific claims should be disclosed for scrutiny by the academic community. It is also in line with the principle of communalism – that scientific results should be the common property of the whole scientific community – and that results should be shared and made reusable for others to build upon.

Open science's desire to harness digital connectivity to promote greater knowledge exchange also aligns with this logic. It can help researchers bring necessary wider skills and knowledge to bear on their object of study. It can make datasets more widely available to catalyse new research questions. Involving citizens in various forms of citizen science can likewise be seen by some researchers as adding value, for example through the

assisting of data collection and analysis. The desire to make science more gender balanced and inclusive aligns with the Mertonian principle of universalism, i.e. that all scientists can contribute to science regardless of race, gender or culture. The value proposition of open science for those researchers who work within this logic seems clear. It also aligns with the values underpinning the EU's draft 2030 vision for research in European universities¹⁰, with its emphasis on academic freedom with responsibility, excellence, ethics, integrity and trust, transparency, inclusiveness and equity in resource allocation.

While alignment appears strong, workshop participants made a number of suggestions to further strengthen this:

- Reflecting on their experiences of RRI, they highlighted the need for sustained, clear communication by the European Commission to universities in terms of what open science is and what it means in practice for academics.
- Reflecting on other initiatives (for example those promoting equality, diversity and inclusion), they stressed that institutionalising open science in universities would be an endeavour requiring sustained commitment from the EC, together with examples of good practice and impact. It would be conditional on the availability of resources for projects, mechanisms of collaboration and the development of harmonised infrastructures.
- They suggested the need for monitoring and evaluation of open science policies and practices in universities, linked to rewards and incentives. This is important to ensure that universities implement open science in substantive and systematic ways, rather than in ways that are symbolic or detached from the day-to-day processes of research and innovation.

Overall, for fundamental or basic research configured within this logic, participants suggested the strategic focus for the European Commission should be on maintaining effective communication, resourcing and sustained, top-down legitimation through policies, funding and monitoring. Participants suggested that it would involve modifying existing

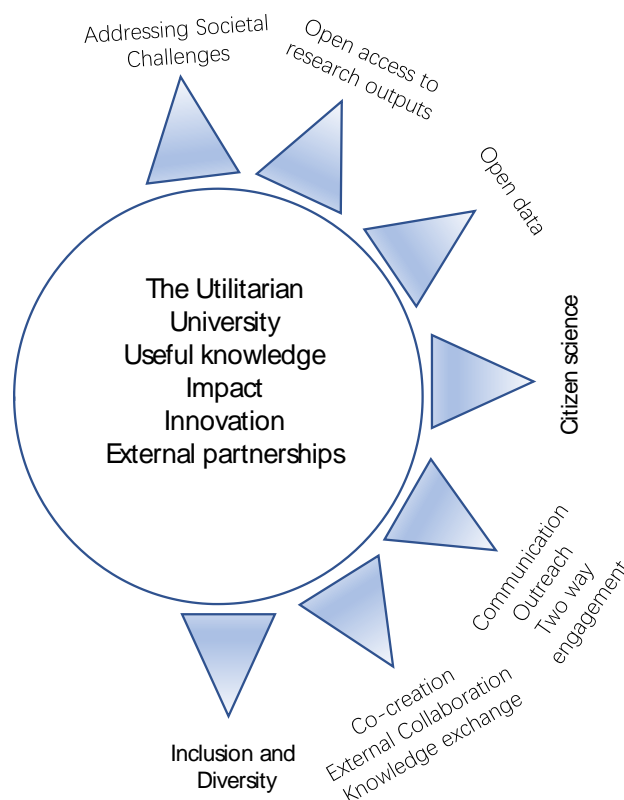
¹⁰ https://ec.europa.eu/info/publications/towards-2030-vision-future-universities-field-ri-europe_en

norms and practices associated with this logic in universities rather than 'fighting to set new norms'.

