doing it together science

Grant agreement no. 709443

DITOs

Doing It Together science

Coordination & Support Action

D3.3 Sustainable support for citizen and DIY science

Work Package: 3

Due date of deliverable: Month 36

Actual submission date: 29 / 05 / 2019

Start date of project: June 01 2016   Duration: 36 months

Lead beneficiary for this deliverable: ECSA

Contributors: ECSA, RBINS, Meritum, Kersnikova, Waag, Medialab Prado, UCL, UPD, UNIGE

Reviewer: Muki Haklay (UCL); Dorte Riemenschneider, Simone Rüfenacht, Tim Woods, Marzia Mazzonetto, Margaret Gold (ECSA)

Project co-funded by the European Commission within the H2020 Programme (2014-2020)		
PU	Public	X
CO	Confidential, only for members of the consortium (including the Commission Services)	
EU-RES	Classified Information: RESTREINT UE (Commission Decision 2005/444/EC)	
EU-CON	Classified Information: CONFIDENTIEL UE (Commission Decision 2005/444/EC)	
EU-SEC	EU-SEC Classified Information: SECRET UE (Commission Decision 2005/444/EC)	

Disclaimer

The content of this deliverable does not reflect the official opinion of the European Union. Responsibility for the information and views expressed herein lies entirely with the author(s).

All 'Doing It Together science' (DITOs) consortium members are also committed to publish accurate and up to date information and take the greatest care to do so. However, the DITOs consortium members cannot accept liability for any inaccuracies or omissions nor do they accept liability for any direct, indirect, special, consequential or other losses or damages of any kind arising out of the use of this information.

Copyright Notice

Acknowledgement

Reference

Please cite this work as:

DITOs Consortium, 2019. *Doing It Together science: D3.3 Sustainable support for citizen and DIY science* ECSA, London.

Document Identification Sheet

Project ref. no.	709443
Project acronym	DITOs
Project full title	Doing It Together Science
Document name	DITOs-D3.3-20190529.pdf
Security (distribution level)	N/A
Contractual date of delivery	Month 36, 31.05.2019
Actual date of delivery	29.05.2019
Deliverable number	D3.3
Deliverable name	D3.3 Sustainable support for citizen and DIY science
Type	Report
Status & version	Version 3.0
Number of pages	45
WP / Task (responsible)	WP3 / T3 (ECSA)
Author(s)	Lead Partner Name: Claudia Göbel
Other contributors	Gaia Agnello, Dorte Riemenschneider, Simone Rüfenacht, Tim Woods, Margaret Gold, Marzia Mazzonetto, Barbara Carneiro, Giulia Melilli (ECSA), Muki Haklay, Alice Sheppard (UCL), Carole Paleco (RBINS), Paweł Wyszomirski (Meritum), Simon Gmajner (Kersnikova), Tamar ter Steege, Pauline Appels (Waag), Chema Blanco, Laura Fernandez (Medialab Prado), Imane Baiz (UPD), Elisa Radosta, Bruno Strasser (UNIGE)
Project Officer	Colombe Warin
Abstract	Summary report on Partners as Innovation Hubs, Cross-pollination through Exchange & Building a European Network.
Keywords	Citizen science, DITOs, innovation hubs, knowledge exchange, networking, legacy, open organisations
Sent to peer reviewer	22/05/2019
Peer review completed	23/05/2019

Supervisory Board approval version 1.0	27/05/2019

Table of Contents

List of Figures

1 Version Log

Version	Date	Released by	Nature of Change
Draft 1	06/05/2019	ECSA	Draft for internal review with ECSA team
Draft 2	22/05/2019	ECSA	Draft for external reviewer
Draft 3	27/05/2019	ECSA	Incorporated changes from reviews
Version 1	28/05/2019	Alice Sheppard/UCL	Final formatted version for publication

2 Definitions and Acronyms

Acronyms	Definitions
ALLISS	Pour une alliance sciences en société (project)
CS	Citizen Science
CSA	Coordination and Support Action
DITOs	Doing It Together science
DIY	Do It Yourself
DT	Discovery Trip
EC	European Commission
ECSA	European Citizen Science Association / Verein der Europäischen Bürgerwissenschaften
EIE	Empowerment, Inclusiveness and Equity
eutema	EUTEMA GMBH
H2020	Horizon 2020 Programme
KI	Kersnikova Institute
KPI	Key Performance Indicator
LISIS	Laboratoire Interdisciplinaire Sciences Innovations Sociétés (project)
Meritum	Centrum Szkolen I Rozwoju Osobistego Meritum
MP	Medialab Prado, Madrid
NGO	Non-government organisation
OS	Open Science
RBINS	Institut Royal des Sciences Naturelles de Belgique

RRI	Responsible Research and Innovation
STARTS	Science, Technology and the Arts (EU initiative)
Tekiu	Tekiu Limited
UCL	University College London
UNIGE	Universite de Geneve
UPD	Universite Paris Descartes
WP	Work package
WS	Waag Society

3   Management Summary

This deliverable addresses the overall question of how DITOs capacities have been used to establish sustainable ways of supporting citizen and DIY science activities in Europe after the end of the project. We have identified three mechanisms, each of which is discussed in one chapter:

(1) DITOs partners acting as innovation hubs in their respective local and practice communities. With a reference to D3.2, we revisit the concept of innovation hubs and briefly discuss what follow-up activities were taking to improve it. Then we present vignettes on DITOs partners including a short overview of activities carried out and future plans along with key learnings and challenges that others can learn from. All partners have used DITOs as an opportunity to modify existing activities, develop new ones and extend their staff capacities. Beyond that, how partners used the project varies with the previous experiences with Citizen Science (CS) and Do-It-Yourself (DIY) science as well as the type of organisations and external factors. While UCL brought their work to a European scale, other partners financed core activities, established their CS activities firmer at the organisation, multiplied their impact or changed their approach.

(2) Exchange and cooperations between DITOs partners are seen as a key aspect of DITOs mentioned by all partners. DITOs has made possible countless cooperation experiences between consortium members as well as with external partners. These experiences have established new relationships and continue to be available as reservoirs of resources for future activities. To make these experiences more tangible, we give an overview of past and desired future cooperations mapped at the project mid-term meeting along with five stories of different cooperation experiences identified by partners as important.

(3) ECSA as an established network for citizen science in Europe backed by a more mature organisation to make DITOs legacy a basis for future work. Here we present an overview of how ECSA's capacities have been extended, e.g. in terms of the number of members, diversified communication channels and number of EU projects. We argue that acting as a legacy organisation for DITOs translates into the

question: How can ECSA continue to promote citizen science, understood in a pluralistic way, and strengthen European cooperation and cross-fertilisation between practitioners? Our answer is: By promoting openness - both by supporting CS practitioners, like the DITOs innovation hubs, to work more openly and by making ECSA a more open organisation itself. We give an overview of the events we used to explore this topic and share six dimensions of openness for CS in Europe: (1) Using pluralistic concepts, (2) Improving situated openness of data and projects, (3) Addressing questions of power, (4) Building more open organisations, (5) Promoting cross-boundary cooperation and cultural diversity and (6) Supporting fair working conditions, team support and self-care. Finally, we show exemplary measures developed at ECSA to put these principles into practice.

The data for this deliverable has been gathered through workshops, interviews with DITOs partners, synthesis work on activities carried out and discussion with ECSA staff.

D3.3 Sustainable support for citizen and DIY science is Deliverable 3.3 (D3.3) from the coordination and support action (CSA) Doing It Together science (DITOs), grant agreement 709443.

4 Introduction

Legacy is a key topic in DITOs and as such has already been addressed during the 3 years operational period. This deliverable (D3.3) approaches legacy through the lens of WP3's signature topic "Public engagement and capacity building".

The main objective of WP3 was to "develop clear guidelines, mechanisms and institutions to extend the development of public engagement in citizen science and DIY science across Europe". The core aims of the work package were:
- Supporting the involvement of citizens and scientists in research and innovation through upstream and downstream engagement;
- Creating avenues for the dissemination and capitalisation of project outcomes throughout Europe;
- Establishing ECSA as a pan-European knowledge and resource centre for RRI-driven citizen science to provide a streamlined interface for stakeholder capacity building.

This deliverable follows D3.1, which set out the DITOs website for knowledge-sharing and portal for data and document repositories and D3.2 on the setting up of project partner innovation hubs.

Photo: DITOs team and supporters at final event in April 2019. Credit: Quentin Chevrier, CC-BY-NC-ND-SA.

Here, we address the overall question of how DITOs capacities have been used to establish sustainable ways of supporting citizen science and DIY science activities in Europe beyond the end of the project. We have identified three key mechanisms for that:

1. DITOs partners who, through the project, have expanded their capacities and function as innovation hubs in their respective local and practice communities;
2. New relations between DITOs partners that have been established through exchange and cooperation during the project, that have altered each partner's work and continue to be available as a reservoir of resources for future activities;
3. ECSA, which has been developed into a network for citizen science practitioners in Europe through the project and that is backed by a more mature organisation to stimulate future work.
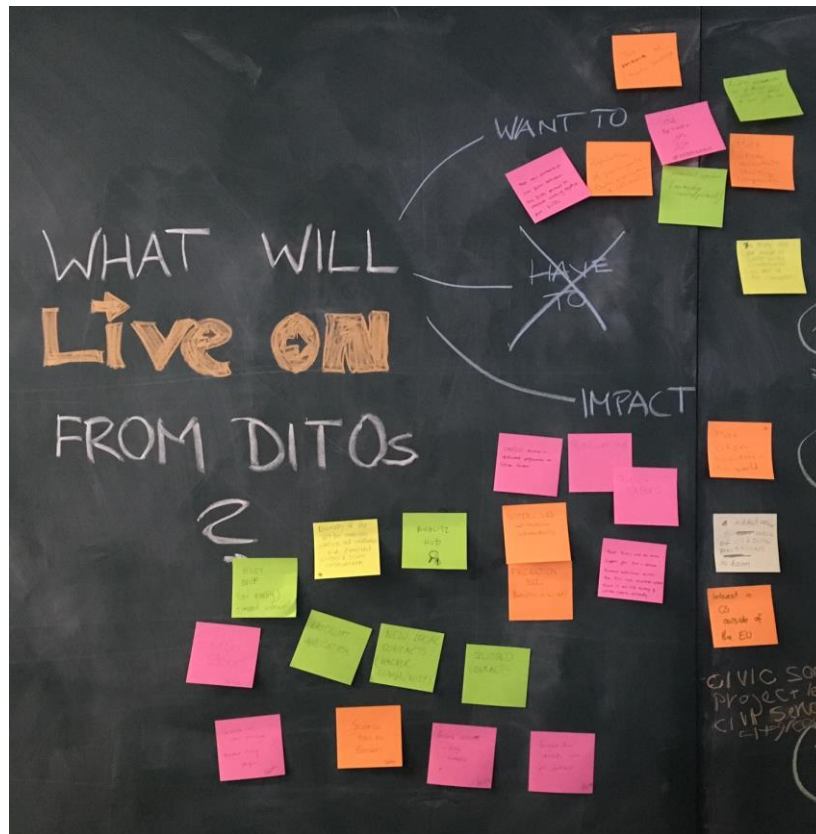
Photo: DITOs legacy workshop at consortium meeting 2018. Credit: Claudia Göbel CC BY 4.0.

