POSITION PAPER: CITIZEN SCIENCE FOR THE FUTURE OF EUROPE

Advocating for deeper integration and dedicated support for citizen science in the 10th Framework Programme for Research and Innovation

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Executive summary

Citizen science encompasses a wide range of participatory research practices that actively engage societal actors and the general public in knowledge co-production. Participants contribute data, contextual insights, and experiential knowledge, provide access to resources, raise research questions, and propose solutions to scientific challenges.

Citizen science has proven its value in addressing global challenges and democratising research. To build upon this success, the 10th Framework Programme for Research and Innovation **(FP10) must ensure continued support for citizen science through dedicated funding and its full integration across research domains.**

This will enable citizen science to tackle research and innovation challenges beyond traditional approaches, generating unique, verified, datasets while fostering inclusive science-society collaborations that drive societal impact. It will strengthen trust and inclusivity in science by ensuring equitable representation of all communities and integrating citizen-generated data and insights into policy frameworks for more effective decision-making. Additionally, it will address emerging challenges by leveraging digital technologies, safeguarding privacy, and promoting human-centered innovation.

Horizon Europe (HE) continues to play a crucial role in mainstreaming citizen science by embedding it within the EU's Research and Innovation Strategy and emphasising citizen engagement in mission-oriented innovation. The European Research Area (ERA) Policy Agenda 2022-2024 reinforced this commitment by prioritising public involvement to increase societal impact and trust in science. FP10 must continue this momentum by maintaining dedicated citizen science funding, supporting co-creation initiatives that directly address citizen concerns, scaling successful projects, and expanding participation to maximize impact.

We set out 5 key recommendations, and 10 further support areas for citizen science in FP10.

Key Recommendations (KR) for FP10:

1. **KR1: Dedicated citizen science programme line:** Establish a specific funding line for citizen science in FP10, building on the success of H2020's "Science with and for Society" programme, to develop innovative ways of connecting science and society.
2. **KR2: Mainstream citizen science principles across FP10:** Embed participatory research methodologies in all funding calls to ensure cross-cutting integration.
3. **KR3: Sustainable funding mechanisms:** provide long-term funding, including multi-year sustaining, and upscaling grants. Funding calls dedicated to the continuation and upscaling of successful ongoing citizen science initiatives will enable longer-term campaigns with broad participation and (data) stewardship models.

4. **KR4: Grassroots funding:** Empower local communities, small-scale initiatives and civil society organisations with accessible and adaptable support, including micro-grants with simplified procedures (potentially through cascading grants mechanism from HE) and participatory budgeting mechanisms.
5. **KR5: Open topic calls**: Introduce more non-prescriptive calls to responsively address societal challenges through bottom-up, citizen-driven research and interdisciplinary collaboration.[1]

Additional Supporting Recommendations (SR) in Strategic Areas:

1. **SR1: Catalysing Europe's innovation, economic growth and competitiveness**: Establish dedicated funding streams to integrate citizen science into key economic and industrial sectors, fostering academia-SME collaboration, knowledge transfer, scaling up successful initiatives, and aligning citizen-generated data with industry standards to enhance socio-economic impact and sustainable competitiveness.

2. **SR2: Strengthening policy integration**: Invest in integrating citizen-generated data into EU monitoring systems by funding data harmonization efforts, advocacy initiatives, and pilot projects aligned with EU and national policy frameworks to enhance credibility and uptake.

3. **SR3: Increasing public trust in science:** Support large-scale public engagement initiatives that promote research literacy, co-creation, and citizen participation throughout the research cycle to combat misinformation and increase trust in science.

4. **SR4: Enhancing access to resources and infrastructures:** Establish and maintain European research infrastructures dedicated to citizen science, ensuring long-term investment in shared resources, data repositories, services and tools, and collaboration platforms to enhance excellence and sustainability.

5. **SR5: Advancing cultural change in the scientific community:** Fund targeted programmes and initiatives that embed citizen science within institutional structures, funding mechanisms, and academic reward systems, ensuring sustained investment in Universities Alliances, ERC, and MSCA actions to make it a mainstream research practice.

[1] This need was also emphasised in the recent Heitor report (EC DG RTD 2024b).

6. **SR6: Rethinking research assessment:** Align research assessment reforms with the CoARA initiative and Open Science agenda, funding projects that develop and test new evaluation indicators recognizing citizen science contributions and achievements.

7. **SR7: Capacity building**: Fund large-scale training programs and capacity-building initiatives for researchers, policymakers, and citizen scientists to ensure equitable access to citizen science opportunities across Europe.

8. **SR8: Harnessing synergies and scaling successes:** Provide funding for networks, interoperable data aggregation platforms, and coordination mechanisms that facilitate the scaling and integration of local citizen science initiatives into European-level policy frameworks.

9. **SR9: Upgrading impact assessment**: Invest in the development of robust impact assessment tools to evaluate the diverse contributions of citizen science initiatives, developing standardized impact assessment tools, training personnel in evaluation methodologies, and supporting small-scale funds for assessing ongoing and completed projects.