2.2 Alignment of open science with the logic of the utilitarian university: insights from the workshop

The logic of the ivory tower often co-exists with a second: the logic of the *utilitarian university*. This has become increasingly prominent in universities as national governments (and European policy makers) have looked to universities to valorise the knowledge they produce. This is a logic motivated by a desire for universities to foster economic and social impact as engines of the knowledge economy, as well as to demonstrate greater public accountability. It places emphasis on useful knowledge and innovation. It is a logic that has a history equal to that of the ivory tower, with some universities having a founding mission of service to society and the communities in which they are located. It loosely aligns with what can be thought of as 'applied' research or research that is aimed at meeting strategic policy challenges (e.g. 'net zero') i.e. 'strategic research'. Words associated with it include the 'entrepreneurial university', the 'civic university' and 'engaged research'. It is visible though the plethora of centres for innovation and entrepreneurship, enterprise zones and mission or challenge-driven institutes that have emerged in and around universities. Committed to active external partnership and engagement they are seen as being central to the meeting of societal challenges, regional prosperity, national competitiveness, growth, and, increasingly, the finances of universities themselves. This logic embeds elements that include intellectual property and patenting regimes, partnership and non-disclosure agreements and assessments of impact and societal relevance in national research evaluation exercises.

The logic of the utilitarian university extends and reconfigures a number of elements of open science as these are configured within the logic of the ivory tower (Figure opposite). Collaboration envisaged by open science that is largely between disciplines within the academy is now extended to those outside it. External partners and stakeholders can set or co-create research goals and agendas. There is an emphasis on meeting societal challenges. In the ivory tower, equality, inclusion and diversity relate to diversifying the academy. This is now extended so that citizens, minority voices and civil society groups are actively brought into the research and innovation process. Societal engagement is a two-way, responsive process that goes beyond unidirectional scientific dissemination and communication. Codes of ethics and integrity are extended to include broader reflection and debate on the wider societal and ethical impacts of strategic research and innovation.



Experiences and insights from workshop participants suggest that open science currently only partially aligns with the logic of the utilitarian university. On one hand, there is significant research targeting societal challenges and resources for this provided by funders. A number of these also ask for evidence of economic and social impact in periodic research evaluation exercises, or ask for the potential for this to be articulated in funding proposals by applicants. It is also true that many universities have established mechanisms and resources for engaging with external partners. On the other hand, participants drew attention to tensions between open access and intellectual property regimes, and the limits

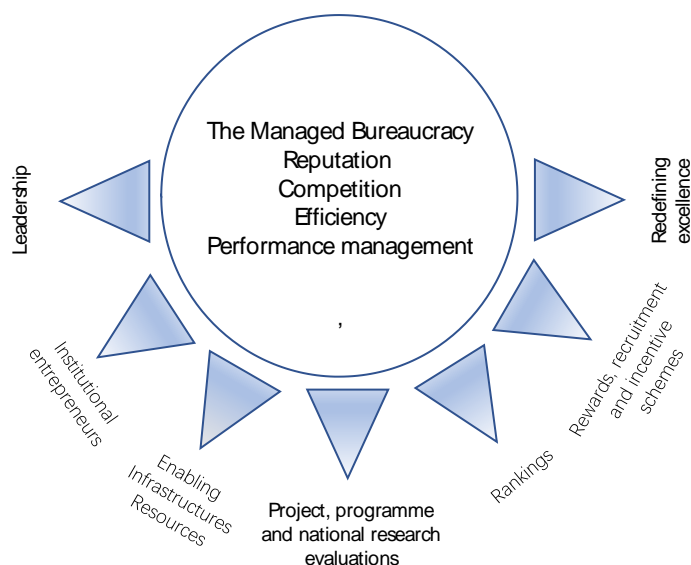
to disclosure of research undertaken with corporate partners. This issue was raised in the report of the Open Science Policy Platform in 2020, which highlighted an 'urgent need for a debate and discussion between academia and industry concerning the open science challenges in public-private partnerships'.

Participants also foregrounded issues of inclusivity and equity relating to the goal of open science to engage and include society in strategic research and innovation. Despite attempts to include civil society and citizens through so called 'quadruple helix' and citizen science models of engagement, those at the workshop drew attention to the overall lack of diversity of external stakeholders involved in strategic research and innovation in universities. This particularly relates to civil society groups and citizens. Likewise, the systematic integration of practices that open up strategic research and innovation to broader ethical reflection and debate is limited in most universities, notwithstanding some important examples of successful experimentation that were noted within SwafS projects.