In the following sections, each of these mechanisms will be presented in more detail based on notable examples from the consortium. The concluding one summarises important influencing factors, challenges and learnings that we have identified for each mechanism.

The data for this deliverable has been gathered through a number of methods, including:
- two workshops on mapping connections and legacy at the 2018 consortium meeting (Ljubljana) facilitated by Cindy Regalado and Claudia Göbel,
- a workshop on detailing cooperation events at the 2019 consortium meeting (London) facilitated by Claudia Göbel,
- interviews with DITOs partners in the last 3 months of the project realised by Claudia Göbel,
- synthesis work on activities carried out and discussion with ECSA staff by Claudia Göbel, Gaia Agnello and the other members of the ECSA team, and
- reviewers comments.

It should be noted that the topic of legacy is naturally a transversal topic in DITOs and thus extends beyond this deliverable to other ones. Against this background and to provide a most consistent and efficient style of reporting, the focus of this deliverable has been slightly adapted. In the project proposal, this deliverable was conceptualised as "report on network expansion and long-term sustainability plans developed by

ECSA, with provision for the continued self-sustaining support of DITOs web". Mapping contents of our final a badge of deliverables thoroughly and liaising with colleagues, we realised that the DITOs communication infrastructure, of which the website is an essential part, will be most extensively covered in deliverable D6.7 and D6.8 will focus on other aspects of the project's ecosystem. In order not to duplicate content and work, D3.3 will thus not address the DITOs website or communication channels and fully focus on partners, their cooperation and ECSA. Furthermore, D5.3 will address summative, formative, ethnographic and case study evaluations of project impacts.

5 DITOs partners: Innovation hubs to support Citizen Science and DIY science activities

In the scoping phase of DITOs, we elaborated the concept of **innovation hubs** to describe the status quo from which the partners are moving to build a sustainable network beyond the duration on the project (D3.2). DITOs innovation hubs are based on principles and practical insights of how organisations can support the implementation of new ideas and concepts that stem from citizen science: Innovation hubs focus on **communal** activities providing room for **self-organising and adaptive** initiatives, that promote **interdisciplinary knowledge transfer** targeted towards **enabling innovators** with the aim for **global impact** (Figure 1). These principles are derived from existing innovation hub networks and informed by the Responsible Research and Innovation (RRI) toolkit.
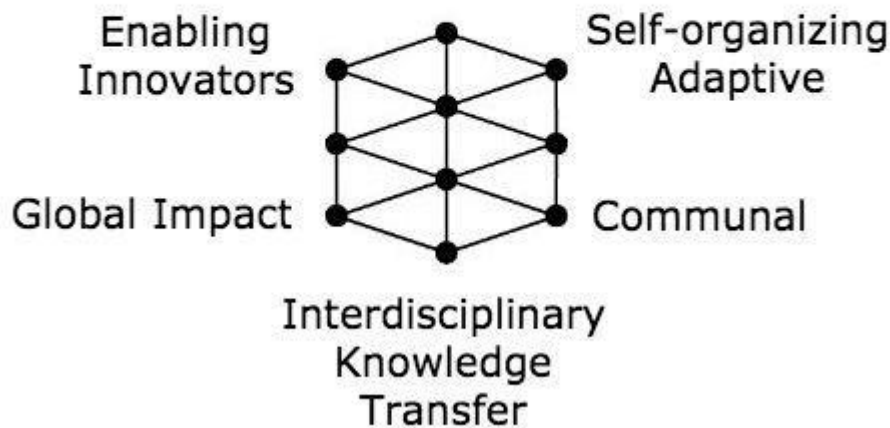
In D3.2, these principles were used as a lens to analyse the practices and capabilities of each DITOs partner: UCL, RBINS, UPD, WS, ECSA, MP, KI, Meritum, UNIGE and Tekiu. Based on these partner characteristics, D3.2 outlined eight propositions to strengthen innovation hubs in the second half of the project:

1. **Furthering the understanding of innovation hub principles**: This has been done through the work on this Deliverable by exchanging experiences and synthesising learnings on how to embed citizen science and DIY science in organisations (see sections 2.1 and following below).
2. **Continuing exchange of good practices**: This has been a continuous aspect of DITOs through regular face-to-face consortium meetings, capacity building visits and cooperation activities (see chapter 3).
3. **Extending the online project space in support of good practice exchange**: While the DITOs website was mainly expanded to facilitate more accurate and easier event reporting, the Hackteria forum that was created in connection to the Biofabbing conference continues to offer a lively platform for exchange. Further learning is integrated in proposals for the EU-Citizen.Science project which builds on DITOs lessons.

4. **Exploring the possibility of measuring the progress of the network with that platform**: WP5 has used event data gathered via the website for DITOs evaluation (see D5.3).
5. **Improving the hubs' capabilities to diversify audiences and promote inclusion**: In 2018, ECSA together with the Living Knowledge Network has created a working group on Empowerment, Inclusiveness and Equity in Citizen Science and Community-Based Research in order to support exchange and work on this topic.
6. **Attract external collaborators by drafting a manifesto**: As an alternative to a manifesto, partners have used and promoted the escalator model of citizen science.
7. **Formulating clearer value propositions to external stakeholders**: For policy engagement work, the strategy has been adopted in the second half of the project and addressed different target groups in a more nuanced way. For instance, we have started to work with NGOs doing capacity building and networking for how to do policy engagement activities and diversified the types of policy briefs into a basic format with general information and a more specialised research insight format.
8. **Outlining a legacy strategy beyond the lifetime of DITOs**: Each partner has done so for their activities (see below) and ECSA developed a legacy strategy and tools at the European community level (see chapter 4).

The next section presents for project partners **how DITOs capacities have been used to establish sustainable ways of supporting citizen science**. This includes a **short overview of activities** partners have done and what their plans are for the future. In addition, some **key learnings and challenges** for doing this work have been collected from which others can learn. The collection of learnings and challenges is an explorative one, not aiming to be neither exhaustive nor representative. Many challenges or learnings are shared by partners. The aim here was to bring out a panorama of key aspects to share good practices from DITOs. These vignettes are provided only for partners doing Citizen Science (CS) and Do-It-Yourself (DIY) science activities as well as communication and facilitation of such initiatives. Partners who mostly focused on providing services to CS practitioners or decision makers are not covered here but separately - for example, Tekiu, who are reporting on discovery trips in D4.4, or eutema, who are presenting the evaluation approaches and results in D5.3 and ECSA's approach to being the legacy organisation of DITOs in chapter 4.

DITOs Innovation Hub Conceptual Framework

Enabling Innovators

Self-organizing Adaptive

Global Impact

Communal

Interdisciplinary Knowledge Transfer

1. **Communal**: an innovation hub encourages collaboration and togetherness
2. **Self-organising and adaptive**: an innovation hub allows Innovators to set the agenda and trajectory of innovation
3. **Interdisciplinary knowledge transfer**: innovators are transferring their knowledge and skills
4. **Enabling innovators:** the hubs transform participants in citizen science into innovators
5. **Global impact**: the innovations aim for tackling issues at a global scale

Figure 1: Principles of innovation hubs.

5.1 The Royal Belgian Institute of Natural Sciences (RBINS)

For RBINS, DITOs represented an opportunity to systematically develop their CS activities a step further and establish them firmer at the organisation. The project helped to improve internal capacities and cooperation, extend collaboration with the public and manoeuvre the ambivalence of CS definitions.

The Royal Belgian Institute of Natural Sciences (RBINS) as both a research institute counting more than 170 scientists out of its 411 total staff, and a museum developing knowledge and education activities in natural sciences for the general public is one of the largest natural history museums in Europe. RBINS has a long experience in Citizen Science regarding the collaboration with volunteers in collecting specimens in nature, identifying them and contributing to managing and cataloguing collections. When the institute renewed its overall strategy a few years ago, an operational strategy for CS was also adapted. It was felt that the DITOs project came just at the right time for systematically extending the existing activities, capacities and connections. Longstanding CS activities gained visibility, e.g. a malacology research group in which amateur naturalists regularly go to the field collecting specimens together with

museum researchers. A new event format – the BioBlitz – was piloted and tailored to the needs of museum researchers. A limited number of people would go to the field with scientists to collect specimens, bring them back to the lab, and analyse and prepare them. The event will be repeated in 2019. Educational programmes, like XperiBIRD.be[1] (see D5.3), were supported through DITOs. In addition, new initiatives were developed to involve visitors in co-creation and evaluation activities in educational service and museology. RBINS plans to continue all of these CS activities. For knowledge sharing and further development of the field, the museum is a partner in the new H2020 project EU-Citizen.Science[2] and will stay a member of ECSA. However, the work of the institute depends on funding for public institutions, which has become more scarce and vulnerable.

"You have to have an objective that will benefit your organisation – to see how it can really be an added value for the people and goals and missions of the organisation. Try to find the right people interested in that. Try to elaborate the activity with them, inviting those citizens already aware of what the organisation is doing and provide a space open for discussion, as a starting point."
– Carole Paleco, Citizen Science facilitator at RBINS

Photo: Insects collected during DITOs BioBlitz 2018 prepared by a volunteer at RBINS and still to be identified - Image credits: RBINS CC BY 4.0.

