

SHAKING UP SCIENCE AND SOCIETY RELATIONS

**POLICY
RECOMMENDATIONS
FROM THE SPARKS
PROJECT**

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HELEN
ANHAO
FERREIRA
OLIVEIRA

SPARKS

RETHINKING INNOVATION. TOGETHER.

The Board of Trustees of the Science Museum

This document puts forth five key policy recommendations from the Sparks project. European, national and regional policymakers are invited to reflect on how they can be integrated into policy and implemented on the ground.

The recommendations were drafted by the Sparks consortium and validated by 150 participants of the project's final Forum.

ABOUT SPARKS

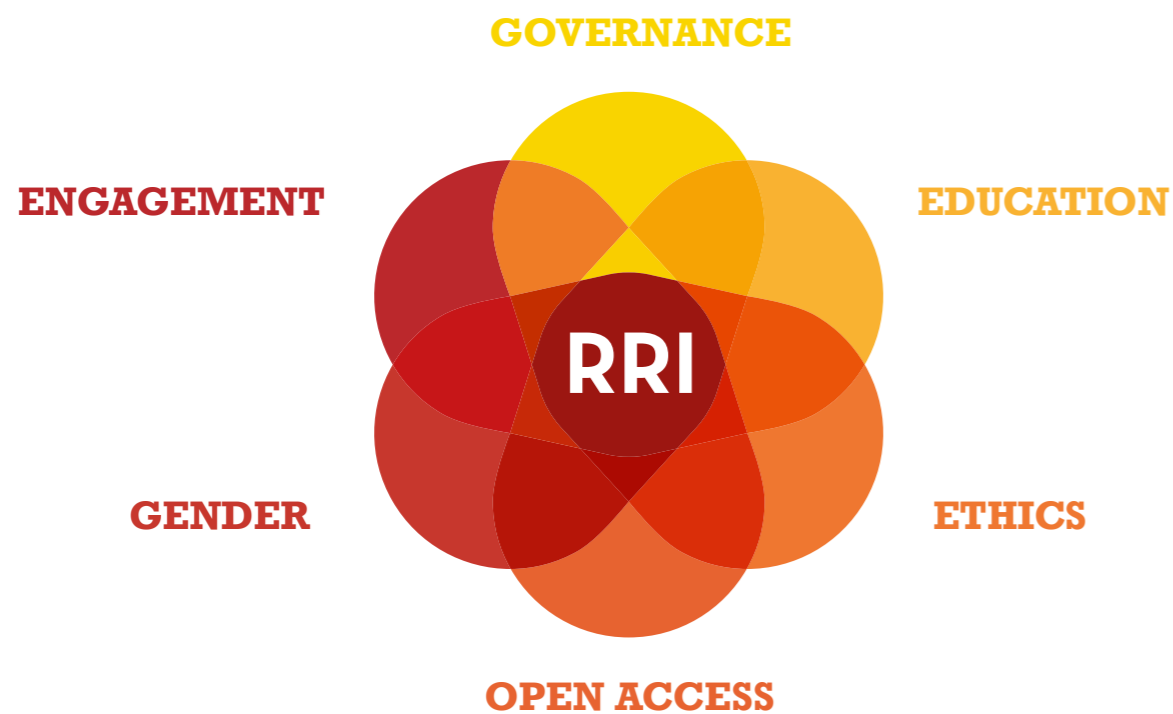
Sparks is an awareness-raising project that shows Europeans from all walks of life that they can get involved in science and that various stakeholders share the responsibility for research and innovation. Taking place across 29 European countries, Sparks bridges the gap between the super-fast pace of scientific innovation and society through a unique touring exhibition and over 230 participatory activities.

VALUES OF RESPONSIBLE RESEARCH AND INNOVATION

According to the European Commission, Responsible Research and Innovation (RRI) means that *'societal actors work together during the whole research and innovation process in order to better align both the process and its outcomes, with the values, needs and expectations of European society'*¹ In a broader sense, RRI is *'taking care of the future through collective stewardship of science and innovation in the present.'*²

RRI and its novel governance models have redefined the relationship between society and the research and innovation system, requiring new forms of public engagement. Alongside science centres, science museums and science shops, new spaces such as makerspaces and fablabs are opening up the relationship between non-experts and other stakeholders. Their activities include **"citizen science"** and **"DIY science"** that are featured in the Sparks exhibition 'Beyond the Lab'.