10. **SR10: Ensuring inclusivity and broad representation across regions and communities**: To achieve more equitable participation, FP10 must provide targeted funding to dismantle barriers and ensure the inclusion of underrepresented groups in citizen science, and to expand citizen science to all regions and Member States, ensuring that the benefits are shared throughout Europe and across all citizens.

Incorporating these funding measures into FP10 is crucial in enabling the EU to tackle contemporary challenges in collaboration with citizens, accelerating innovations and discoveries that deliver both social and economic benefits. Furthermore, these measures will advance the EU's Open Science Agenda and align with the new ERA Policy Agenda 2025-2027 by empowering local communities alongside researchers to freely share knowledge and increase public trust in science.

Achievements of citizen science in past and ongoing framework programmes

This positioning paper sets out the added value of citizen science with reference to an extensive list of examples of citizen science investment in Horizon 2020 and Horizon Europe, and outlines 10 opportunities for FP10 to unlock the potential of citizen science through strategic support. The paper concludes with 5 key recommendations for sustained investment in citizen science, and 10 further support areas.

The added value of citizen science

Benefits for science and society

Citizen science has emerged as a transformative force in research and policymaking that combines scientific excellence with public engagement to achieve a wide range of societal benefits. Benefits for participants include increased scientific literacy, new knowledge and skills, a more profound understanding of issues impacting them and their communities, as well as the opportunity to represent their interests, and gain access to actionable data. Researchers, in turn, gain larger, more detailed and diverse datasets, new insights into complex issues, and increased reach, relevance, and societal impact of their work. In addition, open, networked, and transdisciplinary methods such as citizen science enhance interactions between science, society, and policy, foster a more democratic research environment, and promote evidence-informed decision-making. Moreover, the knowledge and know-how shared via citizen science networks translate directly into the empowerment of local communities to apply scientific methods and data-gathering protocols to address relevant local issues.

<BOX> **EU Missions and frontier research.** Citizen science plays a pivotal role in frontier research. ECHO (ECHO, HORIZON-MISS-2022-SOIL-01-09) is currently implementing 28 tailor-made citizen science initiatives, collecting data from up to 16,500 sites across Europe and Scotland, promoting soil stewardship, and fostering behavioural change. Echo is consolidating this information into ECHOREPO (a long-term open access repository with a direct link to the EU Soil Observatory), that will be available to scientists, citizens, policy makers, farmers, landowners and others, providing valuable information about the state of soil health across EU Member States, and helping citizens to make informed decisions about land use and conservation. </BOX>

Community-based monitoring initiatives can play a key role in driving bottom-up policy change. Citizen Observatories have informed policies on public health, environmental protection, and urban planning (WeObserve 2021), demonstrating the value of integrating community insights into decision-making.[2] Citizen science also strengthens public trust in science by fostering collaboration and transparency. During the COVID-19 pandemic, citizen-led data monitoring projects engaged communities in epidemiological modelling, building resilience and trust during a global crisis (UN 2023, Beck et al. 2024). In addition, citizen science fosters public engagement and education, increasing science literacy and enabling participants to better understand and address complex issues. These educational outcomes often create a feedback loop where participants then, in turn, become advocates for evidence-based decision-making in their communities. (van Brussel and Huyse 2018)

<BOX> **Frontier research.** Women's health still receives too little attention in many areas of medical research. To address this blind spot, Isala **(ERC Grant agreement 852600 Lacto-Be0)**, winner of the 2023 EU Prize for Citizen Science, engaged over 6,000 people in investigating the microbiome of the vaginal tract, making it the world's largest citizen science project in this field. Funded by the ERC, ISALA has compiled a unique database of vaginal swab results that will help researchers develop more effective diagnostics and therapeutic measures. Follow-up studies have been launched in Peru and Switzerland. </BOX>

Return on investment

By engaging volunteers in data collection, analysis, communication and dissemination, citizen science significantly expands research capacity without the corresponding proportional increases in cost. For example, biodiversity monitoring tools and platforms such as Observation.org, Artportalen or iNaturalist have gathered biodiversity data on a scale unattainable by professionals alone, leveraging millions of hours of voluntary effort. This public involvement improves data granularity and coverage, and can complement official monitoring programmes, providing localised, high-frequency data that enhance and supplement scientific efforts at a fraction of the cost of professional monitoring systems, as seen in projects such as GLOBE Observer. Global citizen science contributions to environmental research alone were valued at up to $2.5 billion annuallyup to 2015 (Theobald et al., 2015). In other words, citizen science delivers exceptional returns on investment, with modest funding allocations producing outsized benefits.

[2] Other examples for the added value of citizen-generated data for policy-making include projects such as BioDiversity4All, which has empowered citizens to record over 5 million species observations and directly influenced biodiversity policies, Marine LitterWatch, which has informed water management policies, or CoASTAL, which leveraged local knowledge for effective coastal management.