Workshop participants suggested a need for more radical re-balancing and reconfiguration of this logic in order for it to align with the goals of open science in its fullest sense. This particularly relates to who is currently excluded from – or included in only a limited way – strategic research and innovation in universities. They suggested that the prospects for meaningfully institutionalising open science require more substantive change to how the logic of the utilitarian university is configured in practice. This should be done in ways that are more inclusive, reflexive and beneficial to a wider group of stakeholders. Whilst some universities with a civic mission may already be making strides towards this, for others whose external collaboration is largely limited to corporate and industrial partnerships, this may be more challenging.

2.3 Alignment of open science with the logic of the managed bureaucracy: insights from the workshop

The two logics described above are underpinned by a third: the logic of the *managed bureaucracy*. This is one that manages, supports and resources the other two logics, emphasising bureaucracy, efficiency, centralisation and performance. Its configuration can vary depending on the country in which the university is located and its funding model. In this logic, maintaining and increasing the performance and reputation of the university is key. Reputation is often benchmarked to global rankings which can themselves be supported by metrics that serve as proxies for research quality and excellence. This logic has elements that include periodic evaluations of research in universities, internal performance review and management processes, reward and incentives regimes as well as recruitment and career progression procedures.



Workshop participants suggested the need for *significant reforms to this logic if open science is to become the new norm in universities*. Since this logic combines elements that are both internal and external to universities, reforms to policies and practices both within and beyond universities are needed, for example within the European Commission and national research policy and funding organisations.

Changing the way universities define and manage reputation is key to such reforms. Participants

suggested this links closely to how research quality and impact are defined, measured and evaluated. Reforms to ranking systems, and definitions and measures of research

excellence, quality and impact are a priority. The latter links to European and national research evaluation policies and processes, which should more fully include and support open science values and goals. Addressing these in a harmonised way can ensure a level playing field for universities. Such reforms are likely to have strong influences on practices and behaviours in universities, particularly if these are linked to funding. Participants called for changes across the research cycle, including proposal, project and programme evaluations. They also called for reforms to internal reward and incentive schemes, and processes employed by universities to support recruitment, career progression and performance review and management.

Workshop participants stressed the need to back up these reforms with sustained resourcing of: exemplar projects; initiatives supporting open science experimentation and coalition building within universities; enabling infrastructures to support open science; mechanisms to foster the participation of external actors, particularly for those who are currently under-represented; platforms and networks for open science learning, co-operation and collaboration; and open science ambassadors and change agents within and across universities, both at early career and senior researcher level. History has shown that support for institutional entrepreneurs, backed by visionary leadership within universities and across the sector is crucial for success in institutionalising new agendas such as open science¹¹. Workshop participants drew attention to the sometimes conservative characteristics of those currently leading universities and the need to incentivise more transformative forms of leadership.

3. Open science and societal engagement initiatives and good practices

The European Commission has been supporting open science initiatives over the last decade, but support for many elements of the open science agenda go back decades before this. These include actions relating to RRI, open access, gender equality, ethics, research integrity, and public engagement that have structured and been focal points of the FP7 Science in Society and Horizon 2020 SwafS programmes and others preceding these in successive Framework Programmes. Some elements of open science have also been adopted as policy and implemented in practice¹².

Interim results from a survey of the task force the Joint ERAC (European Research Area and Innovation Committee) Standing Working Group on Open Science and Innovation suggest that national (and regional) policies have been put in place for some elements of open science (e.g. on open access) in many European countries, that many research funders have integrated open science principles and implemented actions, and that several countries mention interactions between open science and research evaluation¹³. The European Commission has made it a mandatory requirement for Horizon Europe beneficiaries to ensure immediate open access to publications, to retain sufficient intellectual property to meet open access requirements, and to produce data management plans in line with FAIR principles. This extends and builds on important European open access initiatives (these include the 2003 Berlin Declaration¹⁴, Plan S¹⁵, and the Principles on Open Access to Research Publications produced by Science Europe¹⁶).

