European Commission

CORDIS Results Pack on
citizen science

A thematic collection of innovative EU-funded research results

April 2022

Inspiring examples of societal engagement for Horizon Europe

Research and
Innovation

Contents

Editorial

Inspiring examples of societal engagement for Horizon Europe

Citizen science, for which citizens collaborate with scientists on research and innovation, has the potential to improve the excellence and impact of research and deepen the relationship between science and society. This Results Pack showcases 12 EU-funded projects that are developing good practices as well as building the capacities and networks needed to foster successful collaborations with citizens across Europe.

A policy priority of the renewed European Research Area is to improve the interaction between the research system and society at large. The Pact for Research & Innovation in Europe, adopted by the Council of the EU in November 2021, established societal responsibility as one of its main principles. Engaging citizens in the design and implementation of research and innovation policies can improve the quality of research outcomes as well as the impact of funding, and ultimately helps build trust and understanding between science and society.

Collaboration and co-creation

In the past, Science with and for Society under Horizon 2020 supported societal engagement and citizen science. Through this part of the programme, 25 projects received EUR 65 million. These projects aimed to push the boundaries of engaging citizens in 'doing science and innovation', built evidence of positive impacts, and established beacons of good practice. The projects saw citizens involved at all stages of research and innovation, from developing agendas and methods, to collecting and analysing data, through to monitoring and evaluating activities.

Today, Horizon Europe represents a step change towards collaborative forms of research and innovation: the programme prioritises co-design and co-creation, and expects to create impact through co-creation with citizens and end users. Applicants are encouraged to consider open science practices and include citizens and societal engagement in their methodology as this aspect is part of the evaluation process. Specific guidance on societal engagement can be found in the Horizon Europe Programme Guide.

Furthermore, citizen and societal engagement are integrated across Horizon Europe's 'clusters' and EU Missions dedicated to addressing global challenges by putting citizens' needs at the core of research objectives. This reflects the recognition that the success of research in Europe is dependent on extensive and high-quality engagement, and optimal leveraging of societal capabilities and intelligence.

It is therefore essential to raise awareness of good practices, networks of practitioners, and sources of knowledge. This Results Pack provides details on 12 inspiring citizen and societal engagement projects supported in Horizon 2020, conveying how citizen and societal engagement can contribute to Horizon Europe in different ways. The selected projects demonstrate the breadth of disciplinary areas and innovation themes where this mode of research and innovation can play a role, whilst providing inspiration to those interested in applying for Horizon Europe grants.

A bootcamp model to accelerate community science

An innovative programme of training and mentoring has empowered 16 citizen science initiatives across Europe, with lessons for organisers on how to support these types of projects.

© Mark Phillips

Citizen science has been around for a very long time. "Many of the people from centuries ago that we would today call scientists were not formally trained in the areas they researched in," explains ACTION (Participatory science toolkit against pollution) project coordinator Elena Simperl from Kings College London, United Kingdom. "They were simply interested and curious, and had the means to learn for themselves and experiment."

A key thing that has changed, notes Simperl, is technology. The digital world has dramatically increased the ability of citizens to contribute to scientific endeavours through, for example, recording and uploading findings on smartphones. This might involve the monitoring of air quality, or searching satellite images for specific astronomical phenomena.

"As a computer scientist, I have always been interested in how technology can be used to both reach people, and communicate science," says Simperl. "I began to realise however that for the sort of technological support that citizen science projects need, there is not a one-size-fits-all solution. There is a spectrum of needs."

Accelerating citizen science

The 3-year, EU-funded ACTION project sought to apply the bootcamp concept – an intensive 6-month programme of interdisciplinary support popular with entrepreneurial or technology communities – to citizen science initiatives. Some 16 initiatives from across Europe were selected, each one focused on a type of pollution, including light, soil, water, noise and air.

To offer the possibility of partaking in its programme to a wide range of stakeholders, ACTION launched two highly competitive open calls for small-scale initiatives, and as a result Commission funding was cascaded to those selected.

At the heart of the project was the ACTION Accelerator, a tailored programme developed by the project partners to provide each selected initiative with funding, training, mentorship and access to digital tools.

"At the same time, we wanted to learn from them about how digital technologies can best support this type of work, in particular how to support collaborations and collective intelligence initiatives with volunteers, scientists and local communities," adds Simperl.

The Accelerator was able to assist projects in a variety of ways. The Street Spectra initiative, for example, sought to map and characterise public lighting sources around the world. Astrophysicists could then use this data to find out more about the impact of urban street lighting on the environment. The ACTION Accelerator was able to address technical challenges, highlight the need to achieve greater data coverage, and raise awareness of potential data privacy issues, such as the risk that volunteers might inadvertently send information on their location or movements when uploading data.

"This is just one example of how we worked to help initiatives," says Simperl. "Different initiatives required different types of engagement."

Other projects assisted by ACTION Accelerator include an Italian experiment to measure the ability of trees to absorb air pollution, with citizens collecting data from innovative sensors placed around urban forests. In Portugal, a mapping exercise of pesticide and fertiliser use in home farming and gardening was carried out.

Across all 16 initiatives, around 1 200 citizen volunteers took part, submitting almost 245 000 photographs and 7 600 audio files.

Leveraging people power

For the sort of technological support that citizen science projects need, there is not a one-size-fits-all solution. There is a spectrum of needs.

The project's findings are contained in a freely available citizen science toolkit to help academics design and realise citizen science projects that make the best use of available technologies.

Simperl would also like to see more research work focused on using digital tools to scale up citizen science projects, and to train more citizen science teams. "I know that there are thousands of initiatives that could benefit from this," she concludes.