---

[1] http://xperibird.be/
[2] http://eu-citizen.science/

Key: Creating links between different parts of the museum.

Doing citizen science involves research, education and communication – activities that are organised in different departments at the museum with their own disciplinary backgrounds, ways of working, schedules, etc. Through DITOs, two people could be hired to work on interfaces – a scientist to improve links between the museum researchers and the general public as well as a communication expert to improve exchange with the general public. A CS working group of museum staff from different departments (research, education, communication) was created. The first thing the working group did was to map the existing activities at the museum with citizen scientists. This aimed at both getting an overview of who is doing what internally as well as making these activities more visible externally. This included creating a dedicated part on the museum website[3] as well as a contact email address (citizenscience@naturalsciences.be). It was also necessary to convince colleagues of the value of CS – both researchers and exhibition designers. For that, it was important to explain that CS involves more than science communication because research is a fundamental part of it; yet, communication is very important for CS activities. Another central point was creating a culture in which the expertise of others is acknowledged as a basis for working together. Links to ECSA helped to improve the ability to reach such expertise. For instance, the conferences are opportunities to see what other projects are going on, working groups, to pick up good practices in the field.

Key: Extending cooperation with the public.

Through workshops and activities, DITOs helped to support the networking and communication on CS and fostered links of scientists or facilitators or explainers with citizens. One highlight was a Citizen Science Day on 1st December 2018 to thank the citizen scientists for collaborating. The event was organised by the CS working group of the Institute. Citizen scientists were presenting their work and cooperation activities and elaborated on why they were collaborating with RBINS and what they found useful (or not). The event was finished by a cocktail and a movie screening. Initially, under DITOs's influence, it was also planned to include and acknowledge amateur contributions in biorooms of the new permanent gallery "Living Planet" due in 2017. But because of delays in developing the gallery notably due to operational and technical issues, this could not happen during the time of DITOs.

"We have to have the trust from the people we are working with so that these collaborations will really have some results and good outputs. If it remains at the communication level, it really is an empty shell. For us, even in cases where we do mainly education and communication related to CS we still try to have some outputs, in terms of content to give to participants or to report on what we did. Most of the events we developed and supported were content-providing, e.g. the Phasma meetings included evaluation & feedback; the BioBlitz with the collected specimens prepared are available for the participants and visitors to see, people can meet the volunteers who prepared them, and the scientists that are always ready to share their knowledge..."
– Carole Paleco, Citizen Science facilitator at RBINS

---

[3] https://www.naturalsciences.be/fr/museum/citizen_science/8998

Challenge: Using the ambivalence of a fuzzy definition of CS productively.
CS was not clearly defined at the institute. Sometimes this ambivalence presented a challenge. The DITOs escalator model comprising CS activities with different levels of engagement was helpful to address the ambivalence and use it productively by giving examples of activities and outlining potential links between them. DITOs opened a window to learn about all these new activities, at RBINS it was about highlighting the added value of CS both for participants and facilitators, and learning through exchange between project partners as well as in ECSA, e.g. regarding biodesign and DIY forms of work.

5.2 Meritum

Through DITOs, Meritum changed its approach to work on air quality from building awareness to also addressing problems directly by building tools and gathering data. This adaptation of methodologies rests on new local and European partnerships and flexibility for accommodating different ways of working.

The Center for Training and Personal Development Meritum is a Polish association founded in 1999. Its mission is to build civil society and improve the quality of human resources with respect to principles of sustainable development. As such, Meritum is an NGO borne out of local activism that works in the service of local communities in Katowice and Silesia. The association has extensive experience in the implementation of training projects. It started to work on air quality in 2015 making awareness campaigns on air quality problems in Silesia. Through DITOs, activities moved from awareness raising towards measuring and translating data into recommendations for adapting behaviour at societal level. The project helped to build new partnerships and exchange with other groups working on air quality in Europe.

Initial activities in DITOs included train-the-trainer workshops oriented towards sustainability, e.g. ecology and sustainable transport, science cafés and stakeholder round tables. These more discursive events focusing on discussion were over time complemented by more action-oriented ones. For instance, monitoring a bus station with diffusion tubes and developing proposals for how to change the layout of the station in order to change exposure to pollution by emissions from transport. Other activities included working with people from Hackerspace Silesia for developing an air quality sensor and the Katoluft app. Recently a prototype for air purifying was created and now investors are sought to develop a commercial product. The cooperation with the Hackerspace Silesia community will continue as well as joint activities with the ECSA working group air quality. In January 2019, DIY Fix the City Foundation – another local partner - opened "W56 city lab". This open space that is especially focused on expertise in public transport invites everybody to join, share their problems and then jointly explore methodologies for how to address these problems. Methodologies include, for example, citizen science and making short videos for building awareness and encouraging other people to share their knowledge and time

to address problems. W56 city lab will be a test best for these types of activities until the summer.

"Please check what people around you really need."
– Paweł Wyszomirski, Meritum & DIY Fix the City Foundation

Key: Building devices.

Together with partners from Poland Meritum has developed the katoluft.pl[4] app, a free and open app informing people about air quality in Katowice. The idea behind the app is to transform air quality measurements from numbers and colours into meaningful advice on how to plan activities according to current air quality. Almost 2,000 people used it during the winter season. Meritum also supported the Hackerspace Silesia community in building a DIY air quality monitoring device for less than 25 euros – the Smogomierz PM meter. The device was tested in 2018 with professional equipment and has similar results (variations around 10%). Currently, the Silesia Hackerspace community is developing software to integrate their sensor with the Luftdaten project and also plans to build a commercial version. Developing physical devices connected to air quality monitoring showed that Meritum is able to do something like that and has lots of expertise that can be useful for other people.

"If you do awareness raising, it's usually hard to know that you have achieved something.
You see during the events that people are interested. But afterwards, it's hard to know
if we really made progress in the promotion or mainstreaming of citizen science.
But this is different from the action-oriented work we now do. Using the sensor and the app.
People are still there and work with me, ask me about diffusion tubes.
In Katowice there is a group of people who have an idea of citizen science
and continue to work on this."
– Paweł Wyszomirski, Meritum & DIY Fix the City Foundation

Key: Building local partnerships and leveraging European networks.

DITOs helped to initiate joint events and longer collaborations with other NGOs and communities in the region. Strengthening the cooperation of Meritum with Foundation Fix your City was instrumental for building these partnerships because it allowed flexibility in operational matters and experimentation with methodology. The cooperation with hackerspace Silesia was another central one. Meritum and Fix the City Foundation are also engaged in the ECSA working group on CS and air quality. This enables links to other people working on this topic, for instance, workshops with the group from Luftdaten.info on how to build their air quality sensors. Thanks to that the device built by hackerspace Silesia will have an interoperable data management system and exchange data. Working group members have also joined forces to organise a European Clean Air Day annually on 20th June starting in 2019. The primary focus of the campaign is to engage citizens in doing science on air pollution across Europe. Thanks to being a member of ECSA DIY Fix the City Foundation is now part of a consortium for a EU-funded project proposal on monitoring air quality in

---

[4] http://katoluft.pl/

Central and Eastern European countries. This project would give opportunities for further development of technology and civic science approaches. Finally, DITOs itself created personal contacts with other members of the consortium that will stay on. Knowing people around Europe who can be contacted for advice and collaborations is very valuable.

Challenge: Accommodating different work styles.
The DITOs project had a strict schedule for organising events. The budget was predetermined with rigid procedures for amendments and huge reporting tasks. This was a challenge for working with local partners both from grassroots groups and the city council. Both needed more time. For the cooperation with the hackerspace it was necessary to wait and continue trying for about 6 - 7 months to organise the first event together. Since the hackerspace is run by a group of volunteers whose working times were very different, it was initially hard to establish what can be done together. After that the collaboration was easy. Therefore it was important to have a backup plan that ensured compliance with DITOs requirements, such as having a stand in a science festival in Katowice, while pursuing the desired cooperation. There were some tradeoffs in terms of what kind of engagement could be reached – the stand would reach a larger number of people while the workshop imagined with the hackerspace focused on in-depth cooperation and should lay the foundation for a future partnership. Some aspired collaborations also did not manifest eventually. For instance, the plan of a joint workshop on air quality with the city was not realised because no agreement could be reached on sharing data openly.

Photo: Prototyping workshop by Meritum and Hackerspace Silesia 2019 - Image credits Meritum CC BY 4.0.

5.3 Kersnikova Institute

Kersnikova used DITOs to extend their existing capacities and strategic positioning. This included developing activities and capacities, reaching new audiences, pursuing business innovation and pushing cutting-edge work to receive awards.

Kersnikova Institute is a not-for-profit cultural institution operating in the fields of investigative art, culture and education focusing on the future at the nexus of art, technology and society. It is an active production platform that encourages, facilitates and showcases investigative artistic production, creates public debate and stimulates critical understanding using citizen science and innovative education – named investigative learning approach. The experience with CS began almost 10 years ago by being introduced to DIY science in the field of DIY Bio through workshops for children and young adults as well as workshops among community members in the DIYbio community. In DITOs three main types of activities were conducted to promote, explore and do citizen science: interdisciplinary art/science works, workshops with children and young adults as well as discussions. This ecosystem of activities has the goal to holistically address topics through a diversity of formats including artistic manifestations, educational activities and discussions.