The European Commission has also supported a number of important initiatives aimed at addressing some of the specific areas for reform raised by workshop participants. These include those aimed at reforming researcher incentives and rewards regimes and those aimed at adapting processes for assessment of researchers, research units, research projects and proposals. Substantial progress has been made on proposal assessment within

¹¹ Owen et al (2021) [Organisational Institutionalisation of Responsible Innovation](#).

¹² See 2019 SPARC Europe survey ([Insights into European research funder Open policies and practices | Zenodo](#))

¹³ See also: <https://op.europa.eu/en/publication-detail/-/publication/6e5718ef-f179-11ea-991b-01aa75ed71a1/language-en/format-PDF/source-195578549>

¹⁴ <https://openaccess.mpg.de/Berlin-Declaration>

¹⁵ <https://www.coalition-s.org/why-plan-s/>

¹⁶ <https://www.scienceeurope.org/our-resources/principles-on-open-access-to-research-publications/>

Horizon Europe as regards engagement of citizens, civil society and end users as an evaluated part of the methodology under the excellence criterion. In terms of rewards and recognition, the Open Science Working Group on Rewards was created to further this, publishing an Open Science Career Assessment Matrix in 2017¹⁷.

In 2018, the European Commission recommended that Member States set and implement clear policies to reward a culture of collaboration and of sharing of knowledge and data¹⁸. In 2020¹⁹, the European Commission set out as a strategic objective the improvement of the research assessment system, and the Council Conclusions on the new ERA²⁰ encouraged the EU Member States and stakeholders to support and implement open science practices in their assessment systems and to strengthen their European coordination. The Research Data Alliance is currently creating a global registry of pilots and examples of good practice aimed at reforms of reward and recognition regimes²¹. Reforms to how research excellence and quality are defined, measured and evaluated have been a recognised issue for some time, at least since the 2012 DORA declaration²², the Leiden Manifesto²³ and the publication of the Metric Tide on responsible use of metrics in 2015^{24,25}.

There are also signs that some universities are considering and even implementing reforms to their recruitment, reward and recognition policies and processes to integrate and foster open science. The decision by Utrecht University in the Netherlands to change its reward and recognition policy to embrace an open science agenda is one recent example; their decision can be seen in the context of reforms to the external research policy environment in the Netherlands²⁶, where changes to the Dutch Standard Evaluation Protocol for universities have been made. Other promising examples of universities and other research performing organisations that have started to reform their own assessment systems are illustrated in several case studies²⁷ identified by DORA.

The European Commission has also supported initiatives aimed at creating supporting infrastructures and enabling environments for open science, which was an issue raised by many workshop participants. This includes support for FAIR principles for open data²⁸, the European Open Science Cloud²⁹ and initiatives aimed at enabling open access (e.g. OpenAIRE³⁰, Open Research Europe publishing platform³¹). Specific initiatives within the European university alliances and a number of EU SwafS projects aimed at institutionalising open science and RRI are presented in Annexe 1 as illustrative examples.

¹⁷ <https://op.europa.eu/en/publication-detail/-/publication/47a3a330-c9cb-11e7-8e69-01aa75ed71a1>. See also the European Universities Association 2019 Open Science and Access Survey (<https://eua.eu/resources/publications/888:research-assessment-in-the-transition-to-open-science.html>)

¹⁸ [Commission Recommendation \(EU\) 2018/790 of 25/04/2018](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32018L0790)

¹⁹ [Commission Communication COM\(2020\) 628 of 30/09/2020 on a new ERA + Council Conclusions on the new ERA of 01/12/2020](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32020C0628)

²⁰ <https://data.consilium.europa.eu/doc/document/ST-13567-2020-INIT/en/pdf>

²¹ openscienceregistry.org

²² <https://sfdora.org/>

²³ <http://www.leidenmanifesto.org/>

²⁴ [Metric Tide - Research England \(ukri.org\)](https://www.research-ukri.org/metric-tide/)