PROJECT
ACTION – Participatory science toolkit against pollution

COORDINATED BY
Kings College London in the United Kingdom

FUNDED UNDER
Horizon 2020-Science with and for Society

CORDIS FACTSHEET
cordis.europa.eu/project/id/824603

PROJECT WEBSITE
actionproject.eu

Public health: empowering citizens to monitor urban pollution

The EU-funded CitieS-Health project places citizens' concerns at the heart of research into public health and the urban environment. The results underline the benefits of engaging with local communities.

City life can benefit from easy access to employment opportunities, cultural activities and transport links, but it can also bring some disadvantages. Urban environments often have higher levels of air pollution and noise than rural areas, and tend to contain fewer green spaces.

"To properly study the impact of urban environments on health, we need to be able to estimate personal exposure to these risk factors," explains CitieS-Health (Citizen Science for Urban Environment and Health) project coordinator Xavier Basagaña, from the Barcelona Institute for Global Health in Spain.

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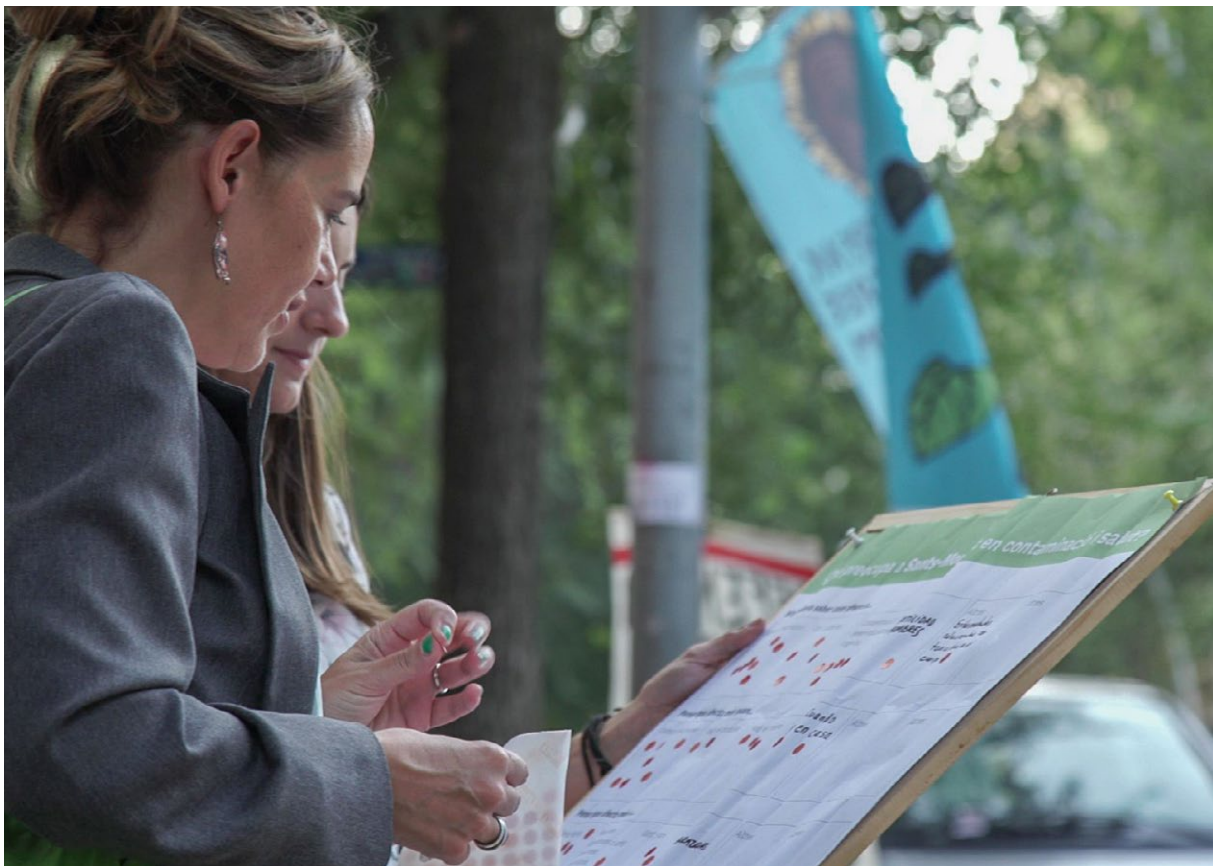
"This can be difficult for scientists alone to measure. Important information such as physical activity or other personal habits also need to be taken into account."

Recognition of this challenge has led to greater citizen involvement in urban science projects over the past few years, with the public called upon to participate in campaigns to monitor air quality or noise.

"We felt, however, that citizen science has not been fully used to evaluate the link between environmental exposures and health," says Basagaña. "This was the main aim of CitieS-Health."

Getting citizens involved

Citizen participation made these pilots more relevant to local community needs and provided insights that improved the design of studies.

Launched in January 2019, the CitieS-Health project ran across five European cities. A different study was created in each, focused on a topic related to health and the urban environment: air pollution, biomass burning, noise pollution, industrial pollution and urban design.

In Barcelona, citizens helped to shape a study into how pollution can affect mental health. Some 300 citizens provided around 2 500 measurements of cognition and well-being on different days. These were then compared to air pollution concentrations that citizens had helped to monitor, using personal nitrogen dioxide collection tubes.

In Lucca, Italy, a survey of 1 025 residents in the Serchio Valley led to the decision to focus on chronic kidney disease. To date, 367 residents have been interviewed about their occupation, diet and lifestyle, and 353 have donated biological samples.