Various activities will be continued in the future, including educational workshops (Friday & Thursday academies) and freaktion bar science cafés. In addition, three particular activities are relevant: Firstly, workshops for girls in the framework of the ČIPke programme at Kersnikova got a spin-off, enabled by DITOs in the Sister's Lab programme in the south of Turkey. After running the initial programme through DITOs and training new female mentors in DIY, DITO and CS methodologies, the programme emancipated itself and got support by the regional departments of education, private foundations (Sabanci), NASA and the United States University in Istanbul. The programme is now facilitating regular workshops, run by the first generation of mentors, trained in the framework of DITOs and more than 80 girls have been involved so far (out of the initial 15 being involved in the first year). Secondly, the DITOs science bus and BioBlitz activities have inspired plans for a Quick Response Vehicle to address the contemporary challenges of Slovenian society. The vehicle will be realised in cooperation with the Projekt Atol Institution and will be able to tackle environmental measurements, signal sensing, data processing, etc. to allow quick access to problematic areas (industry zones, chemical spills, wildlife fires, city centres…). It shall produce relevant measurements with scientific processes and methodologies to provide a check and balances system to official measurements taken and communicated to the public by governmental institutions. Finally, Kersnikova adapted the concept of DITOs innovation hubs to guide its organisational development strategy. A nation-wide network of innovation hubs was proposed for national funding, composed of technical hubs and thematic laboratories (Artificial Life, Mechatronics,

Signal Processing) in 5 major cities in Slovenia. In hubs, Kersnikova plans to carry out capacity building activities for individuals and communities in the creative and innovative use of high technology for implementing smart cities and communities. CS methodologies and approaches are planned to be implemented in many of platform activities, using the escalator principle where scientists (and future "interdisciplinary" scientists) will be able to enter the programme on various levels and entry points, suited to their wants and capacities.
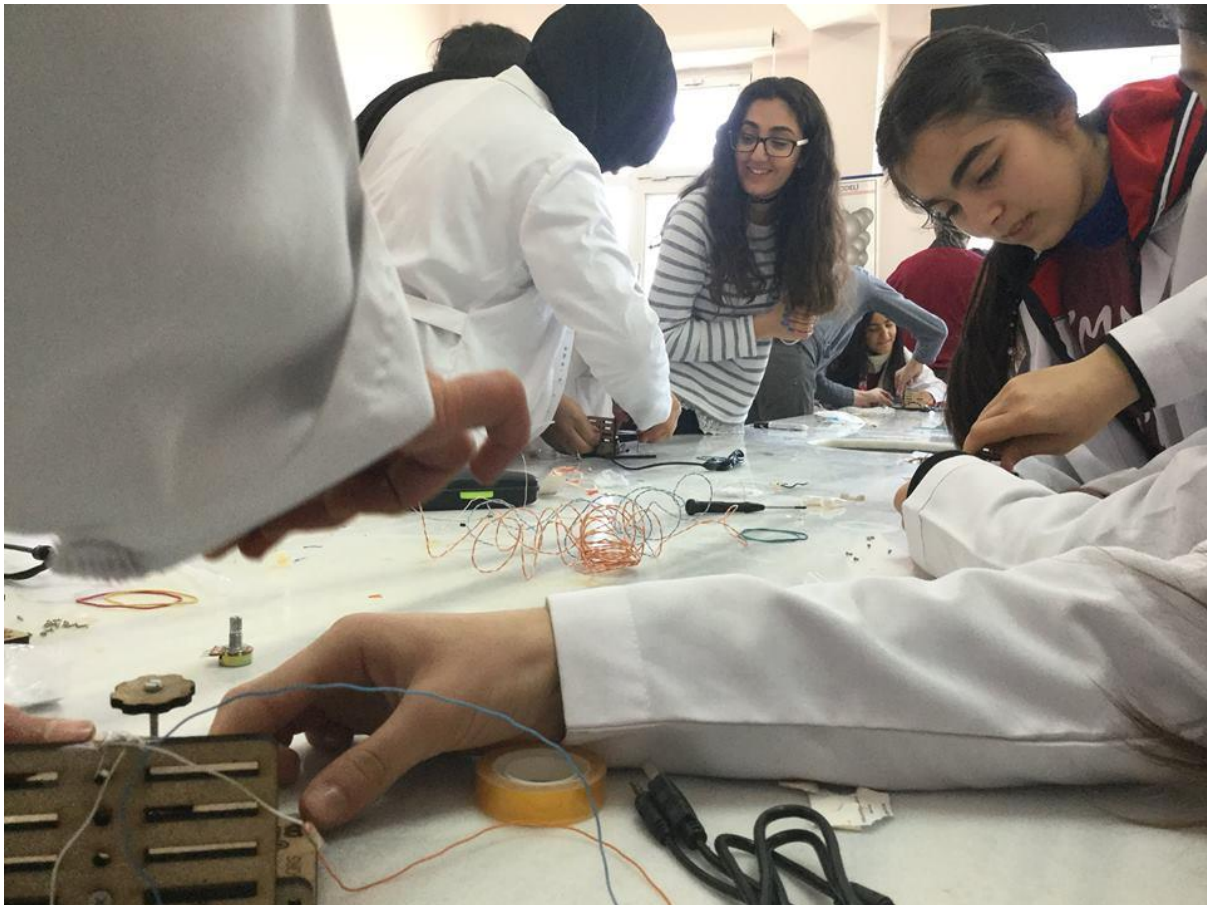

Photo: Sisters' Lab 2017 - Image credits: Simon Gmajner CC BY 4.0.

Key: Business Innovation.

Many of the art projects Kersnikova developed with the exclusive support of the DITOs programme demanded scientific and technical support that exceeded the DIY capacity in providing reliable scientific and technical equipment. For this reason, they connected to manufacturers and providers of scientific and research equipment in Slovenia. For a specific project, Kersnikova needed to develop an incubator for tissue growing that would allow for minimal disturbance of investigated materials. With their DIY community consisting of engineers and programmers, the artist Špela Petrič and an experienced service and manufacturing company, the institution developed an incubator. The incubators allow for observing the tissue without taking it out of its controlled environment. Upon presenting it to a medical chambers developer and manufacturer, it was decided to collaboratively (with researchers, scientists, and

artists) develop a functional prototype that would have a tangible potential to go into mass production. The collaboration is fully running and has recently been endorsed by the STARTS programme with the first prototype planning to be developed by mid-2020.

Key: CS is unknown and advocacy is needed to recognise it.

Citizen science is not a mainstream topic in Slovenia to date, but rather a relatively novel and often misunderstood concept. It was, therefore, necessary to first explain the general approach of citizen science and then connect it to the investigative art/science approach and specific activities Kersnikova undertakes. This translated into an extra effort the project team had to undertake in order to realise the goal of the CS and CS communication activities for DITOs. Kersnikova did a lot of engagement, for example with the ministry of education and sports, different municipalities, other politicians and stakeholders. This advocacy required a lot of personal engagement with many formal and informal meetings doing advocacy at various levels. While such work is in the strategic interest of the organisation pioneering such new approaches, it also raised challenges regarding branding and skills as well as communication. Regarding the first point, CS was not the primary field Kersnikova was working on, which is why they could not and did not see appropriate to champion CS as they would inter-media art. Capacities and knowledge for that were lacking. Regarding the second point, it was also a very practical challenge of how to explain CS in the context of Kersnikova's activities in order for stakeholders to get a better understanding. The reality of stakeholder engagement situation was that Kersnikova was either invited to give short 5 minutes lightning talks, which proved too short for explaining CS, or one-hour keynotes, which then turned out to be too dense for the listeners of whom the majority was new to the topic. Helpful tools were using the DITOs escalator of engagement forms starting with ornithologists as a prototypical example for CS and from there asking what else it can be. This provided the basis to introduce Kersnikova's workshops for young adults and art projects as scientific approaches and methods to come to results.

Challenge: Legitimacy.

It was felt that it is no small matter for Kersnikova to have the opportunity to develop and present, what the general public may consider fringe, art projects with the support and collaboration of scientific institutions, like UCL and UPD. That gave credibility and legitimacy to the efforts of institutions that might otherwise be overlooked or even frowned upon by the scientific community. However, by the general public, Kersnikova's work is often still seen as "quasi" scientific.

5.4 Waag

CS was already a big part of what Waag were doing and this will also remain. DITOs was an opportunity to finance core activities, develop content for workshops and explore new ways of communicating their public research activities.

Waag – an institute for art, science and technology – is a pioneer in the field of digital media. Over the past 25 years, the foundation has developed into an institution of international stature, a platform for artistic research and experimentation, and has become both a catalyst for events and a breeding ground for cultural and social innovation. Citizen science practices are at the heart of many of its programmes. DITOs supported running several of these activity streams and working with different forms of dissemination. CS activities at Waag are connected to different working groups at the organisation. The MAKE group houses several labs, including the fab lab, wet lab and textile lab, in which several DIY workshops were held. One example is the Biohack academy training school for DIY biotechnology. Another is the open lab evenings on Thursdays in which Waag is open for anyone to come in, ask questions, make stuff and participate in workshops. Besides, the CODE working group is leading the so-called smart citizen lab, another major theme of the organisation. They have just started working in different projects where citizens install sensors for air quality and radiation. These activities are planned to continue for a while and also the biohack academy will run a new edition next year. Open lab evenings will continue since they are running independently to third-party projects.

Photo: Do-It-Together Science Bus 2017, Image credits: Waag CC BY-NC-SA 4.0.

Key: Communication for community building.
While at Waag the research groups set up a public research agenda, the communication and events department is working horizontally with all research groups

to tell the story of the organisation, what they are doing, where they are they going to. Being involved in so many different activities, it is challenging to have a clear message and coordinate communication work. One solution is to move away from communicating what different parts of the organisation are doing towards defining overarching themes. For instance, the smart citizens' lab is not a physical lab but rather a context, in which people at Waag do projects related to the theme of citizen sensing. Another approach is to have a regular open lab evening on Thursday. From outside this constitutes a coherent activity, while internally it allows for orchestration by different working groups in the contexts of their projects. Communication with funders and decision makers is done by each working group since because they have their own specific networks. The DITOs science bus was a DITOs activity that communicated really well. It was an iconic concept of a bus going through Europe offering DIY workshops and collecting "folk remedies" with an emphasis both on local traditions and any science behind them. In addition, the vlogging done by the bus drivers was a very energetic way of communicating through video using personal stories that worked very well. Vlogging was also used to accompany the creation of the policy brief on DIY biotechnology to mobilise inputs from the DIY bio community and provide an additional tangible entry point into questions around DIY science, biosecurity and infrastructures. Communication was also very relevant to establish Waag as the hub for Do-It-Yourself Biology. As part of DITOs, the frequence of the open evenings increased. Crucial in this were individual Waag employees that played a key role in organising these events and bringing the community together. The challenge is to continue to hosts activities without the financial support DITOs.