Scaling data-collection and harnessing creativity

Citizen science enables large-scale, granular data collection that can help fulfil critical monitoring obligations, such as those tied to the European Green Deal, the UN Sustainable Development Goals (SDGs) (Global Sustainable Development Reports 2019 and 2023), the Kunming Montreal Global Biodiversity Framework (Danielsen et al. 2024), and the Nature Restoration Law. Thanks to its greater spatial and temporal coverage, citizen science often surpasses traditional scientific approaches in these contexts and has been enhancing the science-policy interface by providing policymakers with timely, cost-effective data (Fritz et al. 2022, von Gönner et al. 2023), with volunteer contributions enabling projects and data collection efforts that would have been impossible to accomplish using traditional approaches (Sauermann & Franzoni, 2015).

<BOX> **Scaling data collection: Intelligent Collections of Food Legumes Genetic Resources for European Agrofood Systems** (INCREASE, SFS-28-2018-2019-2020) is a Horizon Europe project that engages 5.000 participants across Europe in an innovative study on genetic diversity and adaptation with common bean cultivars. Incorporating the traditional knowledge of local farmers, it enhances agrobiodiversity, emphasising legumes' crucial role in soil health, climate resilience and food security. By democratising access to seeds and knowledge through decentralised seed storage, INCREASE promotes agricultural resilience and food sovereignty.

In addition to the benefits arising from the vast volume of data generated by citizen scientists, other dimensions of citizen science—such as the discovery of innovative, unexpected ideas or solutions from participants in game-based projects like Foldit and Eterna, the inclusion of experiential knowledge from citizens (e.g., patients in medical research), and the collaborative potential of community-driven, co-created citizen science projects—play a significant role in enhancing the scientific and societal impacts of citizen science initiatives (Beck et al. 2024).

<BOX> **Bottom-up policy change:** Citizen science empowers communities to gather and utilise data, driving meaningful policy outcomes. **WeCount** (SwafS-15-2018-2019) ran five successful case studies involving hundreds of residents in Cardiff, Dublin, Leuven, Ljubljana and Madrid in using low-cost sensors to monitor traffic, resulting in concrete changes such as speed bumps, lower speed limits, and improved traffic flows. Similarly, **D-NOSES** (H2020-SwafS-2016-17) enabled communities in 10 pilot sites to tackle odor pollution generating 10,000 odour observations worldwide, from over 1,200 citizens, translating grassroots data into actionable policies that directly improved local conditions./BOX>

To build on these achievements and maintain Europe's leadership in this field, the 10th Framework Programme for Research and Innovation (FP10) must continue to support citizen

science through dedicated funding and its integration across all thematic areas. The following section explores how strategic support within FP10 can unlock the full potential of citizen science, fostering innovation, inclusivity, and impactful societal engagement.

The rise of citizen science in Europe and beyond

Over the past two decades, citizen science has gained significant global traction. Reasons for this include technological, societal, and methodological advancements as well as growing evidence of the value of this approach in addressing complex societal challenges. Ever-growing digitisation has facilitated broader participation and data collection, allowing citizens to contribute to scientific research on an unprecedented scale. At the same time, local initiatives have developed innovative approaches to empowering residents and leveraging local knowledge to create tailored solutions and enhance trust between communities and researchers. While it is difficult to determine the total number of participants engaged in citizen science projects worldwide, estimates suggest that millions are actively involved every year (Strasser et al. 2023).

The global perspective

The dynamism of citizen science is highlighted by the 2022 establishment of the Citizen Science Global Partnership of citizen science associations and networks from around the world.[3] Global organisations such as the United Nations Educational, Scientific, and Cultural Organization (UNESCO) and United Nations Environment Programme (UNEP) are also strongly endorsing citizen science, and stress the inclusion of local and indigenous knowledge as a vital tool for addressing pressing global challenges and achieving the Sustainable Development Goals (SDGs) (UNESCO 2021, UNDP 2022, UNEA 2017). They also highlight the role of citizen science in democratising knowledge production and fostering inclusive participation in scientific research, and as a means to enhance education, strengthen science literacy, and empower communities to contribute to evidence-based policy solutions.

Europe as a frontrunner in citizen science

In Europe, citizen science has seen exponential growth (Pelacho et al. 2021), driven by strong support from EU institutions and progressively by EU Member States. Starting with FP7 and the Coordination and Support Action (CSA) Socientize that produced the seminal Green and

[3] Including the European Citizen Science Association (ECSA), the Australian Citizen Science Association (ACSA), the US-based Association for Advancing Participatory Sciences (AAPS), CitizenScience.Asia, the Citizen Science Africa Association (CitSAf), the Ibero-American Network of Participatory Science (RICAP), and the Participatory Monitoring and Management Partnership (PMMP).

White Papers on Citizen Science, the European Commission has increasingly integrated citizen science across its programmes with support from multiple Directorates-General. Examples include the Collective Awareness Platforms for Sustainability and Social Innovation (CAPS) and the Science with and for Society (SwafS) programme overseen by DG RTD, the Citizen Observatory funding programmes overseen by DG ENV, and the LIFE programme overseen by the CINEA agency. In total, more than 200 EC-funded projects have enabled citizens to participate in and contribute new knowledge to scientific research on an unprecedented scale. In parallel, and born out of the growing citizen science community, the European Citizen Science Association (ECSA) was founded in 2014, providing a robust framework for collaboration, standard setting, and advocacy within the rapidly growing citizen science landscape. Membership in the ECSA continues to grow, positioning ECSA as a hub for the European citizen science community.