Other studies looked at the impact of noise on health (Ljubljana, Slovenia) and biomass burning and health (Amsterdam, the Netherlands), as well as the links between perceptions of environmental quality, physical activity and stress (Kaunas, Lithuania).

"In each of these cities, scientists enjoyed a strong interaction with citizens via workshops, meetings and carrying out surveys," notes Basagaña. "Citizens were engaged in all phases of

research, including deciding the research questions. This helped to ensure the social relevance of each study, and made the results more interpretable."

Promoting further participation

CitieS-Health runs until June 2022, and Basagaña and his team are still analysing and discussing incoming data. Nonetheless, some preliminary results are emerging: the Barcelona study detected an association between air pollution levels and attention performance and perceived stress.

In each case, the value of citizen involvement in all phases of research has been underlined. "Citizen participation made these pilots more relevant to local community needs, provided insights that improved the design of studies, and helped us to communicate the findings," adds Basagaña. "This is about bringing science closer to society."

The project has developed an online interactive citizen science toolkit to help projects to engage with communities and tackle issues of common concern. The toolkit contains examples and resources from the project, as well as tips on designing citizen-driven research studies and collecting data.

"The project website also contains a section through which anyone who works on participatory projects can suggest new ways to engage citizens in science," says Basagaña. "We also plan to publish a paper on lessons learned from CitieS-Health. All this will hopefully be useful for upcoming citizen science projects."

PROJECT
CitieS-Health – Citizen Science for Urban Environment and Health

COORDINATED BY
Barcelona Institute for Global Health in Spain

FUNDED UNDER
Horizon 2020-Science with and for Society

CORDIS FACTSHEET
cordis.europa.eu/project/id/824484

PROJECT WEBSITE
citieshealth.eu

Community science rides the escalator of public engagement

Too often, science public communication programmes are didactic in nature. To help generate genuine engagement, the EU-funded DITOs project launched two-way discussions to inspire the public and influence policy.

© Muki Haklay / Shared under Creative Commons

Traditional science communication often precludes opportunities for the opinions of the general public to be voiced, while creating barriers to engagement with science in a way that is meaningful for them.

"Doing-Science-Together creates the potential for genuinely two-way communication between science and society," says Muki Haklay from the DITOs (Doing It Together science) project.

To engage with the public, the project delivered 829 public events over 3 years, achieving over half a million face-to-face interactions and a further 3 300 000 online. Activities were structured around two themes: biodesign and environmental sustainability.

DITOs was guided by the escalator model of engagement. This concept contends that people's engagement with science can

increase or decrease over time, depending on their life stage, resources, capabilities, knowledge and interests.

Piggybacking on activities

The DITOs model had seven levels of engagement, ranging from the passive consumption of knowledge, for example through television, to more active participation, such as enrolling in citizen science projects.

"We wanted to identify opportunities to move individuals up or down to a level suiting their circumstances. Starting with where people are, and not pulling them to where science is, offers meaningful and lifelong engagements with science," explains Haklay from University College London (UCL), the project host.

The project partners used both existing networks and outreach activities to connect with members of the public, with a range of tactics from social media to appearances at museums or festivals.

DITOs also provided support for those partners with little prior experience of citizen science, for example by integrating interactive opportunities for the public into planned events such as exhibitions.

"We tailored science activities according to the partner, designing them to reach people and places usually untouched by traditional engagement efforts," remarks Haklay.

Perhaps the most literal example of this was the Science Bus, coordinated by Dutch charity Waag. Science communication community members were recruited to drive the bus across Europe, making 17 stops at community centres, small towns, public festivals and museums.

Participatory workshops at these locations offered nine activities including experiments to make yoghurt (teaching about bacteria) and a sun cream (investigating the properties of sunrays). Instructions were available in multiple languages, with experiences shared on social media.

Doing-Science-Together creates the potential for genuinely two-way communication between science and society.

Another success was BioBlitz, part of the City Nature Challenge, where people assembled at specific locations and used the iNaturalist app to collect biodiversity data. The Europe-wide BioBlitz network was formed to share these experiences.

A step change

One of the concrete legacies of DITOs is the enlargement of the European Citizen Science Association (ECSA), which continues its work, most prominently in developing the EU-Citizen.Science platform. "ECSA is now the 'go to' organisation for citizen science projects, which often join the association to increase their reach," notes Haklay.

Active in policy, ECSA partook in the discussion on citizen science as part of the European Commission's Open Science agenda.

In the United Kingdom, DITOs gave input into the public participation and funding strategies of the national science funder, UKRI. In Italy, it helped set up a network of citizen science researchers and practitioners, currently influencing national science policy.

The project's results have already been widely published, and a range of policy briefs and guidelines resulting from the project are available online.

PROJECT
DITOs – Doing It Together science

COORDINATED BY
University College London in the United Kingdom

FUNDED UNDER
Horizon 2020-Science with and for Society

CORDIS FACTSHEET
cordis.europa.eu/project/id/709443

PROJECT WEBSITE
togetherscience.eu

Crowdsourced tools sniff out the location of nasty odours

Combining smart technology with odour monitoring techniques and a lot of nostrils, D-NOSES pushes the under-regulated blight of odour pollution up the environmental and policy agendas.

Frequent exposure to odours, at home or at work, can cause a range of ailments, including: headaches, lack of concentration, stress, insomnia and respiratory problems.

"After noise, odours are the second most complained about environmental pollutant globally. However, most techniques to measure odours don't adequately account for their impact on

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citizens. This whole area is under-regulated," says D-NOSES (Distributed Network for Odour Sensing, Empowerment and Sustainability) project coordinator Rosa Arias, previously from the Ibercivis Foundation, the project host, now founder and CEO of Science for Change (website in Spanish).