²⁵ See also the recent SciCV initiative by the Swiss National Science Foundation where a new format for researcher CVs in grant applications in medicine and biology, which will no longer include any journal-based metrics, such as Journal Impact Factors, as a surrogate measure of the quality of individual research articles (<https://www.snf.ch/en/LSM3H14z1Fk295tT/news/news-200131-sciCV-snsf-tests-new-cv-format-in-biology-and-medicine>)

²⁶ [Drive change in recognition and reward of academics | NWO](https://sfdora.org/dora-case-studies/)

²⁷ <https://sfdora.org/dora-case-studies/>

²⁸ <https://www.go-fair.org/fair-principles/>

²⁹ https://ec.europa.eu/info/research-and-innovation/strategy/strategy-2020-2024/our-digital-future/open-science/european-open-science-cloud-eosc_en

³⁰ <https://www.openaire.eu/>

³¹ <https://open-research-europe.ec.europa.eu/>

4. Policy recommendations

Open science appears to align reasonably well with the logic of the ivory tower that configures 'basic' or 'fundamental' research in universities. For this mode of research, the European Commission should continue to build on those ongoing initiatives aimed at reforming incentives and rewards, criteria used for the evaluation of research and recruitment and career progression assessment regimes in universities that are described in the previous section. This should include changes to requirements in grant proposals and project evaluations³² to reward and promote societal engagement, open access, and FAIR and open data practices. It should also continue to support collaboration and the sharing of tools and initiatives aimed at promoting diversity and gender equality in research.

There is less current alignment of open science with research that is strategic, applied or innovation-oriented. Significant reforms to the logic of the utilitarian university are needed if open science is to become the norm in universities in its fullest sense. Collaborative practices currently favour the *disproportionate inclusion of corporate and industrial external actors* in the agendas and processes of research and innovation at the expense of minority voices, civil society and third sector organisations (i.e. organisations that are neither private nor public sector, and which often have a non-profit character) and citizens at large. This is an issue of inclusion, diversity and equity that open science does not sufficiently address at present. More assertive policies and significant resource provision are required to address and rebalance this. *Significant reconfiguration of current European Commission and national funders policies, funding schemes and evaluation processes* are needed to foster and reward *far greater inclusion and diversity in terms of stakeholders and citizens in strategic research and innovation*.

Open science seeks to promote science and innovation that is underpinned by openness and a strong ethical orientation. However, despite some good examples, research and innovation in universities *does not systematically integrate and embed* capacities for broad, ethical reflection on their potential wider impacts, risks and consequences on society and the environment. Open science is not currently configured to open up strategic research and innovation to broader reflection and deliberation in an integrated, systematic and responsive way. Experiences from RRI projects suggest that where this does happen it may be transient and insufficiently integrated into the core technical work of projects or national and regional R&I policies.

Workshop participants suggested that there is a need for substantial reforms to the managerial logic in universities if open science is to become the new norm. *Reforms to definitions and measures of research quality and impact are needed*, in particular for applied and strategic research and innovation. There is also an urgent need to *reform indicators and measures of research performance and reputation*, of which *reforms to university ranking systems are a priority*.

Such reforms should be *sector wide (i.e. across the European higher education sector and European Research Area)* to ensure a level playing field for research performing organisations and researchers.

1) Universities and other research performing organisations should make reforms to criteria, metrics and processes supporting researchers' recruitment and career progression in order to reward open science practices. As part of these reforms, the extent to which civil society organisations and citizens have been engaged and included in strategic or applied research and innovation should be specifically assessed. Likewise, the extent to which processes of broad ethical reflection and debate have

³² This is a reform specifically highlighted by the task force of the Joint ERAC Standing Working Group on Open Science and Innovation in its June 2021 Working Paper, in which they state 'The way research evaluation is currently conducted in Europe constitutes one of the main barriers to any solid transition to Open Science'.

been meaningfully integrated into research and innovation should be assessed and rewarded. The European Commission should bring together and provide support for those universities that have begun to implement open science reforms to recruitment and career progression processes and learn from those universities that have taken the initiative to embed open science in their processes.

2) The European Commission, national research funders and national policy makers should consider the institutionalisation of open science in universities and other research performing organisations as a long term project for which they should provide leadership, co-ordination and sustained legitimisation. This will require continued availability of resources for skills development, training, introduction or enhancement of enabling infrastructures and co-ordination at a European level.