"It is key to really involve the public. The notebook of the science bus drivers is an example. It contains long lists of folk remedies that the workshop participants shared. The fact that people were able to share their own input and be an expert themselves by sharing their own remedy – that really helps to get people involved and empower them to do more with whatever skills they already have. That is the key thing, not doing every experiment very well. It's feeling that they have something to contribute."
– Tamar ter Steege, DITOs project manager at Waag

Key: Conveying the importance of co-creation through doing.
The strategic mission of the organisation – making technology and society more open, fair and inclusive – rests on involving people with their needs and wishes. That translates to working in co-creative, evolving ways acknowledging that everybody brings in expertise. This is reflected in the open events that invite inputs, views and questions from anybody interested in a topic. Co-creation might at first sound like a very vague concept. You only really learn what it means by going along and doing these workshops. Even though it is just a small-scale workshop, working in that way enables you to tell the bigger story, which makes the claim how important it is to do research in a co-created way.

Challenge: Finding funding for research with society.

Waag's core methods involve co-creation, for instance in the form of citizen science. The EU is one of the most important funders for research like this through the Horizon 2020 and Creative Europe programmes. Not many other institutions give money for such experimental approaches involving society. In business, people pay for a product that has already been developed. EU funding pays for new ways of doing things and looking at things, even when the outcome is not yet clear. Another important funder is the municipality. For example, in technology-related topics like digital identity and privacy, Amsterdam has just realised their own tech strategy. Then there are other independent orders, like students wanting to do a workshop at Waag and pay for it.

5.5 Medialab Prado

Medialab strengthened their CS activities during DITOs. The use of CS methodologies was explored in Interactivos? workshops, the CiCiLab was created: Citizen Science Lab and partnerships were built.

Medialab Prado is a citizen laboratory of production, research and broadcasting of cultural projects that explore experimentation and collaborative learning. It is part of the Department of Culture and Sports of the Madrid City Council. Facilitating investigative projects in open collaborative ways is the core activity of Medialab Prado. Different approaches, like scientific, technological and artistic forms of investigation, are blended together. Citizen science has been part of this mix for many years both in a broad sense of public experimentation done by citizens as well as in a more narrow sense of explicit DIY science or CS activities.

Medialab's signature annual workshop, Interactivos?, has incorporated citizen science approaches in the work on urban mobility (2017), waste & recycling (2018) and food futures (2019). New types of activities, such as BioBlitzes, were explored and collaborations manifested, for instance organising annual CS meetings for the Spanish CS community and giving space to CS projects from the Madrid area. Synergies have also been created with other projects to develop dedicated CS projects, for example on air quality. While the end of DITOs funding will for the near future decrease the strategic facilitation capacities for CS activities, Medialab will continue to have CS as one approach among the ones they support through their workshops and in the open spaces they create. More strategic engagement with CS is still in debate.

Key: Practicing openness.

Medialab Prado seeks to act as an open platform that invites users to configure, alter and modify research and production processes. Openness is practised in many ways here. For instance, activities are publicly communicated, open for registration and free of charge. Events are also mediated in order to actively reach underrepresented groups. Collaborative prototyping workshops address different topics through creative experimentation with free hardware and software tools. Here the focus is very much on the process and methodology, through which these prototyping workshops provide

informal learning, enriching cooperation experiences and concrete proofs of concept. Every participant is encouraged to document the process and the results under a free/open license. Medialab aims at making knowledge abundant and shareable by crediting the participants without emphasising the institution that shall act as a mere facilitator. The main activities, such as Interactivos?, are organised as open space events where the public can propose projects. The first stage of such a workshop involves organising an open call for projects that address a certain grand challenge, like food futures. Interdisciplinary projects are particularly encouraged. When the call closes, a selection is made by different professional profiles with an effort to select projects to balance their perspective and nature (artistic, scientific, goal oriented, or speculative). Once the selection is complete, Medialab opens a call for collaborators, where different profiles are again requested. This method demonstrates an attempt to encourage diverse and interdisciplinary visions and ways of working from the start. For the implementation of these types of events, Medialab aims to build a supportive atmosphere for these proposals to flourish through collaboration until they reach a prototype stage. Medialab provides infrastructure and resources such as mentorship, technical knowledge, and materials. Listening to every participant to improve daily operations and adapt to the participants' needs when requested is important for running these events. Besides that, every group working on a project is self-organised and free to explore and work in the way they decide.

Photo: Interactivos?17 Presentación de proyectos/Álvaro Minguito, Image credits: Medialab Prado CC BY-SA 2.0.

Challenge: Tensions between openness and strategy.

Medialab Prado operates as an interface that seeks to facilitate ideas, experiences and work with the public to address important challenges of living together. It is guided by a long-term strategy that emphasises methodology: open calls for projects, open calls for collaborators,and mediation. This work as an intermediary brings with it a tension between being open to the public and addressing topics strategically. This also manifests how CS has been organised. A thematic lab has been created on citizen science – CiCiLab – as one of six thematic focal points at Medialab. The lab bundles communication and activities on the topic of CS. The lab is run by one facilitator who is in charge of organising activities and communication as well as the administrative site of processing contracts and bills. One aim of having labs is to provide orientation, structured communication and impact in such a very experimental setup that is Medialab. The three years of DITOs in which this setup was piloted with doing many activities brought out an important learning: In addition to Medialab's overall focus on open workshop methodologies, strategies (medium and long term) both for topics addressed and of methodologies used to address them, such as CS, could improve impact and quality. Facilitators play a key role in mediating this tension since they have expertise on the topic of activities in order to organise workshops, are familiar with the methodology and close to participants. However, this role is limited formally by the division of labour in the organisation as well as factually by the administrative workload.

5.6 UCL Extreme Citizen Science Group (ExCiteS)

UCL ExCiteS is a leading group in citizen science research and practice in Europe that used DITOs to bring their work to a European scale, gain international visibility and overdeliver results. DITOs influenced people – by engaging hundreds of thousands to learn about CS and DIY science and building capacity of hundreds to work with it, by opening career opportunities for citizen scientists and research staff as well as by making important allies in the European Commission and national policy circles.

The UCL Extreme Citizen Science group is one of the leading research groups in the field of citizen science, focusing on bottom-up, community-led citizen science activities. The group is based at University College London (UCL). The Extreme Citizen Science (ExCiteS) group is based on nearly 20 years of experience in organising, running and coordinating public engagement, participatory and social mapping and the citizen science of environmental activities across the world. ExCiteS projects and activities address the challenge of inclusive engagement with people and communities and the creation, co-production, and management of knowledge as well as their ability to engage in decision-making and problem-solving as active civic participants regardless of their level of literacy, background, and geographical location. UCL ExCiteS coordinated DITOs and realised public and policy engagement activities. In the future, such activities will continue to be organised in line with the group's mission statement of "developing tools (e.g. Sapelli, Geokey, community maps), methodologies (for running community-led activities), techniques (such as prototypes

or playshops) and theories (e.g. informed by post-normal science, Habermasian thinking or post-Actor Network Theory), to allow any community, regardless of literacy, to start and run citizen science project". The group is currently exploring public health as a new research area for future work.

"Two elements of DITOs were very important for the successes of the project: the long development period of the proposal and the internal community building element. Through the project we created a mini-community of people working on citizen science and DIY science. Take the long consortium meetings we had. After the administrative work was done, people stayed on for doing CS and informal exchange."
- Muki Haklay, DITOs coordinator, UCL ExCiteS co-director, ECSA co-vice chair

Key: The escalator model of a citizen science definition.
A key concept of the DITOs project is the escalator of different types of citizen science and DIY science activities, which engage participants to different degrees. The conceptual model is based on the work of the ExCiteS group. In DITOs it was used to bring different CS and DIY science activities into productive relations of exchange – by building a project addressing several practitioner communities that are usually not cooperating as well as by encouraging people to try out other forms of engagement as well. Since citizen science is a relatively young community of practice, struggles around definitions and boundary work on what methodologies are counted as in or as out are still very common. By adopting a pluralist stance, the escalator model provided an example for offering a useful definition that supports integration as well as innovation. It shows how to be specific enough to create mutual understanding and be able to act while remaining open enough for different interpretations and thus providing interpretative and practical flexibility. This can be a model for European CS communities and could gain relevance beyond the project by building capacities at ECSA.

Key: Institutional mutability.
ExCiteS is a hybrid research and practice group with several interconnected activities and organisational forms – a research group at UCL, a now-independent NGO with Mapping for Change, a mobile data collection platform with Sapelli, and others. Shifting between these organisational arms allows accessing different forms of funding for public engagement with science and technology, research and innovation. For instance, since the 1990s there is pressure to work on social enterprises as an alternative route for innovation that can be addressed by Mapping for Change, a spin-off of the group. Without substantial backing of CS activities through research funding in the UK, this mode of working makes it possible to create relative stability of jobs within the group in the absence of permanent positions. This approach represents a way to make the mutability of the work that causes the misfit with established institutions productive as versatility. This is also associated with a style of co-leadership and flat hierarchies that supports members to take their own activities forward. Both multiple structures and the mission of the group (as based on methodology and being discipline-agnostic) allow that to happen but also create

issues. The disadvantage is the pressure to constantly mutate, which included potential struggles with the organisation. For instance, ExCiteS recently changed its institutional home from engineering to the geography department to have the chance to develop an MSc programme. While UCL considered opening an office for CS that would comprise ExCiteS as well as other CS-related activities of the university, there is still no concrete plan.

Challenge: Improving possibilities for future funding of CS in the UK.
While the UK is a world leader in declaring the importance of citizen science and practicing it, the funding for such activities is lagging behind substantially and very poor in international comparison. Grant applications including CS are often rejected by research funders with arguments contesting participatory methodologies. Regardless of the successes of DITOs, the situation in the UK is still the same. It has not been possible so far to leverage the rise of CS on EC agendas and international networking to stimulate a change in UK research policy. That means that in addition to the lottery, the EU is still a key funder of CS activities. This is problematic in many ways. For instance, many projects do not have the capacities to work in EU projects and, currently, the many uncertainties of Brexit meant UK partners have had a hard time applying as project leaders to funding calls in the Science with and for Society line of the EU. UCL was even kicked out of one proposal due to an instruction by the Austrian government.

5.7 UPD Center for Research and Interdisciplinarity (CRI)

Photo: iGAMER 2 CRI Paris, Image credits: Quentin Chevrier CC-BY-NC-ND-SA.

CRI used DITOs to build on the initial work done in previous EU projects to establish a more diversified organisational profile in CS. For this, CRI developed new types of CS activities and implemented a massive number of events with local partners.