The EU-supported citizen science D-NOSES project improved a specially designed app to crowdsource real-time geopositioned odour data, augmented by the experiences of those affected.

The nose proves to be a highly effective sensor!

The project tested its methodology in 10 pilots across eight European countries, alongside Chile and Uganda for wider perspectives. Some of the pilots' results have already been published, such as those for Italy, Greece and Chile.

In Spain, OdourCollect recently won the prestigious Prismas (website in Spanish) award for science outreach.

Mapping tools

The project followed University College London's Extreme Citizen Science approach, which prioritises bottom-up practices, with an awareness of local needs, to help ensure citizen participation and inclusivity during all research phases.

The strategies to engage members of the public were adapted for each pilot, with ethnographic research followed by targeted activities in museums and festivals, alongside appearances in local media. Once engaged, participants took part in sensory walks and odour trainings, alongside data analysis workshops.

At the heart of D-NOSES was the OdourCollect app, built on an earlier iteration created by the MYGEOSS project and designed to enable affected communities to map odour pollution and advocate change. During the 10 pilots, participants suggested improvements to the app's functionality, such as mapping pleasant smells in addition to unpleasant ones.

The flagship Barcelona pilot focused on the Forum area of the city which had endured the impact of waste and wastewater treatment facilities for over 20 years. Users were trained to recognise different smells including waste, sewage, sludge and biogas, and map them. This data was then linked to industrial operations using the app's historical analysis. Over 600 observations were reported over a 12-month period, involving 86 participants.

In total the project collated over 10 000 odour observations worldwide, from over 1 200 citizens.

"Thanks to our engagement model's gender perspective, 70 % of observations were collected by women," adds Arias. "Overall our pilots validated our methodology, with the Barcelona and Italian pilots aligning with the results of traditional odour studies. The nose proves to be a highly effective sensor!"

Influencing policy

The D-NOSES event, 'Revisiting Odour Pollution in Europe', hosted online by Greek MEP Maria Spyraki, resulted in the inclusion of odour pollution and citizen science in the EU Action Plan 'Towards Zero Pollution for Air, Water and Soil'.

The team also hope that their green paper will prompt discussion about a comprehensive European odour policy, and lead to a white paper.

Another outcome has been the International Odour Observatory, an interactive online resource where users input and consult data crowdsourced globally. Advocacy of policy changes was also undertaken locally during the pilots, as well as more generally with an advocacy toolkit, policy briefs and the strategic roadmap for governance.

The team are currently standardising their methodology in Spain, while also working on a municipal model to guide odour regulation. "Our objective is that citizen data is used as evidence by authorities, to prompt action," concludes Arias. "Crucially, our methodology can be replicated in other contexts and/or applied to other socio-environmental issues."

PROJECT

D-NOSES – Distributed Network for Odour Sensing, Empowerment and Sustainability

COORDINATED BY
Ibercivis Foundation in Spain

FUNDED UNDER
Horizon 2020-Science with and for Society

CORDIS FACTSHEET
cordis.europa.eu/project/id/789315

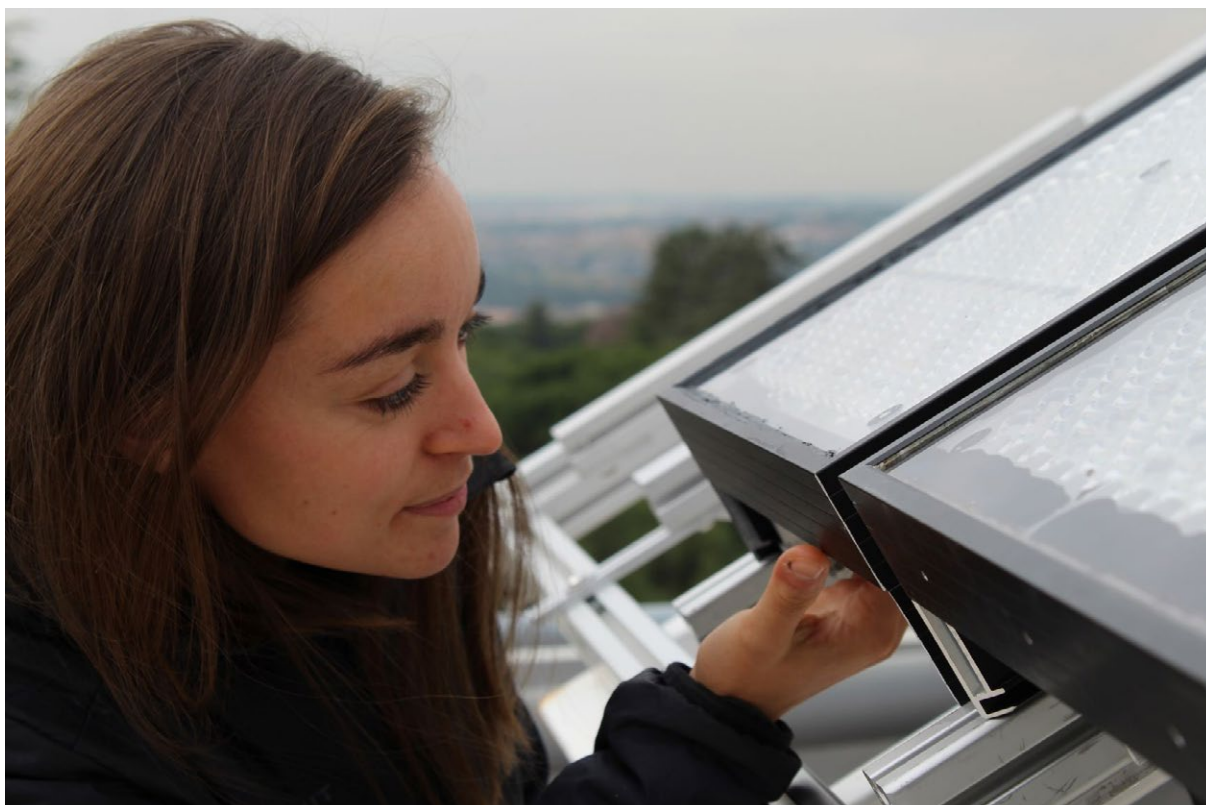**PROJECT WEBSITE**
dnoses.eu

Could open science help spark the photovoltaic generation?