3) The European Commission, national policy makers and research funders, universities and other research performing organisations should continue to make reforms to indicators, measures and processes utilised by them in project, programme, researchers and research unit evaluations to ensure these include assessment and evaluation of open science practices. These reforms should include assessment of the extent to which civil society organisations and citizens have been engaged and included in projects and programmes that are focused on strategic or applied research and innovation, as well as the extent to which processes of broad ethical reflection and debate have been meaningfully integrated into research.

4) The European Commission and national research funders should continue to improve criteria, metrics and methods that underpin research proposal evaluation processes³³. Progress has already been made on this in Horizon Europe as regards “engagement of citizens, civil society and end users” within evaluations of methodology under the excellence criterion. Assessments of research proposals should additionally be adapted to include the extent to which there is integration of broad ethical reflection and debate within the core of research and innovation-oriented projects.

5) University ranking organisations should undertake substantial reforms to criteria, metrics and methods that underpin ranking systems for universities in order to reward open science practices.

³³ Note that reforms to the research assessment system are the subject of significant policy discussion, with bilateral meetings ongoing between the Commission and stakeholders

Annexe 1: Highlights from participants on open science initiatives

1) Examples of ambitions of the European University Alliances projects (pilot 1)

17 European University Alliances (pilot 1) projects³⁴ partook in the event. Three of the 17 projects made presentations in view of their particular focus on the event's themes: open science practices (ARQUS R.I. and TORCH) as well as the involvement of citizens, civil society and public/cities authorities in Research and Innovation (SMART-ER).

[TORCH](#)³⁵ intends to develop an Open Science Community dashboard and a CHARM-EU toolkit. The CHARM-EU European University Alliance monitors its open science pillars: open access, infrastructural support, data management policies, research integrity codes, experience of open science advocacy, training and skills provision, rewards and incentives.



[ARQUS R.I.](#)³⁶ focusing on open science skills and training materials as well as research assessment skills intends to establish an open science ambassador network. The Arqus alliance will produce a position paper on open science (expected 2022).



The Arqus Academy is a joint Alliance body offering a wide range of shared face-to-face (f2f), blended and virtual opportunities for student learning, doctoral education, staff development and societal outreach, and their certification. It is created to act as an overarching coordinating body for all learning and staff development activities and their certification.

The Arqus Academy itineraries and contents will be both disciplinary, where appropriate, but also go beyond traditional discipline-based approaches to address matters relating to inclusion; sustainable development goals; entrepreneurship, transversal and forward-looking competences; language and intercultural competence; all these through the innovative methodologies of work-based learning; service learning; research-based learning and mentoring programmes.

³⁴ Arqus R.I., CIVICA RESEARCH, EDUC-SHARE, EPICUR-Research, EU4ART_differences, EU-CONEXUS-RFS, EUGLOHRIA, EUTOPIA-TRAIN, FIT FORTHEM, reSEArch-EU, RIS4CIVIS, SMART-ER, TORCH, TRAIN4EU, Una.Resin, UNITE.H2020, YUFERING

³⁵ <https://www.charm-eu.eu/torch>

³⁶ <https://arqus-alliance.eu>

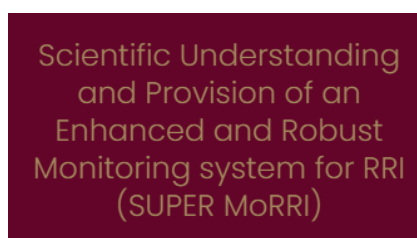
The ECIU [SMART-ER](https://www.eciu.org/smart-er-for-researchers)³⁷ university project, is developing guidelines and a toolbox for public engagement practice. It will also create an online community for citizen science. The SMART-ER Academy will offer a novel approach in training and equipping researchers as well as other research staff with open science skills.



2) Examples of SwafS projects supporting the research community to implement institutional changes

Three projects, each with a unique focus, presented their offerings.