<BOX> **Active public involvement: Inclusive Science and European Democracies** (ISEED, GOVERNANCE-21-2020) adapts the participatory spirit of citizen science to political processes, actively involving the public in democratic decision-making. By fostering collaboration and inclusivity, ISEED amplifies citizens' voices and equips them to act as informed, impactful decision-makers.</BOX>

The European Commission also has identified Living Labs and citizen science as key mechanisms for citizen-driven innovation, and a 2023 Memorandum of Understanding between ECSA and the European Network of Living Labs (ENoLL) aims to strengthen this approach – emphasised in its Position Paper for Living Labs in FP 10 Living Labs – as integral partners in EU-funded projects, advocating for their role in fostering inclusive, agile, and efficient pathways to address societal challenges. Additionally, frontier research funded by the European Research Council (ERC) (69 projects from 19 countries) has demonstrated the value of citizen science in diverse fields such as biodiversity, public health, climate change, education and sustainable development. Moreover, long-term strategic bodies of the EU have highlighted their support for citizen science as a tool for future innovation, such as the European Strategy Forum on Research Infrastructures (ESFRI) and the EOSC Strategic Research and Innovation Agenda.

The professionalisation of the field is reflected in initiatives such as the Citizen Science COST Action and its groundbreaking publication, The Science of Citizen Science (Vohland et al., 2021), which brought together 277 researchers from 39 countries to refine methodologies and expand the impact of citizen science.

Following Europe's lead: The role of national investments

Similarly, the number of national and regional citizen science associations is growing across Europe with support from the ECS project's network of 28 Citizen Science Ambassadors, which connects grassroots initiatives with more established practitioners. These developments have a snowball effect, reaching wider and more diverse communities of researchers, practitioners and societal actors who are collaborating in knowledge production.

<BOX> **Infrastructure to support national networks: The Platform for Sharing, Initiating, and Learning Citizen Science in Europe** (EU-Citizen.Science, SwafS-15-2018-2019) and **European Citizen Science** (ECS, HORIZON-WIDERA-2021-ERA-01) created a platform and an extensive range of training, outreach, and policy activities that have improved the awareness and use of citizen science in European, as well as supported national networks. The **eu-citizen.science** platform connects over 5,000 users in over 37 countries and stands out as a flagship initiative on the European Research Area Platform. Its innovative framework is now powering new platforms, including the Dutch **CS-NL Knowledge Platform**, Portugal's **cienciacidada.pt**, and Brazil's **civis.ibict.br**. With the **European Citizen Science Academy** providing dynamic training and resources, this platform is at the heart of a growing movement that's transforming how science and citizens collaborate worldwide.</BOX>

In light of the continuous growth of citizen science and the demonstrated scientific excellence and policy impacts shown in recent studies (Bedessem et al. 2021, DG ENV 2018), governments and academic institutions have followed the European Commission's lead in embedding citizen science within national science policies and open science strategies with dedicated funding mechanisms. For example, Spain's strategy to promote citizen science incorporates funding calls from the Spanish Foundation for Science and Technology (FECYT), legal frameworks, and institutional support for citizen science, while Germany's Participation Strategy Research and the Netherlands' Open Science NL programme provide dedicated funding and are building citizen science infrastructure. Austria introduced a funding instrument for citizen science with schools, called Sparkling Science, in 2007, and a Centre for Citizen Science in 2015. These investments demonstrate the growing recognition of citizen science as a key driver of research innovation and societal benefit.

<BOX> **Evidencing impact: Measuring the impact of citizen science** (MICS, SwafS-15-2018-2019) provided a robust framework for measuring the impact of citizen science projects. The project demonstrated the significant and measurable impact of citizen science, which goes beyond most areas of open science. </BOX>

However, the first topic report of the MLE Citizen Science (EC DG RTD 2022) shows that more effort is required to meet the growing public interest in participatory research. Based on the Special Eurobarometer 516 study published in 2021, the report estimates that 12% of EU citizens would like to become actively involved in scientific projects (EC DG COMM 2021). The

same Eurobarometer survey found that 6 in 10 Europeans (61%) agree that "involving non-scientists in research and technological development ensures that science and technology respond to the needs, values and expectations of society". In other words, Europe has an untapped potential for broadening citizen science for societal benefits. However, realizing this potential requires a deeper cultural shift within scientific communities.

<BOX> **Scaling co-creation:** A Horizon 2020 project (SCALINGS, SwafS-13-2017) explored how co-creative innovation works in practice and how to scale it responsibly across diverse contexts. The result? A roadmap for implementing responsible co-creation, now driving change in the EU-funded **BoostEuroTeQ** project to revolutionise engineering education. </BOX>

10 opportunities for FP10: Unlocking citizen science potential for ERA through strategic support

FP10 can extensively harness citizen science for innovation and societal impact by embedding well-funded citizen science components into its mechanisms. Targeted calls and dedicated modules will support scaling, long-term engagement, and robust infrastructures for training, data management, and collaboration.