Focusing on transformative solar technologies, GRECO demonstrates that successfully embedding open science in research and development relies on making clear its benefit to both technology itself and its transfer to society.

© Regina Schwald, European Science Communication Institute

Photovoltaic (PV) technology plays an important role in our transition from fossil fuels to more environmentally benign energy sources. As PV innovations touch many settings, from domestic to industrial, feedback about their design and implementation from a range of stakeholders could help hasten their wider adoption.

The EU-supported GRECO (Fostering a Next Generation of European Photovoltaic Society through Open Science) project conducted a series of pilots to test how open science tools could shape the development of PV products.

"Despite the principles of open science and responsible research and innovation being well established, and widespread recognition of their value, a gap remains between theory and practical implementation in the energy and engineering sectors," explains Carlos del Cañizo, project coordinator.

Pilots and products

To understand the perceived barriers to integrating open science, GRECO worked with PV researchers in Brazil, Bulgaria, Germany, Portugal, Spain and the United Kingdom.

The team found that many researchers did not view it as their responsibility, while others feared that intellectual property would be compromised, or were concerned about the extra workload.

GRECO organised events with over 100 PV stakeholders – including installers, manufacturers, consumer groups and policymakers – to identify research priorities. Those cited include: technical and cost accessibility, high quality and efficiency, recyclability and low polluting, alongside adaptation to surroundings.

GRECO's pilots enabled the team to develop innovations that helped address some of these findings.

In one pilot, working with PV system owners, the team developed ageing and degradation models, leading to in situ repairs aided by video tutorials. "This benefits the circular economy through less waste," remarks Cañizo, from the Polytechnic University of Madrid in Spain, the project host.

In another, irrigators using PVs in large-scale systems were asked to redefine initial research questions. The result was a new PV design (video in Spanish) for the powering of high-voltage pumps which SolaQua, a follow-up project, is further developing.

To increase the adoption of PV in cities, GRECO worked on some specific product innovations. For example, GRECO tested a cell architecture, combining a perovskite cell with a silicon solar cell to produce a novel three-terminal device.

The team also developed an advanced PV module based on the highly efficient 'micro-concentration' technology – currently being refined by project partner Insolight – in addition to a PV architecture to power heat pumps for air conditioning.

Integrating the best open science solution

For each workstream, GRECO identified the best open science approaches. For instance, with the technology readiness level (TRL) high for irrigation, open innovation was implemented.

Whereas with a low TRL for solar cell technology, an open database was created to share perovskite information based on 44 000 published literature data points, crowdsourced by over 80 volunteers from 25 000 peer-reviewed papers.

GRECO even started a citizen science initiative, creating an app and platform to collect and map data on global PV installations.

Lessons from these pilot studies led to a practical guide to help researchers embed open science approaches. "Our bottom-up vision has already inspired researchers, and our practical guide has helped them make changes within their spheres of influence," notes Cañizo.

"While Generation Solar is basic, it demonstrates what could be achieved with the right resources," says Cañizo, adding: "What is needed is a campaign which shows open science as a winning strategy for both science and society. This means changing researcher incentives from a focus on paper citations, to more collaborative metrics and we need to persuade citizens to stop considering themselves as passive consumers of technology, and instead as co-protagonists in the energy revolution."

The project results, including scientific papers, are also available through Zenodo.

We need to persuade citizens to stop considering themselves as passive consumers of technology, and instead as co-protagonists in the energy revolution.

PROJECT

GRECO – Fostering a Next Generation of European Photovoltaic Society through Open Science

COORDINATED BY
Polytechnic University of Madrid in Spain

FUNDED UNDER
Horizon 2020-Science with and for Society

CORDIS FACTSHEET
cordis.europa.eu/project/id/787289

PROJECT WEBSITE
greco-project.eu

Inspiring new directions in citizen-based science

An online, collaborative platform aims to showcase citizen-led science projects and share their stories – and successes – with the world.

Citizen science initiatives are under way across the world, from Europe to Africa, the Americas to Asia. While these projects can make significant contributions to society, they often do so while working in a vacuum. Much more could be achieved if citizen scientists, scientists and other key stakeholders pooled their experiences and shared their knowledge to create research and projects that directly respond to the needs of communities.

This is exactly the thinking behind the EU-funded InSPIRES (Ingenious Science shops to promote Participatory Innovation, Research and Equity in Science) project.

"Our goal was to connect social concerns and demands with researchers to co-create research projects with the potential to transform knowledge into action, reduce inequalities, and promote self-determination and a better society," says Anne-Sophie Gresle, InSPIRES project coordinator.

Supporting numerous science shops

At the heart of the project is the science shop, an intermediation structure between science and society that provides independent, community-based research addressing concerns of civil society. "To start, we brought together practitioners and experts from Europe and beyond to co-design, jointly pilot and implement

innovative models for science shops," explains Gresle. "We then looked to support these participatory projects and evaluate their impact on the different groups involved."