The Center for Research and Interdisciplinarity (CRI) experiments and spreads new ways of learning, teaching, making research and mobilising collective intelligence in three main areas: life sciences, learning sciences and digital sciences. Before DITOs, CRI was involved in some seed citizen science activities, for instance through the EC-funded project Citizen Cyberlab. In DITOs these roots could be continued and further developed.

A vast number of activities has been conducted to communicate the methodology of CS by doing as well as its potential for new modes of education, research and innovation. While some activity types from previous experiences were carried forward, several event formats were newly developed. A main aim of these activities as to make people who do not know each other meet and connect to promote initiatives to build a community around CS and DIY science. Policy engagement activities, for example stakeholder round tables, were another type that aimed at creating recommendations for policy makers. In addition to these outreach activities for CS, there are also PhD students at CRI applying a CS approach in their respective research work. Recently, CRI has started making its activities more visible through a platform for projects[5] on which it is possible to search for citizen science. This will help the communication of what activities are undertaken and by whom internally as well as externally. Currently, CRI is in the phase of establishing a more strategic approach to its CS-related activities. The future of CS activities is still being negotiated. The ones realized as part of research projects are planned to continue. However currently there might be no follow-up project that is likely to continue the CS outreach activities that were built under DITOs, e.g. high school workshops and conferences.

"For research centers hosting PhDs and research projects: Think of the relevance of your work for society and make connections." – Imane Baïz, Center for Interdisciplinary Research

Key: Role of event organiser-facilitator-mediator-community manager.
For carrying out activities, CRI substantially relied on the role of project managers as a mediator with a very broad profile of responsibilities. These include organising events of various types, facilitating workshops and discussions, bringing people together and building networks as well as administering events and the EU project. As connector between various people and communities, these facilitators had a very central role for shaping CRI's profile in this area. CRI had one such project manager paid through DITOs who was then able to mobilise a team of interns from students. On the one hand this brought in diverse creative capacities and made an exchange of skills possible from which not only CRI but the whole DITOs project benefited. On the

---

[5] https://projects.cri-paris.org/projects

other hand this model meant a high fluctuation of support staff that was nevertheless essential for realizing the volume of activities, which brought a very high training effort and insecurities in planning with available skills. Regarding citizen science it was emphasized that these activities, e.g. doing an activity with a researcher in a school, rather had the character of doing promotion for CS, than actually doing CS. They were aimed at connecting people and showing what was possible, like an educational warm-up for doing citizen science. If these activities would then be continued and properly followed up, they would be CS.

> *"Without our team it would have been difficult for the researchers. You need an intermediary asking for authorization to go into schools, talking to teachers to fit the activity with pedagogical goals and translate research into something relevant for the students. Or for the environmentally-oriented workshops someone needs to translate the needs of various parties involved and make people talk and understand each other. This is a community builder and project manager. It's a little bit like an octopus, someone having multiple arms and identities, wearing different caps. You need many slashes to express that."*
> *– Imane Baïz, Citizen Science event organizer-facilitator-mediator-community manager-… at CRI*

Challenge: Sustainability of networks and quality management of activities.
CRI has managed to develop various series of events during DITOs and valuable experiences have been gathered by piloting methodologies. However, follow-up activities for single events could not be implemented during DITOs. This is due to the high number of events committed to, rigid procedures to make changes to EU projects and the nascent stage of CS support capacities at the institution. A central learning from the project is that such follow-up activities, e.g. connecting teachers and school classes to researchers after a high school workshop and following up with results, are important for reaching more sustained engagement of participants. They are also expected to be relevant for promoting mobility of people along the escalator of different depths of engagement with science, technology and innovation. It is felt that on the basis of these experiences a synthesis and review exercise would be essential to improve quality by taking stock of and sort what has worked more and less well. In addition to methodology, CRI has also established itself as a mediating institution on the French CS landscape by creating countless networks and partnerships, e.g. of teachers and DIY science practitioners. Also internally a lot of work on awareness raising has been undertaken. However currently it is not specified how these relations can be nurtured for in the future. For these three central questions – How to extract learning and make these experiences useful for the organisation? How to continue working with the communities that were built? Having created awareness among institute researchers and external partners, where can they go in the future? – knowledge transfer and personal continuity are key challenges that need to be addressed. This is important for facilitating continuity of activities and communication of what was done. A suggestion is to have a contact person for CS as interface at CRI, who has a horizontally integrating role of developing CS in all research and outreach projects and representing externally.

5.8 UNIGE Bioscope

The Bioscope at the University of Geneva runs regular citizen science activities. DITOs offered an opportunity to improve these in terms of methodologies, gain experiences and confidence in practicalities of other event types to be introduced in the future, build connections to European and international CS communities and seed future joint projects.

The Bioscope is part of the University of Geneva (UNIGE) Scienscope – a series of public laboratories that offers schools and the general public a new way to discover the world of scientific research and its social consequences through hands-on activities. The Bioscope is devoted to the life sciences and the biomedical sciences and offers an environment mixing lab, classroom and hackerspace. The Bioscope offers a large panel of activities for school children and the general public and themes ranging from biodiversity to the neurosciences. The Bioscope runs citizen science projects such as "Participatory Biodiversity", where children and the general public contribute to DNA-barcoding insects and plants of the Geneva region. In addition to these, there are also educational activities with presentations and hands-on experiences for schools and the public, such as "bionights" where scientists from the university communicate about their research. An affiliated research group does humanities research on the social history of participatory research. The bionight public evenings were established as regular monthly events during DITOs and will continue after the project along with two biodiversity CS activities that were not financed through DITOs. It is planned to stay involved with CS getting funding for research and outreach activities.

Key: Face-to-face meetings for connecting communities.

The multiple types of expertise on CS and on event formats (research, communication, education, reflection of CS) were used for the organisation of two important conferences – the Biofabbing conference on DIY biology lead by UNIGE in partnership with the Hackteria network, and support for the organisation of the ECSA international conference 2018. These events are considered milestones for their important role in connecting communities. The Biofabbing conference was successful in linking practitioners of DIY biology in grassroots organisations as well as academia, such as the Hackteria network, other DITOs partners involved in biodesign activities, the broader CS communities, and people who do research on CS and DIY science. In addition to the importance of physically coming together in one place and doing things together, Hackteria also created an online forum for exchange, which is still actively running.

The ECSA conference was important in two ways for the Bioscope. On the one hand, it strengthened the links between the Bioscope and the international communities of CS practitioners. On the other hand, the conference provided hands-on experience in organising a new type of event – a BioBlitz – and creating relations with other BioBlitz

organisers from DITOs. This activity provided an opportunity to try out this new event format, gain confidence and experience how connections can be build with the public. On this basis, UNIGE is now contemplating if more BioBlitz activities can be organized, and perhaps participate in City Nature Challenges. Moreover, this event was linked to a meeting of the ECSA BioBlitz working group, a European network of CS practitioners that have experience with this kind of activity. Beyond fellow practitioners, both of the conferences also created opportunities to build or deepen relations with local organisations, such as the city administration, Science et Cité a public science communication organization, Hackuarium, a Swiss hackerspace, local associations that were part of the Sunday open marketplace as well as other research labs, such as Citizen Cyberlab.

"Approach activities from the angle of doing it for the people, not for looking good. Look for what is needed and then help to do that. For example at one point we thought of doing something with cyclists, something useful for them, also for the city and the climate. Then you contact cyclist associations to see if they are interested in that idea, find out their questions, involve them in designing the processes and sensors. Then they will use it."
– Elisa Radosta, scientific mediator and associated researcher at Bioscope

Key: Values.

Another important legacy is that a paragraph on inclusion was added to the charta of the Bioscope[6] that sets out as one mission to reach out to the minorities. "*Inclusion: Le Bioscope encourage l'inclusion, parmi ses participant-e-s, ses partenaires et son équipe, les minorités sociales, culturelles et de genre sous-représentées dans les sciences.*" The paragraph captures reflections from Bioscope events, research work and DITOs exchanges on diversity of publics and needs for inclusiveness and equitable cooperation. Putting this idea of inclusion into practice means adapting activities, hours and knowledge to the people we work with in order to really be welcoming and adapting. One way in which UNIGE has started to address this is by improving evaluation by adapting forms to capture who participants are and what they are looking for, liking and disliking in Bioscope activities.

Challenge: Guarding space for experimentation while pooling resources with other outreach laboratories.

The Bioscope is part of a bigger family of university outreach labs at the University of Geneva, the Sciencope[7]. In comparison to other labs, the Bioscope is felt to be a bit more quirky, involving CS, European projects, and being connected to societal issues. Labs are now moving administratively closer to each other in order to pool resources and attract funding. This will result in a physical relocation and common communication strategy. Such a unification process is seen to have benefits for external communication both with funders and public. However, it is felt that there are risks to lose the individual profile of each lab, which may have to subscribe to values

---

[6] https://scienscope.unige.ch/bioscope/bioscope-2/presentation/
[7] https://scienscope.unige.ch/

which are not shared. This is of particular concern since not all scientists are convinced by the value of public participation in scientific research and CS.

6 Cooperations: Cross-pollination between DITOs partners

A key aspect of DITOs mentioned by all partners is the importance and value of capacity building and knowledge sharing. DITOs has made possible countless cooperation experiences between consortium members as well as with external partners. At the project mid-term meeting, we mapped past and desired future cooperations (see photo below). These included the following activities:

- Organising joint events and participating in each other's activities
- Creating event formats, action lines in organisations, businesses and tutorials
- Planning joint projects, facilitator exchanges, cooperations, publications
- Building awareness, networks and technologies
- Improving concepts and methods
- Collecting resources and good practice
- Reflecting on impact and strategy
- Offering mentoring and support
- Exploring topics

Figure 2 - Collaborative mapping of links within the consortium by Month 24 (image credit: Claudia Göbel, CC BY 4.0).

In what follows, we present in more detail five stories of different cooperation experiences identified by partners as important for their work.

6.1 Adapting educational tools - UNIGE & RBINS[8]

UNIGE attended the RBINS Phasma meeting on 29.04.2018. There, UNIGE fell in love with stick insects and brought some specimens back to the Bioscope where they are now happily growing. They are used during various biodiversity activities from the Bioscope as they are triggering lots of questions from children and are great to use to talk about insect development. It is also planned to use them in examples in an activity about sex (parthenogeny vs. F/M reproduction). We could be said to have escalated one step on the stick insects elevator/education tools escalator.