Promoting citizen science at the EU level, rather than solely at national level, brings distinct advantages. Cross-border collaboration enables the pooling of diverse perspectives, skills, and knowledge, leading to richer and more comprehensive datasets. EU-level coordination also allows for the harmonisation of methodologies, data standards, and ethical guidelines, ensuring compatibility and interoperability across projects and countries. This enables large-scale projects that would be difficult to achieve at the national level alone facilitating solutions to global challenges like climate change and public health while ensuring the European Research Area leads in open, inclusive, and impactful science-society collaboration.

To fully unlock the potential of citizen science, FP10 must address key challenges and leverage strategic opportunities. For each of the following ten areas highlighting strategic opportunities for Europe, we outline the necessary conditions for success and propose targeted recommendations to support its realisation.

Opportunity 1: Catalysing Europe's innovation, economic growth and competitiveness

Opportunity: Similar to barriers encountered in traditional academic science, citizen science must expand into key economic and industrial sectors to unlock its capacities as a driver of open innovation, value creation, and knowledge transfer. In today's knowledge- and data-driven economy, Europe must champion its core values of democracy, inclusivity, and sustainability to remain competitive globally. Europe's edge lies in combining excellence, sustainability, digital transformation, and citizen engagement, where citizen science plays a pivotal role in delivering sustainable, human-centered, and locally grounded innovations. While universities, communities of practice, and start-ups often lead citizen science initiatives, European industries still lack a clear understanding of its transformative role for fostering a fair, effective, and inclusive research and innovation ecosystem. Policymakers must act now—bridging knowledge valorisation gaps and positioning citizen science as a cornerstone of Europe's strategic autonomy, innovation leadership, and sustainable growth under FP10.

Conditions for Realising the Opportunity: Citizen science aligns seamlessly with the European Union's priorities for 2024-2029 by driving sustainable innovation, boosting industrial and digital competitiveness, strengthening global leadership, and upholding European values. Expanding citizen science into key economic and industrial sectors such as tourism, agrifood, health, and emerging technologies is essential to unlocking its transformative role. Beyond its application as a research tool, studying citizen science itself is crucial for understanding its methodologies, evolution as a field, and impact. Ensuring cross-sector collaboration, academia-SME partnerships to facilitate knowledge transfer, and socio-economic impact assessment tools will further amplify its role in Europe's innovation ecosystem.

Opportunity 2: Strengthening policy integration

Opportunity: The Global Sustainable Development Reports of 2019 and 2023 highlight the role of citizen science as a vital tool for strengthening the science-policy interface and supporting policymakers and other stakeholders in implementing the second half of Agenda 2030. Community-based environmental monitoring initiatives can generate fine-scale, cost-effective data that fill critical gaps, provide context-sensitive insights, and complement official data gathering programmes. However, its strength remains underutilised due to policymakers' hesitancy to rely on citizen-generated data, inconsistencies in data management, and insufficient infrastructure—issues that could be mitigated with the adoption of best practices and robust support systems (Fraisl et al. 2023).

Conditions for Realising the Opportunity: Sustained funding is essential to integrate citizen-generated data into policy frameworks and EU monitoring systems, ensuring its use in tracking SDGs and directives like the Ambient Air Quality Directive. The Copenhagen Framework on Citizen Data underscores the importance of predictable resources for creating reliable data infrastructures, standardisation, and quality assurance to build trust and enhance data usability.

Opportunity 3: Increasing public trust in science

Opportunity: Citizen science strengthens public trust in science by promoting transparency, collaboration, and inclusivity. Although European citizens generally hold positive views of science and technology, as reflected in the 2021 Eurobarometer survey, this confidence is increasingly challenged by disinformation, populism, and anti-science rhetoric. Citizen science initiatives, such as the H2020 project WeCount and Horizon Europe's NEWSERA, have demonstrated the value of involving citizens in scientific processes to enhance credibility and counter misinformation. Despite these successes, the systematic integration of citizen engagement into research policy and funding remains limited, leaving opportunities to create meaningful science-society collaborations and build trust untapped.

<BOX> Strengthening public trust in science: WeCount: Citizens Observing UrbaN Transport (WeCount, SwafS-15-2018-2019) not only supported innovation in traffic management through collaboration, thereby strengthening public trust, but also supported SME innovation, with the activities of Spotteron, an Austrian SME. **WeCount** brought the **Telraam sensor** to market readiness, now empowering communities and local authorities to collaboratively build sensor networks. </BOX>

Conditions for Realising the Opportunity: Flexibility in defining research questions and impact pathways is essential to allow for collaborative processes that respond to emerging societal needs. By enabling active citizen participation throughout the research cycle, FP10 can foster a deeper public understanding of scientific processes and their limitations. This approach not only helps combat disinformation but also builds resilience against polarisation and mistrust, bolstering public confidence in science while enhancing its societal relevance and impact.

Opportunity 4: Enhancing access to resources and infrastructures

Opportunity: Citizen science has the capability to drive inclusive, participatory, and context-specific science-society collaborations, fostering deeper societal engagement with research and innovation. As Europe moves towards a digitally connected, highly skilled society,

FP10 should seize the opportunity to equip citizen scientists, practitioners, and policymakers with cutting-edge tools, shared data platforms, and open-access resources. By tapping into the collective intelligence of diverse contributors, FP10 can support the co-creation of knowledge, accelerate data collection, and enhance the societal relevance and impact of research outcomes, contributing to Europe's leadership in open science.