In total, InSPIRES provided support to 123 science shops working in Bolivia, France, Hungary, Italy, the Netherlands, Spain and Tunisia. The project also funded six more projects through the organisation of a competitive call.

The work these projects did was very diverse. For example, a project in Hungary investigated how the use of trauma-informed yoga classes can benefit the well-being of various disadvantaged groups. In France, another project explored how urban planning decisions can lead to the gentrification of neighbourhoods.

A full list of the initiatives that InSPIRES supported is available online.

Even though each of these projects touched on different topics and took place in different countries, each was born out of a concern expressed by a civil society organisation. "The level of participation for each project was adapted according to civil society expectations and needs," notes Gresle. "Furthermore, all projects communicated their research results back to the relevant civil society organisation, which is a mandatory component within the science shop mechanism."

The InSPIRES Open Platform

Information from all the different projects was then used to build the InSPIRES Open Platform, an online collaborative and crowdsourced database featuring science shops and citizen science initiatives. "The Open Platform is where we showcase the projects and their results," adds Gresle. "It's a community where actors can tell stories of inspiring experiences, learn together and grasp the real impact of their work."

According to Gresle, the platform offers an intuitive and easy monitoring and evaluation tool that projects can use to measure their impact. All a project has to do is enter their information and ask participants to answer simple questionnaires. The tool then automatically analyses the data and produces reports in real time.

This work has reinforced our conviction in the need to permeate science with participatory processes.

As its name suggests, the InSPIRES project was all about inspiring new directions in citizen-based science. "This work has reinforced our conviction in the need to permeate science with participatory processes," concludes Gresle. "By providing ongoing support to the global science community, enhancing mutual learning by sharing experiences, and promoting best practices in citizen science, the InSPIRES Open Platform is perfectly placed to do exactly that."

PROJECT
InSPIRES – Ingenious Science shops to promote Participatory Innovation, Research and Equity in Science

COORDINATED BY
Barcelona Institute for Global Health in Spain

FUNDED UNDER
Horizon 2020-Science with and for Society

CORDIS FACTSHEET
cordis.europa.eu/project/id/741677

PROJECT WEBSITE
app.inspiresproject.com

Measuring the impact of citizen science

A new platform aims to help citizen science projects better understand the impact their work is having.

© Claire Williams

Citizen science, where the public collaborates with scientists to conduct research and produce scientific knowledge, has many potential benefits. Participants learn new skills and benefit from gaining a deeper appreciation of the scientific process, while scientists gain access to large, localised data sets that they simply could not collect working alone. Even society benefits, as citizen science projects can inform government decisions and support sustainable initiatives.

"Whilst the potential of citizen science is well-documented, we are pretty limited when it comes to trying to measure it in a quantifiable way," says Luigi Ceccaroni, a scientist at Earthwatch Europe. "In fact, there is no streamlined process for assessing a project's impact and making comparisons to other projects."

With the support of the EU-funded MICS (Developing metrics and instruments to evaluate citizen science impacts on the environment and society) project, Ceccaroni and his colleagues are working to create methods and guidelines for measuring the impact of citizen science, which they will present in a comprehensive online platform. "The project is currently working on five case studies exploring the applicability of different citizen science approaches and tools across different regions and contexts," adds Ceccaroni.

Consider, for example, the Marzenego river in Italy. Over the years, the river's course has been artificially modified, resulting in an increased flood risk. Furthermore, the river has become polluted due to urbanisation and agricultural activity.

To change this, MICS adapted existing co-design methodologies from the EU-funded Ground Truth 2.0 project to bring together the local water authority, government leaders and citizen scientists. Together, they discussed the challenges related to

the river and nearby wetlands, identified priorities, and provided citizen scientists with the tools and training they need to monitor and analyse water quality and vegetation.

A platform for everyone

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Whilst the potential of citizen science is well-documented, we are pretty limited when it comes to trying to measure it in a quantifiable way.

Lessons learned from case studies in Hungary, Italy, Romania and the United Kingdom have been considered in the development of the MICS platform. As Ceccaroni explains, citizen-science project coordinators will be able to easily log onto the platform and enter their project's data. Using artificial intelligence algorithms, the platform then generates an impact assessment of the project.

"Because the platform will be made freely available, other citizen science projects will have access to the impact assessment tools and guidance and will be able to use the platform to consider the impact their activities are having," notes Ceccaroni.

The platform can be used at any stage of a project. For example, before a project begins, it can help shape the design of the project. A project that is already running can leverage the platform to help alter its activities to maximise its impact. After a project finishes, the platform can be used to summarise what was achieved and attract additional funding.

"Each project will have its own page on the platform, from which they can share impact reports with anyone interested in their activities," concludes Ceccaroni. "Ultimately, the platform will help citizen science projects think critically about their own impact and adapt their approach to ensure they deliver benefits to participants, the scientific community, the environment and society as a whole."

PROJECT

MICS – Developing metrics and instruments to evaluate citizen science impacts on the environment and society

COORDINATED BY

Conservation Education & Research Trust in the United Kingdom

FUNDED UNDER

Horizon 2020-Science with and for Society

CORDIS FACTSHEET

cordis.europa.eu/project/id/824711

PROJECT WEBSITE

mics.tools

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Think local, act global: Can community-led actions tackle large-scale societal issues?

Often used to curate locally relevant collaborations, co-creation is a tempting paradigm for tackling more wide-scale social issues. However, does scaling up such a system jeopardise the focus it offers?

When companies, universities, policymakers and citizens get together to collaborate on a project or innovation, they are engaging in what is called co-creation.