The Sparks policy recommendations embrace the RRI values, with a particular focus on inclusive engagement as a central means of ensuring that societal voices are represented within the research and innovation process.



¹ EC (2012): Responsible Research and Innovation. Europe's Ability to Respond to Societal Challenges. European Commission, Brussels.

² Stilgoe, J.; Owen, R. & Macnaghten, P. (2013): Developing a framework for responsible innovation, Research Policy, 42, pp.1568-1580.



Photo: Beyond the Lab at AHHA Science Centre

SPARKS POLICY RECOMMENDATION 1: INSPIRE

Create inspiring contexts and opportunities to stimulate citizens' desire to engage in science.

Photo: DIY Biologist © Angela Moore



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Visitors were very energized by the novelty of all the stories. Beyond the Lab comes with an extremely positive outlook on the future and is a very empowering exhibition.

Sparks Local Organiser - Norrköping
Visualization Center, Sweden

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RATIONALE

The desire to learn about science should be driven by people's innate curiosity, originating from their interests. Citizens will show interest towards issues that are tangibly linked to their everyday lives – for example, pollution, food or health. These issues also correspond to Europe's urgent societal challenges. Cultivating people's interest in science allows them to engage in dialogue with research and innovation and empowers them for more **democratic participation**. Europe cannot achieve excellent science without **excellent education** and **critical thinking**. These skills will enable citizens to contribute responsibly to their communities and take ethical choices in scientific, political and democratic contexts.

RECOMMENDED ACTIONS

A. Encourage critical thinking

- The European Commission should ensure that **critical thinking** is among the **key skills** at the core of European Education Area to be implemented by 2025.
- National and regional level policymakers should ensure that critical thinking is a key skill at the core of school curricula. Tools such as documentaries, exhibitions and interactive activities engaging researchers should be used to provide emotional incentives for lifelong learning of these skills.
- Policymakers at all levels should support more initiatives to better integrate the **informal and formal** components of **learning**.

B. Missions for public engagement

- The European Commission should exploit the new mission-embedded structure of Horizon Europe (2021-2027) to put public engagement at the heart of the funding programmes, where the **missions serve as hooks that citizens can relate** their everyday lives to.
- Public engagement in science must be recognised as an integral part of the R&I system.

C. Promote models of inclusive research and innovation that is responsive to societal needs

- At all levels, from regional to European, projects and actions that show evidence of involving a wide range of stakeholders, including citizens should benefit from public funds.
- Arts are an interesting entry point to stimulate **curiosity in scientific topics**, spur critical thinking among citizens on societal issues: all levels of policy making should support multidisciplinary projects and initiatives that integrate an arts/science/technology dimension.

D. Support exchange of good practices

- The EU's Research and Innovation Framework Programmes should support:
 - the exchange of good practices on how to inspire citizens to participate in the research process (e.g. dedicated events, a platform of dialogue, online space to share information among European funded projects dealing with public engagement);
 - pan-European coordination and support projects inspiring citizens to get involved in science through innovative transdisciplinary approaches;
 - new approaches such as hackathons to inspire people to engage in innovation;
 - awards, such as a **European Capital/Region of Science Award** to shape people's scientific spirit and science-conscious identity.

THE SPARKS EXPERIENCE

Sparks created **an inspiring context**, where citizens' interest and curiosity for science was sparked by a theme they can easily relate to: **technological shifts in health and medicine**. Sparks' Europe-wide touring exhibition (**Beyond The Lab**) was visited by over a million citizens. The exhibition showcased empowering stories of individuals impacting R&I together with case studies of local research projects being carried out in a responsible way. The exhibition was accompanied by **innovative participatory activities** with multi-stakeholder groups involved in local partnerships. Our evaluation shows that:

- Responses to the exhibition survey reflect that the exhibited stories and artworks presented a high relevance for the viewers, being able to stir their thoughts and generate dialogue.
- More specifically, 90% of respondents agreed that Beyond The Lab had a thought-provoking presentation and found the topic relevant to them.
- The **opportunity to engage with experts** and the relevance of the topic were shown to be key triggers for citizens to participate in future events.
- Hackathons were a particularly effective tool to engage people in the concept of innovation.