Conditions for Realising the Opportunity: To fully unlock their promise, citizen science initiatives require well-planned participatory practices, and dedicated European Research Infrastructures such as the one currently being conceptualised by the RIECS-Concept project, and sustained resources. Such infrastructures would enhance the efficiency, scalability, interoperability, and sustainability of citizen science projects, foster excellence-based access, collaboration and data sharing, and help build trust in citizen-generated data. Ensuring adequate support services will enable projects to engage underrepresented groups, facilitate effective data management, and enhance long-term collaboration. Without such support, citizen science risks being reduced to superficial and fragmented activities which fail to capitalise on the deeper benefits of engagement and co-creation.

<BOX> **Infrastructure and sustained resources: the Research Infrastructure for Excellent Citizen Science** (RIECS-Concept, 2024-DEV-01) aims to conceptualise a new research infrastructure for citizen science within the future European Strategy Forum on Research Infrastructures (ESFRI) roadmap, engaging multiple stakeholders and placing society at its core. The project will co-design a comprehensive catalogue of resources and services, integrating technical, legal, and ethical considerations, along with sustainability and governance frameworks for implementation. By accessing this infrastructure, researchers and practitioners will be able to deploy citizen science initiatives more efficiently, with full support and guarantees to ensure long-term impact and reliability.</BOX>

Opportunity 5: Advancing cultural change in the scientific community

Opportunity: Citizen science has the potential to fundamentally reshape the relationship between research and society. Despite its growing recognition, it remains marginalised within many scientific communities, often viewed as secondary to traditional research practices. Projects such as TIME4CS, LibOCS, and other European Research Area initiatives have begun the critical work of driving culture change by promoting citizen science and public engagement as integral components of the research landscape. FP10 represents an opportunity to solidify these achievements by sending a clear signal that citizen science is not a passing trend but a necessary evolution of research practice that must be prioritised and integrated into mainstream research systems.

Conditions for Realising the Opportunity: Achieving lasting cultural change in research requires sustained investment, similar to the long-term integration of gender equality in Research and Innovation. FP10 must continue funding initiatives by ensuring that citizen science is seen as essential to achieving research excellence and societal impact, FP10 can lay the groundwork for it to become a permanent and valued feature of European research, much as Responsible Research and Innovation (RRI) began to pave the way for these shifts. A decade-long commitment is needed to ensure that citizen science becomes a mainstream research practice, reinforcing inclusivity, transparency, and public trust in science.

Opportunity 6: Rethinking research assessment

Opportunity: Citizen science offers unique contributions to high-impact and excellent research but requires significant management and communication efforts, often leaving limited time for the production of conventional academic outputs measured by traditional metrics. This can deter early-career researchers, who face significant publication pressures, from engaging in citizen science. Integrating societal engagement into research assessment frameworks is thus essential.

Conditions for Realising the Opportunity: FP10 funding can drive institutional reforms, such as those championed by the CoARA initiative, to establish evaluation frameworks that acknowledge societal engagement as one aspect of academic excellence. This will create a research culture that values citizen science as a fundamental component of Open Science and as a practice that enhances research quality and impact. FP10 should provide sustained funding to embed citizen science into European Open Science over the next decade. Furthermore, instruments like the EU Prize for Citizen Science should receive continued funding to create tangible incentives for participatory research.

Opportunity 7: Capacity building

Opportunity: Citizen science can only scale effectively if practitioners, authorities, and citizens have the right skills and resources. Gaps in expertise, particularly in data management, engagement strategies, and policy integration, limit impact. Training initiatives like the ECS Academy, MLE on Citizen Science for Policy, and accelerators like IMPETUS and ACTION show the power of structured learning, but they remain fragmented and underfunded.

Conditions for Realising the Opportunity: To maximize its impact, citizen science practitioners, authorities, and citizens need targeted training in data management, engagement strategies, and policy integration. FP10 should fund national and transnational training programs, mutual learning exercises, and workshops to build expertise at multiple

levels. Dedicated grants should support professional development for educators, researchers, and decision-makers, embedding citizen science in academic curricula and public institutions. Funding should also ensure capacity-building efforts reach underrepresented regions and sectors of society, ensuring equitable access to citizen science opportunities.

Opportunity 8: Harnessing synergies and scaling successes

Opportunity: Citizen science offers substantial potential to foster innovative solutions to societal and environmental challenges. While many projects succeed at the local level, their impact is often constrained by a lack of alignment with broader networks, initiatives and policy goals. EU-funded Coordination and Support Actions (CSAs) such as the eu-citizen.science, ECS, IMPETUS, CROPS, ScienceUs, SCALINGS, and OTTERS projects, have demonstrated the value of facilitating cross-border knowledge-sharing and of scaling local initiatives through coordinated efforts. Similarly, the success of projects like Plastic Pirates - Go Europe! underscores the importance of systematic upscaling to extend reach and impact.