6.2 Advice on collaborator - Kersnikova & UCL[9]

2016. Muki Haklay from UCL explored and recommended potential collaborations for Maja Smrekar's "bioart" project ARTE_mis. Kersnikova needed to recruit an expert in the field of genetics and (stem) cell research. Following his recommendations, we were able to identify and bring in authority in this field to advise in the project. The scientist started collaborating with Kersnikova Institute and the collaboration continued after the project - he is at the moment advising Kersnikova Institute (Kapelica Gallery and BioTehna Lab) with our hybrid art and biotechnology projects, also bringing in knowledge from his scientific network.

Photo: Interactivos?17, Image credit: Medialab Prado CC BY SA 2.0.

---

[8] By Elisa Radosta & Carole Paleco
[9] By Simon Gmajner

6.3 Mentoring at Interactivos - Medialab & UCL[10]

Christian Nold from UCL took part in the Interactivos?17 workshop as a project mentor. Interactivos? is a research and production platform for the creative and educational uses of technology. Its main goal is to expand on the use of electronic and software tools for artists, designers and educators, thus contributing to the development of local communities of cultural producers in this field. During the workshop, Christian Nold brought his experience in tutoring groups to explore experimental technology and Locative Media contexts. He also carried out ethnographic observations about the materialisation of responsibility in the form of the prototypes that will be published as a chapter in a book.

6.4 Joining forces for policy engagement - RBINS & ECSA[11]

The Head of Communication Unit at DG Environment and organiser of the annual EU Green Week, Gilles Laroche, invited ECSA and DITOs to organise a session on citizen science. The 2018 edition took place on 22-24 May 2018 in Brussels and the theme was *Green cities for a greener future.* Even though being an additional event (not in the DoA), DITOs partners welcomed the opportunity to liaise further in the consortium, with external partners and with policymakers. ECSA, RBINS and Tekiu collaborated closely to organise a booth at the marketplace and an interactive session.

The session *Making cities green with citizen science* introduced cross border projects such as the Horizon 2020 projects DITOs, LandSense and WeObserve, bringing evidence of the potential of citizen science to drive positive change for greener cities. The focus was on two main topics: European urban initiatives where citizen science is achieving environmental policy impact on diverse topics such as air quality and flooding; and an overview of international initiatives promoting public engagement with biodiversity monitoring such as BioBlitzes and City Nature Challenge.

The event was an opportunity for networking with other EU projects and contributing to integrate citizen science into environmental policy agendas. Citizen science was not a new topic for most of the audience, mainly decision/policy-makers; in fact, they participated in the session with interest and posed interesting questions to our speakers. Networking continued after the session as participants approached speakers and organisers to make connections and explore further opportunities for collaboration and exchange. Overall, the event was very successful and receive positive feedback from speakers involved in the session, audience and DG Environment.

---

[10] By Chema Blanco Calvo & Christian Nold
[11] By Carole Paleco & Gaia Agnello

6.5 Workshops for organisational development - UCL & ECSA[12]

In 2016, Muki Haklay facilitated a workshop with ECSA about how to think about their future developments. Later on, not yet as a member of the board, Margaret Gold and Muki Haklay ran a strategy meeting for ECSA board and HQ team to help define the strategic objectives of the organisation. The concept of the balance of funding between membership, projects, conferences and other events is still on the ECSA website as their long term business plan. This was funded as part of the DITOs capacity building commitment. The impact was that ECSA developed a business plan and strategic plan which the organisation is now following, leading to the growth and stability of the organisation.

7 ECSA: European network to support CS

From the very outset of DITOs, ECSA has been designated to become the legacy organisation of the project. The basic idea was along the lines that as an organisation ECSA is made to be durable and can thus offer a home for materials, results, infrastructures and communities created during the project to hopefully remain active, accessible and relevant. The central question is: How can ECSA build on the results of DITOs and continue to be a network supporting Citizen Science and DIY science communities in Europe? What it could mean concretely to fill the concept of legacy organisation with life, however, has been far from obvious. In this section, we present the vision and practical implementation that we have created over the past years together with the ECSA community and DITOs partners.

7.1 ECSA as the legacy organisation for DITOs

The DITOs project has been intimately linked to the first five years of ECSA as a maturing organisation - the first discussion about DITOs started in early 2014, and the first proposal was written in the same year that ECSA was incorporated as non-profit organisation in Germany, a step that occurred roughly after two years of intensive exchange to formalise a European umbrella organisation for Citizen Science. Since the ideas for the DITOs project took shape while the ECSA secretariat was established and the community started to become more connected, supporting the establishment of ECSA has always been a key aim of DITOs. And progress with organisational development was substantial:

- DITOs partners were among the first organisations to become ECSA **members** – today there are more than 170;
- ECSA **Headquarters' capacities** increased from one part-time employee before DITOs to four staff members with the beginning of the project and eleven now at its end (however all still part-time);
- DITOs also supported the first major **transitions in leadership** from the founding chairs of the association to new directions;

---

[12] By Muki Haklay

- ECSA **communication channels** have been fundamentally expanded – from a basic newsletter to multiple-channels and a knowledge sharing platform being built;
- DITOs was the **first EU project** for ECSA; today there are six – among them the Coordination and Support Action EU-Citizen.Science that is to establish the reference platform on Citizen Science information and training in Europe;
- While ECSA was mainly linked to the US-based Citizen Science Association three years ago, today it is part of a much **denser ecosystem of related networks** in Europe, including a COST Action supporting research on Citizen Science (CA15212) and national networks in many EU countries, as well as internationally;
- And finally, **relations to related communities of practice**, such as DIY science, community-based research and science communication have been established and often transformed into cooperations and strategic partnerships, for instance by exploring needs for opening institutions with DIYbio communities, creating a joint working group with the Living Knowledge Network and ECSITE being a fellow project partner in EU-Citizen.Science.

Building on the project as energiser for the first five years of activity, how can ECSA now become a custodian for DITOs legacy? DITOs' overall aim as stated in the proposal was to "make a step change in European public engagement with science and innovation [...] [by] moving from a model in which scientific research, innovation, and problem-solving is mainly driven by scientific institutions to one that is based on active public participation and capacity building with various levels and strategies of engagement in the scientific process". We defined four dimensions of addressing this aim: "deep public engagement in scientific knowledge production through citizen science; an 'escalator' that allows people to enter at a level of engagement that matches their needs, interests, and abilities, while also encouraging them to move beyond; the strengthening of European cooperation through capacity building of the European Citizen Science Association; and participatory activities, with a strong focus on cross-European fertilisation and knowledge sharing between hubs and activity centres". Against this background becoming a legacy organisation for DITOs translates into the question: **How can ECSA continue to promote citizen science, understood in a pluralistic way, and strengthen European cooperation and cross-fertilisation between practitioners?**

We have used the past three years to discuss this question with ECSA members, partner organisations, staff, critics, competitors, research and engagement funders, policy makers and other stakeholders. While the concrete nature of such support will always depend on specific contexts, overarching principles can be identified for how ECSA shall realise its role as network organisation to nurture a thriving, diverse and inclusive community of practice. In summary, we call this **"working openly"**. It comes into play, for instance regarding the definitions we use, how we interact with members or how our teams work. Based on a series of activities we have realised in DITOs, we

have iteratively developed a concept and made prototypes of what "working openly" can mean in practice. They will be presented below.

7.2 Creating spaces to work on openness in the CS community

Photo: Storytelling workshop at ECSA 2018, Image credit: © Science et Cite Eva Zornio.

ECSA has used the DITOs project as an opportunity to make openness a topic within the European CS community together with project partners. There have been two central dimensions to this work - how can we foster openness by supporting CS practitioners, like the DITOs innovation hubs, and how can ECSA become a more open organisation and network itself. Highlights of this work include:

- 06/2016 ECSA Inclusiveness Challenge[13] at first ECSA International Conference, Berlin
- 11/2016 European Stakeholder Round Table[14] on Citizen and DIY Science and Responsible Research and Innovation, ECSA, Berlin
- 01/2017 Founding of ECSA working group on Citizen Science & Open Science[15] at ECSA General Assembly, Vienna
- 02/2017 Voices of Citizen Science and DIY Bio[16] Call for videos by CRI

---

[13] https://ecsa.citizen-science.net/blog/following-ecsa-inclusiveness-challenge

[14] http://discovery.ucl.ac.uk/1563626/

[15] https://ecsa.citizen-science.net/working-groups/citizen-science-and-open-science

[16] https://www.youtube.com/playlist?list=PLB6IBD9OG9pBuILrkboQtLoP_xCaWN_Uy

- 03/2017 European Citizen Science Forum[17], organised by CRI, Paris
- 06/2017 Working group meeting for co-creation of DITOs Policy Brief on Citizen Science and Open Science[18], organised with eutema and GBIF, COpenhagen
- 10/2017 European Policy Round Table on Citizen Science[19], organised together with eutema and European Commission's DG for Research and Innovation, Brussels
- 03/2018 European Round Table Citizen Science and Open Science – Synergies and Instruments[20], organised together with COST Action CA15212 and Tekiu, Brussels
- 06/2018 Storytelling workshop Perspectives on Citizen Science from Ecuador, Africa and SIDS[21], Second ECSA International Conference, Geneva
- 10/2018 Start of monthly online meetings and webinars by working group on Empowerment, Inclusiveness & Equity in Citizen Science and Community-Based Research[22] by ECSA and Living Knowledge Network that was founded at the second ECSA International Conference
- 02/2019 European Stakeholder Round Table Empowering civil society through participatory investigation?[23] organised with ALLISS, LISIS and Living Knowledge Network, Paris
- 04/2019 Story sharing workshop Empowerment of civil society through citizen science and other types of participatory investigation[24] organised with EIE working group at ECSA General Assembly, Brussels
- 05/2019 DITOs storytelling & digital legacy workshop How can ECSA continue to support CS and DIY science communities in Europe?[25], Bad Belzig

7.3 Synthesis: Six dimensions of openness for CS in Europe

From putting this topic on the agenda, creating spaces for co-creation, listening to our critics and reflecting with our colleagues we have identified six dimensions to address openness in citizen science related to our work at ECSA in Europe:

1. **Using pluralistic concepts** that are based on a diversity of participation practices and account for multiple possible contributions to science is essential to realise the transformative potential of citizen science. A large part of the work of every DITOs partner was to deal with the terminology, the fuzziness of the

---

[17] https://cri-paris.org/news/the-european-citizen-science-forum/
[18] http://discovery.ucl.ac.uk/10043574/
[19] https://ecsa.citizen-science.net/blog/towards-citizen-science-roadmap
[20] https://www.cs-eu.net/news/workshop-report-wg-3-citizen-science-and-open-science-%E2%80%93-synergies-and-instruments
[21] https://ecsa.citizen-science.net/events/ecsa-events/story-cafe
[22] https://ecsa.citizen-science.net/empowerment-inclusiveness-equity
[23] https://ecsa.citizen-science.net/events/ecsa-events/empowering-civil-society-through-participatory-investigation
[24] https://docs.google.com/document/d/1D6RtGuM7dMuxGl8QAtM39orxG2tQMZd0b8RNYLi_zho/edit
[25] https://docs.google.com/document/d/1tn74qBojl_hzGYYQ3kcI7F7gY57bcwo9FY6KPYgliRI/edit

concept of citizen science and its many problems. The escalator model (described above) was one way of addressing this.