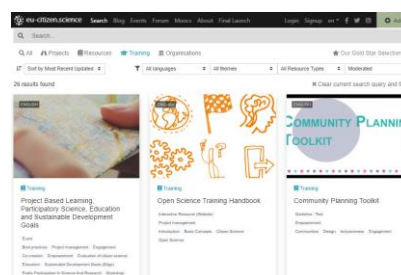
[SUPER MoRRI](#) is committed to developing a monitoring and evaluation system for Responsible Research and Innovation (RRI). To support this process in a co-creative way, the project is facilitating a SwafS ecosystem consisting of 53 projects currently and convenes monthly meetings to exchange on RRI matters. The SUPER-MoRRI dashboard for RRI / open science, which will make publicly available monitoring and indicator data on RRI across Europe, is currently under development.



[ROSiE](#) is establishing a community of practice for open science stakeholders. To this end, the project intends to develop a knowledge hub and a cross-SwafS stakeholder forum for responsible open science.



The [EU-Citizen.Science platform](#) is an online platform for sharing knowledge, projects, tools, training and resources for citizen science – by the community, for the community.

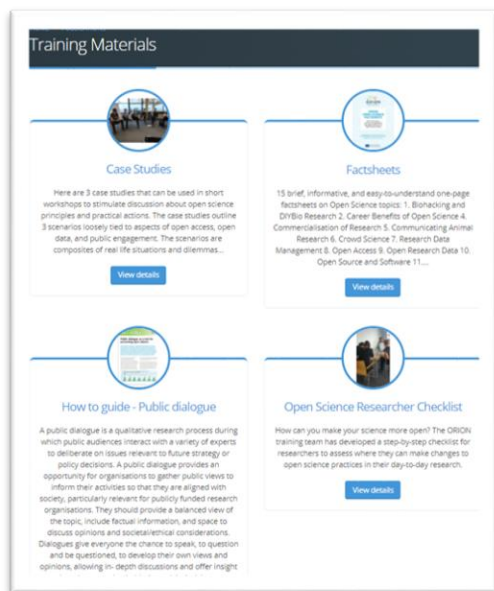


³⁷ <https://www.eciu.org/smart-er-for-researchers>

3) Examples of SwafS projects dedicated to implementing Responsible Research and Innovation (RRI) in Research Funding and Performing Organisations (RFPOs)

16 RRI participating projects dedicated to implementing institutional changes in beneficiary RFPOs presented in brief their project and the outline below focuses on their offerings.

The [ORION](#) open science project is exploring ways to trigger institutional and cultural changes to 'embed' open science in research funding organisations in life sciences and biomedicine.



ORION developed a range of [training resources](#) for open science and designed tools for co-creation experiments: (i) research strategy and funding, (ii) identifying risks and opportunities presented by disruptive technologies, and (iii) citizen science in fundamental research. A [booklet](#) of inspiring stories captures the "EUREKA moment" and highlights successes and learnings from activities conducted during the project.

The [NUCLEUS](#) project produced a [Hands on Guide: Consolidated Operational Recommendations and Guidelines for Implementation](#) that summarises practical and policy aspects of RRI implementation for research managers and administrators, university leaders and funding providers. A [compilation of case studies](#) and a [lessons learned brochure](#) illustrate how dedicated units established RRI in the culture and structure of their institutions.



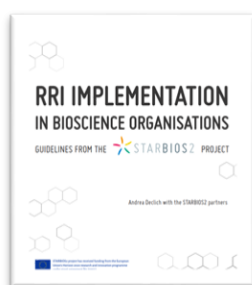
The [FoTTRIS](#) project developed and introduced new governance practices to co-create transdisciplinary Responsible Research and Innovation (co-RRI) project concepts. Five dedicated organisations - [competence cells](#) - were developed to bring FoTTRIS's results into practice. An [online collaboration platform](#) and its step-by-step [RRI 'Cookbook'](#) are the key elements of this project's legacy.



The [PROSO](#) project aimed to foster the engagement of citizens and 'third sector organisations', notably non-governmental organisations (NGOs) and civil society organisations (CSOs), in Europe's research and innovation processes across three domains of research and innovation: nanotechnology, food and health, and the bio-economy. The [PROSO Support Tool](#) promotes engagement of citizens and third sector actors in research and innovation policy.