<BOX> **Driving Impact:** Citizen science fosters societal change by promoting diversity, inclusion, and participation. EU-funded initiatives like IMPETUS and ECS play key roles: IMPETUS honors excellence with the "European Union Prize for Citizen Science" and supports small projects through cascade grants, while ECS focuses on network-building, institutionalisation, and mutual support. Complementary projects, including COALESCE, PATTERN, and REINFORCE, further strengthen this mission.</BOX>

Conditions for Realising the Opportunity: The Open Science movement in Europe is in a phase of regulatory consolidation, with multiple Member States implementing national strategies that mandate open access and new infrastructures, aligning with initiatives like the European Open Science Cloud (EOSC). To enable collaboration, the sharing of best practices, and the alignment of citizen science projects with European policy priorities, dedicated funding in FP10 should support the creation of networks, interoperable data platforms, and coordination mechanisms. Furthermore, targeted funding for upscaling successful local initiatives is needed to ensure sustainability and maximise impact. Through these measures, FP10 can drive progress towards larger efforts like the European Green Deal, SDGs, and strategic missions, while fostering a more integrated and impactful citizen science landscape.

<BOX> **Driving Small-Scale Innovation:** The ACTION **Accelerator** empowered grassroots initiatives to combat environmental pollution through two highly competitive open calls. Selected projects received cascade funding, bespoke training, expert mentoring, and access to state-of-the-art digital tools and infrastructure—unlocking their potential to deliver real impact where it matters most.</BOX>

Opportunity 9: Upgrading impact assessment

Opportunity: Citizen science initiatives face intense challenges in evaluating their multidimensional impacts across scientific, societal, policy, and environmental domains, particularly when these unfold over long periods. Many projects lack standardised frameworks and resources for impact assessment, which hampers their ability to demonstrate value to funders and stakeholders. This limitation restricts recognition and growth despite the significant contributions citizen science can make. Given the diversity of citizen science initiatives, flexible and adaptable evaluation approaches are essential.

Conditions for Realising the Opportunity: Progress has been achieved through projects like ACTION, Time4CS, NEWSERA, and MICS, which developed impact models covering various aspects of collaborative research. Continued investment is needed to refine and expand these tools helping citizen science initiatives to measure and communicate their outcomes.

Opportunity 10: Ensuring inclusivity and broad representation across regions and communities

Opportunity: Citizen science can play a transformative role in addressing societal challenges by fostering inclusivity and harnessing diverse perspectives. Since participation remains uneven across Member States, regions and demographic groups, with under-served communities often excluded (Pateman and West 2023), there is great potential to close persistent gaps and involve the communities most affected by issues such as environmental pollution and public health challenges. Building on the learnings of EU-funded projects such as WeCount, IMPETUS, ACTION, NATURE4ALL, and InSPIRE, the relevance, reach, and societal impact of Research and Innovation can be enhanced to tackle pressing European societal goals.

Conditions for Realising the Opportunity: As shown by the multiple position papers currently published (ERA Portal Austria 2024), citizen science uptake remains uneven across Member States and demographic groups. While some countries prioritize citizen science as a strategic component, others offer only limited support for open science. Ensuring broad representation requires addressing barriers to participation, particularly for underrepresented communities. Without targeted investment, these groups risk being excluded from the benefits of citizen science. Long-term investment is needed to foster meaningful engagement, co-ownership, and trust, allowing citizen science to reflect the diversity of European society and develop effective solutions to societal challenges.

<BOX> **Youth Taking Action on Pollution: The Plastic Pirates project,** part of the **EU's Mission Restore our Ocean and Waters,** empowers young Europeans aged 10 to 16 to investigate

plastic waste pollution in rivers, waterways, and coastal areas. Since 2022, the initiative has expanded to 13 countries, with over 16,000 students sampling more than 350 sites. Their findings, validated by researchers, inform EU policies like the Zero Pollution Action Plan, the Marine Strategy Framework Directive, and the Single-Use Plastics Directive, showcasing the power of youth-driven environmental action. </BOX>

Recommendations: A call for sustained investment in citizen science

Citizen science can play a central role in addressing the challenges presented in this document equitably and inclusively, ensuring human-centred approaches in an era of rapid technological transformation (EC DG RTD 2024b) that lead to more effective, impactful, and democratic solutions.

Continued support in FP10 will not only consolidate the progress already made, but will help citizen science approaches reach their full transformative potential to empower citizens, advance research, drive innovation, collaboratively address pressing societal challenges, and strengthen democracy. With adequate funding, citizen science will amplify public engagement, enhance inclusivity and diversity in research, strengthen data ecosystems for evidence-based policymaking, promote necessary cultural reforms within research institutions, and counteract societal threats, such as misinformation, polarisation, and anti-science rhetoric, by fostering critical thinking and collaborative problem-solving.

In order to maintain the European Research Area's global leadership in this field, it is essential to sustain and strengthen the momentum established under Horizon 2020 and Horizon Europe. The integration of citizen science into FP10 must be closely aligned with the European Research Area Policy Agenda, its priorities and corresponding actions, ensuring that its outcomes effectively contribute to an open, inclusive, and excellence-driven European Research Area. By embedding citizen science across all funding streams and expanding dedicated funding for citizen science, FP10 can solidify Europe's position as a global leader in innovation, open science, and citizen engagement, ensuring the transformative benefits of citizen science are fully realised and equitably distributed.