SPARKS POLICY RECOMMENDATION 2: DIVERSIFY

Broaden citizen participation, including hard-to-reach, diverse and marginalised groups by fostering new, innovative collaborations among stakeholders that do not typically engage in research and innovation.

Photo: Anouk Wipprecht Ars Electronica by Florian Voggeneder

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Most visitors were very surprised to discover that people with no background in medicine and/or engineering started to make incredible inventions that helped them and others to live better with their diseases. Many visitors underlined that this was the key message of the exhibition and also that motivated them to also get involved.

Sparks Local Organiser - Luxembourg
Science Centre, Luxembourg

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RATIONALE

European citizens are demographically **extremely varied** in terms of age, culture, accessibility, language, education, socio-economic background, ethnicity, religion, gender identity, sexual orientation and many others. When citizens are engaged in research and innovation, care must be taken to ensure this diversity is respected and represented so that **R&I is rooted in the societal needs of all**, and not only in those of **privileged** groups. **Unconventional and transdisciplinary collaborations**, such as those between **artists and scientists**, are an effective way to trigger interest and provide fresh perspectives on ways of engaging the public in science - increasing acceptance and facilitating the understanding of science and innovation.

RECOMMENDED ACTIONS

A. Identify and engage underrepresented groups

- The EU's R&I Framework Programmes should:
 - explicitly promote inclusion and outreach in science throughout their R&I actions;
 - map and lead actions that address and involve groups currently underrepresented in research and innovation.

B. Set up transdisciplinary multi-stakeholder local partnerships

- The EU's R&I Framework Programmes should:
 - use the expertise of science engagement organisations to support the establishment of **local partnerships** and mobilise Civil Society Organisations with a diverse range of stakeholders **including the arts** (visual, performing, literary and applied) for public engagement in science;
 - link this process to the existing **innovation ecosystems at the regional level**.

C. Promote societal outreach

- **Researchers** and other individuals engaged in research and innovation should be rewarded in their career path for their **societal outreach** and engagement with the public.
- Promote and use **interface/bridging organisations and facilitators** to reach out to underrepresented audiences in science engagement activities.
- **Audience development strategies** of both scientific and artistic centres or museums should integrate an arts and science dimension.

THE SPARKS EXPERIENCE

The Sparks exhibition reached underrepresented groups through, among other means, **the use of art as an entry point**. Sparks demonstrated innovative products and services stemming from a diverse range of **citizen-scientist interactions** through exhibition stories, local case studies, artworks and local partnerships. Local organisers built **multi-stakeholder, transdisciplinary local partnerships** to organise the innovative participatory activities. Key findings included:

- One of the most significant success factors in the activities was the fact that experts came from different backgrounds, representing diverse points of view and

stimulating the conversation from various angles.

- The Reverse Science Café is a particularly suitable format to stimulate research professionals to engage with diverse societal actors.
- The local display in the exhibition encouraged Sparks partners to think creatively. They had to find and engage local partners taking a people-centred, inclusive and responsible approach to R&I.
- The **art pieces** in the exhibition often served as **mediator between the public and science**. It was important to present the artworks as equal to the science stories, making sure links between the two were visible to the visitors.

SPARKS POLICY RECOMMENDATION 3: EMBED

Encourage and incentivise organisations, networks and individuals to embed public engagement into their policies and practices.

Photo: Engagement exercise at Sparks Final Forum



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The Sparks project has provided a great opportunity for ESSRG to establish domestic partnership relations through a series of participatory activities. We had some very interesting discussions with experts and citizens [during Science Espressos and a Citizen Science workshop] which led to formulating conclusions and steps forward to progress from an RRI perspective.

Sparks Local Organiser
ESSRG, Hungary

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RATIONALE

There are numerous examples where science engagement is used in order to address societal needs of research and innovation processes. The challenge now is to move towards a **systemic approach** where these practices are deeply **embedded in the mindsets, practices and policies** of all actors in the research and innovation process. The sustainability and scaling-up of public engagement are only feasible if they are fully acknowledged and incorporated both at individual and organisational levels.