Long used in the business world, particularly around consumer relations, the EU is increasingly seeing co-creation as a potential vehicle for steering innovation to support the public

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good. However, there is an assumption that, to have widespread impact, co-created solutions would have to be scaled up.

"At first glance, the idea of scaling up co-creation seems to risk throwing the baby out with the bathwater," explains Sebastian Pfotenhauer, a professor at the Technical University of Munich (TU Munich). "Expanding the scale would risk losing its core value proposition – the ability to address locally specific needs and concerns and better embed innovation within society."

With the support of the EU-funded SCALINGS (Scaling up Co-creation: Avenues and Limits for Integrating Society in Science and Innovation) project, Pfotenhauer is leading an effort to find out if, and when, scaling co-creation is desirable – or even possible. "We wanted to see how far co-creation could be responsibly scaled across different places and domains, and what the limits are," he says.

Eye-opening discoveries

The project carried out a comparative study of co-creation efforts happening in 10 countries. During the study, researchers examined three mainstream co-creation instruments, namely living labs, public procurement of innovation, and co-creation facilities, being used across a range of technical domains.

"Co-creation looks very different in different regions and contexts of application," says Carlos Cuevas Garcia, a researcher from the TU Munich team, adding that it can be both inclusive and exclusive. "While co-creation is often viewed as a process that brings people together, it can also reveal, even exacerbate, substantial power asymmetries and inequalities," notes Cuevas Garcia. "To be scalable, the process needs to address the political dimension of co-creation and be implemented both carefully and reflexively."

Another major insight was that the demand for co-creation expertise and dialogue is huge. "Many technical communities are already deploying co-creation formats regularly," adds Pfotenhauer. "However, when they do, they tend to run into the same kind of questions and challenges."

Expanding the scale (of co-creation) would risk losing its core value proposition – the ability to address locally specific needs and concerns and better embed innovation within society.

According to Pfotenhauer, some of the most common questions heard include: Who should be involved and when? How do the requirements change when moving from one site to another? How can these communities be sustained beyond individual project cycles? How much of the co-creation process can actually be standardised in policy instruments? What role should the EU play?

A roadmap for responsible co-creation

To help answer these questions, the project leveraged all its findings and best practices to create a roadmap for implementing responsible co-creation projects.

"This tool provides organisers and policymakers with a set of prompts that can help steer their co-creation efforts towards more desirable, sustainable and impactful outcomes," remarks Pfotenhauer. "We expect this tool will become a go-to resource for policymaking, research funding and all things co-creation."

The roadmap, along with SCALINGS' other findings and teaching resources, are already playing a central role in another EU-funded project, BoostEuroTeQ, which focuses on augmenting future engineering education.

PROJECT

SCALINGS – Scaling up Co-creation: Avenues and Limits for Integrating Society in Science and Innovation

COORDINATED BY
Technical University of Munich in Germany

FUNDED UNDER
Horizon 2020-Science with and for Society

CORDIS FACTSHEET
cordis.europa.eu/project/id/788359

PROJECT WEBSITE
scalings.eu

Putting citizens in the driving seat of urban transport policy

For urban policies, it's often the case that citizens themselves know what needs improving. An EU-funded project deployed low-cost traffic monitoring systems in five European cities, enabling residents to shape urban transport policies.

School children assembling traffic counters during an engagement workshop

© Colman O'Sullivan, RTE News, Ireland

Traffic is something that affects most city dwellers, whether they are stuck in a jam, waiting too long for public transport, trying to navigate through on foot, or suffering from pollution.

WeCount (Citizens Observing UrbaN Transport), an EU-funded citizen science project, included residents in the collection of

traffic data, giving them the necessary evidence to push for new transport policies.

"The aim of our project was to enable citizens to initiate a policymaking process by having them collect traffic data with an automated sensor," explains Kris Vanherle, WeCount

project coordinator at Transport & Mobility Leuven. "We wanted to empower citizens, give them the means to collect and analyse traffic data, and formulate solutions for local mobility problems."

The WeCount project ran five successful case studies involving hundreds of citizens in Cardiff, Dublin, Leuven, Ljubljana and Madrid.

"We demonstrated the approach works for different cities, with different cultural and mobility challenges," Vanherle says. "In all cases, there are examples of changes in the field, such as speed bumps, lowering speed limits, and changes to traffic circulation – as a direct result of the actions of the citizens in the project," he adds.

Taking advantage of local knowledge

The aim of our project was to enable citizens to initiate a policymaking process by having them collect traffic data with an automated sensor.

WeCount used an existing traffic counting sensor known as Telraam: a low-cost, high-tech device that citizens can install in the front windows of their homes to monitor passing traffic. These sensors send the data to a dedicated software platform, letting all users easily access and visualise the data.

"We improved these sensors and the platform, to increase ease of use and installation from the perspective of the citizen, and to facilitate the management of the citizen science project from the perspective of the researcher," notes Vanherle.

Yet while technology was a major component of WeCount, it's first and foremost a citizen science project, he adds. "We engaged with citizens to understand concerns about local traffic, the collection of data itself, the interpretation of data and creating the bridge with the policy level, enabling dialogue."

Residents are well placed to understand specific local issues, and can explain the sometimes counterintuitive trends found in traffic data. For example, while there are typical peaks in traffic during the morning and evening, some local streets show strange usage patterns that a transport policy specialist behind a desk might not understand.

Urban policy through public involvement

The WeCount team wanted to create a system that could be replicated by residents of other European cities, in future citizen science projects. Two policy briefs also emerged: one focused on the challenges of adapting citizen science methodology to an online setting, necessary due to the constraints brought on by the COVID-19 pandemic. The second highlights the success stories from WeCount, and how the lessons learned can better inform future urban policy.