Our Key Recommendations (KR) for FP10:

1. **KR1**: Dedicated citizen science programme line: Establish a dedicated programme line for citizen science in FP10, building on the success of H2020's "Science with and for Society" programme, to develop innovative ways of connecting science and society,

while continuing to mainstream citizen science approaches across the entire Framework Programme.

2. **KR2: Mainstream citizen science principles across FP10:** Embed participatory research methodologies in all funding calls to ensure cross-cutting integration.
3. **KR3: Multi-year sustaining, and upscaling funding**: Set up funding calls dedicated to the continuation and upscaling of successful ongoing citizen science initiatives. These enable comprehensive longer-term campaigns with broad participation and (data) stewardship models that maximise their potential to generate impact.
4. **KR4: Grassroots funding:** Empower local communities, small-scale initiatives and civil society organisations by providing accessible, inclusive, and adaptable support. This approach could include micro-grants with simplified application procedures and reduced reporting obligations (potentially through cascading grants mechanism from HE). Participatory budgeting engages citizens in funding decisions, fostering ownership. Rapid response funds could ensure flexibility for urgent efforts like disaster monitoring, and crowd-matched grants could combine crowdfunding with institutional.
5. **KR5: Open topic calls**: Introduce more non-prescriptive calls to responsively address unforeseen and dynamic societal challenges and new subject areas, fostering innovative, bottom-up solutions through citizen engagement and interdisciplinary collaboration.[4]

Moreover, FP10 should support the opportunities described above with the next targeted recommendations. Additional Supporting Recommendations (SR) in Strategic Areas:

1. **SR1: Catalysing Europe's innovation, economic growth and competitiveness**: Establish dedicated funding streams to integrate citizen science into key economic and industrial sectors, fostering academia-SME collaboration,transfer, scaling up successful initiatives, and aligning citizen-generated data with industry standards to enhance socio-economic impact and sustainable competitiveness.

2. **SR2: Strengthening policy integration**: Invest in integrating citizen-generated data into EU monitoring systems by funding data harmonization efforts, advocacy initiatives, and pilot projects aligned with EU and national policy frameworks to enhance credibility and uptake.

3. **SR3: Increasing public trust in science:** Support large-scale public engagement initiatives that promote research literacy, co-creation, and citizen participation throughout the research cycle to combat misinformation and increase trust in science.

[4] This need was also emphasised in the recent Heitor report (EC DG RTD 2024b).

4. **SR4: Enhancing access to resources and infrastructures:** Establish and maintain European research infrastructures dedicated to citizen science, ensuring long-term investment in shared resources, data repositories, services and tools, and collaboration platforms to enhance excellence and sustainability.

5. **SR5: Advancing cultural change in the scientific community:** Fund targeted programmes and initiatives that embed citizen science within institutional structures, funding mechanisms, and academic reward systems, ensuring sustained investment in Universities Alliances, ERC, and MSCA actions to make it a mainstream research practice.

6. **SR6: Rethinking research assessment:** Align research assessment reforms with the CoARA initiative and Open Science agenda, funding projects that develop and test new evaluation indicators recognizing citizen science contributions and achievements.

7. **SR7: Capacity building**: Fund large-scale training programs and capacity-building initiatives for researchers, policymakers, and citizen scientists to ensure equitable access to citizen science opportunities across Europe.

8. **SR8: Harnessing synergies and scaling successes:** Provide funding for networks, interoperable data aggregation platforms, and coordination mechanisms that facilitate the scaling and integration of local citizen science initiatives into European-level policy frameworks.

9. **SR9: Upgrading impact assessment**: Invest in the development of robust impact assessment tools to evaluate the diverse contributions of citizen science initiatives, developing standardized impact assessment tools, training personnel in evaluation methodologies, and supporting small-scale funds for assessing ongoing and completed projects.

10. **SR10: Ensuring inclusivity and broad representation across regions and communities**: To achieve more equitable participation, FP10 must provide targeted funding to dismantle barriers and ensure the inclusion of underrepresented groups in citizen science, and to expand citizen science to all regions and Member States, ensuring that the benefits are shared throughout Europe and across all citizens.

In these challenging times, marked by multiple global crises, misinformation, and deepening societal divides, Europe must reaffirm its commitment to its core values and strengthen its societal resilience. Citizen science offers more than a research approach: it is a catalyst for civic engagement, trust in science, and collective problem-solving. It drives stronger democracy, fosters inclusion, and enhances sustainable competitiveness.

The EU cannot afford inaction and must act now, building on proven successes of uniting communities and science, to drive change and address pressing challenges. By embedding dedicated and substantial citizen science funding into FP10, the EU can improve lives, maximise knowledge valorisation, reinforce social cohesion, and ensure that research and policymaking reflect the real needs of European society. This is Europe's opportunity to lead boldly, paving the way toward a sustainable, knowledge-driven future where science and citizens work hand in hand to shape a better tomorrow.

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