2. **Improving situated openness of data and projects** is another key challenge. An important share of citizen activities are dedicated to data gathering and analysis. Creating frameworks to improve data findability, accessibility, interoperability and reusability (FAIR-ness) is thus a major concern.

3. **Addressing questions of power** head-on and more thoroughly is a third important piece of the puzzle. Both Citizen Science and Open Science draw a lot of their visionary strength from hinting at concepts like participation, accessibility, and democracy, which are political in the sense that each community of practice interprets them through their own ideological glasses and associates them with different values. It is therefore important to critically interrogate the different approaches of participatory research regarding their historical, social, cultural, and political contexts: Which values are they based on? Which hierarchies and economic principles do their standards and technologies convey? Who benefits?

4. **Building more open organisations** is another central question in the larger task of adapting research infrastructures to participatory research. Doing Citizen Science, DIY science and working with communities also requires a shift in organisational cultures to allow working with people within and outside scientific institutions in new ways.

5. **Promoting cross-boundary cooperation and cultural diversity** in Europe and beyond is important to improve CS. Environmental problems like biodiversity loss and pollution do not stop at national borders and exchange of tools and good practice is a motor of the growth of the European CS communities. Such collaborations and especially networks and platforms need to take the diversity of infrastructures and cultures into account that manifests in different ways to do public engagement, research and civic action This diversity should be approached as a richness to build on.

6. **Fair working conditions, team support and self-care** are important as the basis for the growth of citizen science. Structures need to be improved to offer good working conditions, options for permanent contracts and fair compensation for those who work on CS. At the same time, structures need to allow for nurturing healthy teams to support colleagues and self-care should become an explicitly supported practice at the workplace both for academic researchers and volunteers engaging with CS.

By advocating for, implementing and further working on these principles, we argue, ECSA can continue to promote citizen science, understood in a pluralistic way, and

strengthen European cooperation and cross-fertilisation between practitioners - thus enacting DITOs legacy. This can be done, for instance, by adopting these principles in strategies or bringing them forward in proposals that build on DITOs results.

7.4 What this can mean in practice - opening ECSA

Photo: DITOs Stakeholder Round Table Italy 2019, Image credits: Gaia Agnello CC BY 4.0.

With this vision of advocating for a cultural change towards working more openly for CS, we propose an idea of DITOs legacy as a living culture, structures and procedures for supporting new work, rather than picturing ECSA as a repository for old deliverables. Here are some examples of what this can like in practice in the work of ECSA that we have developed during DITOs. They are being incorporated into the training material for new staff at ECSA:

● When **representing CS communities**, which is the case when ECSA organised events or writes policy briefs, for example, ECSA needs to ensure to draw on and represent a diversity of CS approaches and disciplines. This can be done, for instance, by providing a pluralistic and nuanced definition of CS, rather than an easy one. Another way is to invite a number of practitioners and experts from different subfields to bring forward their views and experiences, instead of providing a single voice for an allegedly uniform CS community. Using plural when referring to CS and DIY science communities is recommended.

- Beyond representation diversity should also inform **ECSA's strategies for community building,** drawing in new members and communication.

- **Encouraging diversity and inclusiveness for ECSA knowledge gathering and capacity building activities**. As a European umbrella organisation, ECSA often undertakes and supports synthesis work and collection of good practice. While the aim is to involve as many relevant stakeholders as possible to increase quality and promote uptake, not all stakeholder groups are represented equally. For ECSA membership and participation in events, for instance, representatives of civil society organisations, freelancers, SMEs and citizen scientists are underrepresented. Strengthening the role of civil society and of those actors in new more irregular professional roles should be a strategic priority. ECSA has started changing event timing and framing to make the participation of those with other jobs more feasible. We have also started to experiment with co-keynotes of having a member of a research institution and a civil society organisation present together on a cooperation project they undertook. For the international conference in 2020 more measures for inclusiveness are planned by the working group on Empowerment, Inclusiveness and Equity. Another concrete measure is to create a procedure to pay a small honorary for actively contributing to ECSA events, which is designed to support the participation of civil society organisations, freelancers, SMEs and citizen scientists in knowledge gathering and capacity building activities.

- When planning for events as part of proposals, a useful way to increase inclusiveness is to plan some **money for open calls for activities**. We have experimented with this for the teacher training workshops in DITOs and could multiply the capacities used for the project, increase the reach beyond consortium partners and bring more practitioners into the ECSA network.

- ECSA working groups are key instruments for bringing work on topic areas further, such as interoperability, CS and education or national CS platforms. With the two ECSA working groups supported through DITOs, the one on CS and Open Science and the one on Empowerment, Inclusiveness and Equity, we have developed and tested small steps for working more openly. These experiences have now been documented and enriched with resources and workflows in a **guide for working group chairs and ECSA staff**.
- In order for this work to become more visible and be developed further, an **ECSA policy on working more openly** has been developed and will be presented to the ECSA Board for adoption.

8 Summary

There are three important ways in which DITOs capacities have been used to establish sustainable ways of supporting citizen science and DIY science activities in Europe after the end of the project: DITOs partners acting as innovation hubs, exchange and cooperations between DITOs partners, and establishing ECSA as a reference network for citizen science in Europe. The central arguments and findings for each of them are summarised below.

8.1 Innovation Hubs

DITOs innovation hubs are based on principles and practical insights into how organisations can support the implementation of new ideas and concepts that stem from citizen science. They focus on communal activities providing room for self-organising and adaptive initiatives, that promote interdisciplinary knowledge transfer targeted towards enabling innovators with the aim for global impact (D3.2).

How have DITOs capacities been used to establish DITOs partner organisations as innovation hubs and thus sustainable ways of supporting citizen and DIY science? All partners have used DITOs as an opportunity to modify existing activities, develop new ones and extend their staff capacities. Beyond that, how partners used the project varies with the previous experiences with CS and DIY science as well as the type of organisations and external factors. While UCL brought their work to a European scale, other partners financed core activities, established their CS activities firmer at the organisation, multiplied their impact or changed their approach.

From these activities, we have identified the following key factors and challenges:

Key factors:
- Creating links between different parts of the organisation.
- Extending cooperation with the public.
- Building devices.
- Building local partnerships and leveraging European networks.
- Business Innovation.
- Communicating.
- Conveying the importance of co-creation through doing.
- Practicing openness.
- The escalator model of a citizen science definition.
- Institutional mutability.
- Face-to-face meetings for connecting communities.
- Values.
- Role of event organiser-facilitator-mediator-community manager.

Challenges:

● Using the ambivalence of a fuzzy definition of CS productively.
● Accommodating different work styles.
● Citizen science is unknown and advocacy is needed to recognise it.
● Legitimacy.
● Finding funding for research with society.
● Tensions between openness and strategy.
● Improving possibilities for future funding of CS in UK.
● Guarding space for experimentation while pooling resources with other departments.
● Sustainability of networks and quality management of activities.

We hope these will stimulate future conversations and learnings.

8.2 Cooperation between partners

The exchange between DITOs partners is seen as a fundamental aspect of DITOs capacity building and impact mentioned by all partners. DITOs has made possible countless cooperation experiences between consortium members as well as with external partners. These experiences have established new relations and continue to be available as a reservoir of resources for future activities. To make these experiences more tangible, we give an overview of past and desired future cooperations mapped at the project mid-term meeting along with five stories of different cooperation experiences identified by partners as important.

8.3 Network level

DITOs progress has been closely linked to ECSA's organisational development and growth of the community. The aim to build ECSA's capacity has been successful as number of members, increased HQ capacities, successfully managed transitions in leadership, diversified communication channels, number of EU projects, ecosystem of related networks and relations to neighbouring communities of practice testify. As such, ECSA is capable of acting as a legacy organisation for DITOs. This translates into the question: How can ECSA continue to promote citizen science, understood in a pluralistic way, and strengthen European cooperation and cross-fertilisation between practitioners? Our answer is: By promoting openness - both by supporting CS practitioners, like the DITOs innovation hubs, to work more openly and by making ECSA a more open organisation itself. The many dimensions of what this means we explored in more than 13 events and two ECSA working groups together with CS and DIY science practitioners and stakeholders.

On this basis, we propose six dimensions of openness for CS in Europe: (1) Using pluralistic concepts, (2) Improving situated openness of data and projects, (3) Addressing questions of power, (4) Building more open organisations, (5) Promoting cross-boundary cooperation and cultural diversity and (6) Supporting fair working conditions, team support and self-care. By advocating for, implementing and further

working on these principles ECSA enacts DITOs legacy as a living culture, structures and procedures for supporting new work, rather than picturing ECSA as a repository for old deliverables.

Finally, we show what exemplary measures we have developed at ECSA to put these principles into practice. They include making diversity a starting point when representing CS communities and creating ECSA's strategies for community building, encouraging diversity and inclusiveness for ECSA knowledge gathering and capacity building activities, open calls for activities, guide for working group chairs and ECSA staff, and an organisational commitment to working more openly.

Photo: DITOs legacy workshop in Ljubljana 2018, Image credits: Claudia Göbel CC BY 4.0.