"Ultimately, the project also engaged with local and regional authorities and cities, to share the potential of involving citizens in the process of data gathering," says Cláudia Ribeiro, project officer at POLIS, the network for European cities and regions cooperating for sustainable urban mobility. "This can lead policymakers to make better informed decisions about traffic planning and management," she adds.

PROJECT
WeCount – Citizens Observing UrbaN Transport

COORDINATED BY
Transport & Mobility Leuven in Belgium

FUNDED UNDER
Horizon 2020-Science with and for Society

CORDIS FACTSHEET
cordis.europa.eu/project/id/872743

PROJECT WEBSITE
we-count.net

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Cultivating the fruits of shared innovation

Responsible research and innovation can significantly support collaboration between healthcare sectors and research and innovation policies. Through the EU-funded CHERRIES project, a consortium of partners across Europe supports the development and market-uptake of responsible healthcare innovations.

CHERRIES (Constructing Healthcare Environments through Responsible Research Innovation and Entrepreneurship Strategies) supports healthcare research and innovation policy and pilot actions by interlinking responsible research and innovation (RRI), demand-side policy and regional innovation models. The project aims to create more open, inclusive and self-sustaining R&I ecosystems by ensuring bottom-up involvement of all kinds of citizens, irrespective of their age, gender, ethnicity and socio-economic background.

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The CHERRIES model is being implemented through RRI policy experiments in the healthcare sector across three European regions – in Murcia, Spain, Örebro in Sweden and Cyprus. Using an RRI framework, the CHERRIES team is mobilising stakeholders to form regional pilot actions. These initiatives identify local needs in the healthcare sector and encourage the proposition and co-creation of innovative solutions to these identified needs. Experience has shown that innovations produced in this participatory manner will have a higher chance of being widely adopted and achieving commercial success.

The regional pilots also facilitate reflection on how to innovate healthcare practices through participatory approaches, and present evidence-based recommendations for the revision of sectoral policies, strategies and innovation support instruments. The pilots address the progression of multiple sclerosis, loneliness in elderly people, and the provision of healthcare services for people living in remote areas.

Bringing together 12 institutions including universities, research organisations, SMEs, healthcare institutions and regional authorities from seven EU Member States, CHERRIES will contribute to more open, transparent and democratic research and innovation systems in the engaged regions and beyond, producing positive societal, democratic, environmental and scientific impacts.

PROJECT

CHERRIES – Constructing Healthcare Environments through Responsible Research Innovation and Entrepreneurship Strategies

COORDINATED BY
Centre for Social Innovation (ZSI) in Austria

FUNDED UNDER
Horizon 2020-Science with and for society

CORDIS FACTSHEET
cordis.europa.eu/project/id/872873

PROJECT WEBSITE
cherries2020.eu

EU-Citizen.Science

Coordinated by the Museum of Natural History in Germany

The project's mission is to make citizen science an appreciated and widely established means for the democratisation of science in Europe. It established the EU-Citizen.Science platform as the knowledge and community hub for high-quality citizen science exchange and learning, serving as a reference point for citizen science participants, practitioners, researchers, policymakers and society across Europe. The EU-Citizen.Science platform empowers stakeholders to implement citizen science approaches professionally, strengthens links between citizen science and policymaking, and advances citizen science into the research and innovation process.

EU-CITIZEN.SCIENCE PLATFORM
eu-citizen.science

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WeObserve

Coordinated by the International Institute for Applied Systems Analysis in Austria

WeObserve tackles a specific form of citizen science: the Citizen Observatory. Citizen Observatories are community-based environmental monitoring and information systems to support evidence-based policy and behaviour changes.

WeObserve improves the coordination between existing Citizen Observatories and related regional, European and international activities to tackle three key challenges that Citizens Observatories face: awareness of citizen science, acceptability of and trust in data and processes, and sustainability of activities.

The project established Communities of Practice around key topics, extended the geographical coverage of the Citizen Observatory knowledge base, and demonstrated their added value in environmental monitoring mechanisms.

All outputs are available on the WeObserve website and on **Zenodo**, including a **Roadmap for policymakers** to move citizen science into the mainstream as well as an online '**Cookbook**' that guides users on how to set up a Citizen Observatory.

WEOBSERVE WEBSITE
weobserve.eu

CORDIS Results Pack

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Pollution affects us all, from the air we breathe, to the water we drink, to the food we eat.

In Episode #05 of the CORDIScovery podcast, we meet three EU-funded researchers who are kicking up a stink about pollution with innovative solutions to tackle this health and environmental scourge. Rosa Arias, a chemical engineer with a background in odour pollution is involved in the **D-NOSES** project that gives people the tools they need to record data from one of the most sensitive sensors we have, our noses! Fabio Galatioto explains how he and his colleagues through the **APA** project have developed disruptive technology to shake up our approach to air purifiers at home, work and on our streets. Ioannis Dontas, a physicist whose focus is on material and surface sciences, tells us more about how the **IMPRESSIVE** project is using drones and earth observation data to protect the environment.

Tune in and enjoy: **bit.ly/CORDIScovery_Episode_5**

CORDIScovery podcast

#05
EU researchers tackle pollution

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Interested in hearing more about the cutting-edge EU research that is shedding light on our world and tackling the key issues facing us today? Every month, the CORDIScovery podcast brings together a selection of Europe's leading scientists to discuss what is happening at the forefront of their scientific fields. Play the episodes of your choice directly through your browser on **anchor.fm/cordiscovery**, or subscribe to the whole series through your favourite podcasting service.

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