RECOMMENDED ACTIONS

A. Support the embedding of public engagement in science

- The EU's R&I Framework Programmes should:
 - strengthen its continued support for cooperation among European networks of stakeholder groups in order to ensure research and innovation actions engage multiple actors on the long term;
 - focus on **training, capacity building and twinning programmes** for actors in research and innovation to embed a public engagement approach throughout their institutions;
 - support the creation of a **Public Engagement Champion label** to reward those institutions that can show evidence of embedding public engagement in their operation and policies and which can serve as an advantage during project proposal evaluation.
- The **European Commission** should widen their expert **advisory groups with credible and legitimate organisations and networks** to better respond to societal needs.
- Policy makers at all levels should build on the Sparks experience and make use of **participatory techniques** during the **design and implementation of their Smart Specialisation 2.0 strategies**.
- Research projects at all levels should show that public engagement has been considered and the approach articulated.

B. Make public engagement in science sustainable

- Policymakers at all levels should strongly support **public-private partnerships** that include public engagement, making use of methodologies such as those in Sparks. The European Commission should propose a **multi-stakeholder approach to innovation** as part of its holistic **Industrial Policy Strategy** that goes beyond social entrepreneurship and CSR to embed public engagement across Member States.

THE SPARKS EXPERIENCE

Sparks has **developed and widely tested techniques** that could be exploited in participatory and transdisciplinary processes, such as Reverse Science Café, Incubation Workshops, Scenario building activities, Pop-Up Science Shops and Science Espressos. **The analysis shows that organisers are largely keen to run similar events in the future.**

All Sparks' partners started the project by building **local partnerships** of different kinds of stakeholders. Many of them reported that this experience laid grounds for

long term collaborations and projects that go way beyond Sparks. Sparks sets a precedent for public engagement in science to be rolled out more broadly using local partnerships as hubs.

Having a common local challenge (building the local case studies together) allowed local actors to reflect on public engagement and citizen science in their countries and how it could be more deeply embedded. Similar input as part of the Reverse Science Café and conferences in Brussels also played a key role in this reflection.

SPARKS POLICY RECOMMENDATION 4: MAXIMIZE

Exploit and maximise the existing dynamics and resources of science museums, science centres, science Shops and other such institutions as spaces for public engagement and citizen science.

Photo: Michał Boni at Sparks Forum © Reimar Ott



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Medical students have now been involved in developing a new school programme on medicine and mental health in AHHAA. During the scenario workshops the medical students indicated that they got many new insights from the public that they would like to look into during their future studies and research.

Sparks Local Organiser
AHHAA Science Center, Estonia

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RATIONALE

Science museums, science centres and science shops have proven successful as trusted hubs for interaction among R&I stakeholders with expertise in public engagement. A **welcoming and inclusive environment** with **professional facilitators** is key in the process. To spark real societal engagement in research and innovation and to ensure that research has a true societal impact, Europe must capitalise on these existing institutions that offer a space for this process and possess the right capacity and skills.

RECOMMENDED ACTIONS

A. Support existing spaces:

- The EU's R&I Framework Programmes should
 - ensure continued strong support for the **locally-embedded work of science museums, science centres and science shops** to strengthen their position as spaces for engagement in solid alliance with other R&I stakeholders, particularly with local and regional administrations.
 - strongly support the work of science museums, science centres and science shops as actors in capacity building in science engagement for R&I stakeholders.

B. Share best practices

- The EU's R&I Framework Programmes should
 - support projects that develop **places for experimentation and frugal innovation** such as science centres and museums, science shops, art spaces, living labs, makerspaces and fablabs whose potential for public engagement has not been fully exploited and which are currently in a policy vacuum;
 - support projects **encouraging crossovers between traditional STEM disciplines and SSH** (Social Science and Humanities) and CAD (Creative Arts and Design);
 - strongly support the **sharing and rollout of best practices** among science museums, science centres and science shops in order to consolidate their role within public engagement and citizen science.