The [STARBIOS 2](#) project produced action plans geared to putting in place structural changes in one or more of the RRI dimensions in partner institutions, all active in the field of the biosciences. The project developed [guidelines](#) and a model for RRI implementation in bio-science organisations as well as suggestions for [Mainstreaming RRI in biosciences and beyond](#).



The [JERRI](#) project implemented institutional changes in research technology organisations, Fraunhofer and TNO.

It produced a [deep institutionalisation framework for RRI](#), an open research data repository and launched an open access communication platform.



The [RRI-Practice](#) project aimed to understand the barriers and drivers of successful implementation of RRI and to identify and support best practices to facilitate the uptake of RRI in organisations and research programmes through its activities in 23 research organisations worldwide. To this end, the project delivered [12 national reports](#), [two comparative reports](#) and a [Handbook for Implementing RRI](#). Building on the project's [Policy recommendations](#), RRI-Practice, together with the NUCLEUS project, initiated the '[Joint Declaration on Mainstreaming RRI across Horizon Europe](#)'.



[FIT4RRI](#) focuses on the training of RFPOs through workshops. The co-creation experiments and training and content mapping done under the FIT4RRI project, include valuable contributions to a [RRI toolkit](#) and guidelines on governance settings for RRI / open science.

The following more recent projects are working on institutional change initiatives with various specificities:



[GRACE](#): focusing on developing RRI roadmaps, produced a reflection tool for RRI and institutional change initiatives in research performing and funding organisations.



[GRRIP](#): focuses on embedding RRI practices through action plans in marine and maritime Research Funding Organisations (RFOs) and Research Performing Organisations (RPOs).



[ETHNA System](#) will develop and implement an ethics governance system for grounding good practices in RRI in higher education and funding and research centres. It will produce a code of ethics and good practices in R&I for use by RPOs and RFOs.



[RESBIOS](#) focuses on biosciences organisations and intends to produce codes of conduct, tools for supporting RRI sustainability and other educational tools.



[Co-Change](#) centres on the concept of change labs to generate transformative capacity for institutional change in terms of practices, procedures, rules and norms and will produce RRI self-evaluation and impact assessment as well as a toolbox.



[INCENTIVE](#) is dedicated to establishing citizen science hubs and seeks to deliver guidance for European and international research institutes on how to create and operate their own hubs.



[TIME4CS](#) aims to support and facilitate the implementation of sustainable institutional changes in RPOs to promote citizen science and public engagement (citizens and citizens associations) in science and technology.



[JOINus4HEALTH](#): will produce a digital platform dedicated to engaging with citizens on health research.

4) Takeaways from presentations on themes of the event:

`Changes needed in universities for public engagement and citizen science'³⁸

- Institutional adoption of citizen science is a process not a revolution;
- Link to a similar institution that already developed capabilities, and make use of their knowledge and experience;
- There is a growing body of knowledge and guidance in networks such as European Citizen Science Association (ECSA) that is worth tapping into.

`Methods and good practices for involving public/cities authorities'³⁹

- In-depth analysis of the context as starting point (no one-size-fits-all solution). RRI place-based implementation should be adapted to the specific regional framework;
- Show the added value of societal engagement;
- Strong need for capacity building and sharing of experiences.

`Methods and good practices for involving citizens and civil society'⁴⁰

- Shape participatory processes revolving around the added value that citizens can bring;
- Plan and perform accountable and transparent citizen engagement processes;
- Involve citizens beyond the consultation phase (medium and long-term engagement);
- Promote strong vision and contribution to the public good.

³⁸ Muki Haklay, Extreme Citizen Science research group, University College London

³⁹ Marzia Mazzonetto, Stickydot

⁴⁰ Idem

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This report presents insights and recommendations from a workshop held on 1 July 2021 attended by beneficiaries of the Science with and for Society (SwafS) Responsible Research and Innovation institutional change portfolio of projects funded under Horizon 2020 and the initial group of European University Alliances under the European Universities Initiative that received funding under the SwafS programme. Participants discussed how open science and societal engagement could be enabled to become the norm in research performing organisations across the European Research Area, with a particular focus on universities.

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