C. Focus on local/regional dimension

- Local and regional administrations should delegate a **clear mandate to public engagement institutions**. The institutions taking up this role should be **adequately resourced for long-term projects**.

D. Invest in skills development

- The local partnerships should ensure spaces for public engagement are staffed with skilled facilitators. Investment in their training should be included in human capital operational programmes or equivalent.

THE SPARKS EXPERIENCE

The Sparks project developed and validated several transferable techniques, cultivating 'hotspots' that grow and spread.

Its activities proved that science centres, science shops, community labs, maker/hackerspaces and FabLabs, where grassroots innovations take place, also provide ideal spaces for public engagement.

Sparks' new, innovative participatory activities significantly **developed skills within the host organisations**.

- 75% of visitors of the Beyond the Lab exhibition and 82% of participants in Sparks activities agreed that science museums and centres are the appropriate places to share thoughts and debate among which most of them were further convinced by their experience in Sparks.

- Sparks has provided spaces for citizen-led innovation advancing research: 14 reverse science cafés resulted in new research inputs generated from the public (out of 27 organised for which data is available).

SPARKS POLICY RECOMMENDATION 5: DEMONSTRATE

Assess the impact of public engagement within open science on societal and individual levels by appropriate indicators

Photo: Sparks Forum © Reimar Ott

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The action allowed the group to participate in user-driven sessions to discuss the current perception of the research being made and understand how potential end-users value the current outputs. The result of these sessions is currently being discussed internally to identify potential future work pathways.

Sparks Case Study
BITalino, Portugal

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RATIONALE

Current indicators for impact assessment in research and innovation tend to be **based on economic performance**. These assessments often overlook the **positive impact** that public engagement can have on social welfare or enriched democratic values as part of an open science model. They rarely make it possible to show evidence on individual and personal empowerment through successful implementation.

Groundwork has been laid by the **EU Expert Group on Policy Indicators for Responsible Research and Innovation** as well as projects such as **MoRRI** and **RRI Tools** in order to put in place indicators that measure RRI impact. However, more work is needed to **refine and implement these indicators** in order **to build a set of evidence** supporting the case for public engagement in science.

RECOMMENDED ACTIONS

A. Raise awareness

- The EU's R&I Framework Programmes should:
 - strongly support **large-scale activities raising awareness** of the benefits of an approach to R&I that is oriented around **sustainability and societal concerns**;
 - strongly support regular organisation of high-level conferences and events where the **value and impact of open science can be highlighted** to a broad range of stakeholders at European level.

B. Evaluate

- The EU's R&I Framework Programmes should strongly support a **thorough assessment and evaluation of the RRI policy framework components**. Such assessment should build on the work of the EU Expert Group on Policy Indicators for Responsible Research and Innovation and of projects like MoRRI and RRI Tools, and define indicators bottom-up, with the involvement of the stakeholders.
- At European and national level, policymakers should **support the sharing of methodologies** developed for evaluation through publications, reports and training programmes.
- Criteria to **evaluate public engagement and societal outreach** should be applied to both organisations' and networks' development and individual researchers' careers.

THE SPARKS EXPERIENCE

Sparks has proven that when policymakers, researchers, etc. engage in dialogue with citizens and take into consideration their opinions and experiences, **individual citizen empowerment** increases and has spill-over effects on their desire to be involved in other democratic participatory activities.

Sparks' data collection and analysis activities have conceptualised the knowledge and impact of the project on the communication of RRI practices within the interconnected fields of health, science and technology. In doing so, the project has developed indicators to evaluate the level of public engagement, stakeholders' engagement in the acti-

vities as well as successful practices relating the potential replicability of the formats and methodologies tested out. The results of the analysis ground the present recommendations.

- 88% of respondents to the activities survey agreed that the latter encouraged them to share their thoughts (including 51% who strongly agree).
- 12 Science Espressos and 7 hackathons resulted in new or innovative forms of collaboration
- 12 new strategy/action plans came out of Sparks activities at local level.

SPARKS ON TOUR



Photo: Institute of Isolation by Lucy McRea





Sparks Hakathon at Copernicus Science Centre

MAY 2018

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