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The European citizen science landscape – a snapshot

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The increased importance of open science in the European Commission research policy makes it important to understand and analyse the development of the field. The Open Science Monitor of the European Commission is being developed to meet this need (European Commission 2017). In 2016, the authors conducted the first large-scale explorative survey of the European citizen science landscape to help establish a baseline for the monitor.

The survey focused on five major areas of interest, including the types of citizen science projects being undertaken, their perceived impact and added value, challenges, current funding schemes for citizen science, and project outcomes. Data was collected through an online survey in October and November 2016, predominantly with closed question formats to facilitate participant response and to cover as many projects as possible. This provided reliable and quantifiable basic information about different citizen science projects across Europe. The data is available upon request. This snapshot covers the main findings.

Geographical scale of projects

The survey attracted responses from 174 co-ordinators of citizen science projects. Most of the respondents are either from Central (40 per cent) or Western Europe (32 per cent), with only a few respondents from Southern

(16 per cent), Northern (10 per cent) or Eastern (1 per cent) Europe (see figure 13.1). Major activities across Europe were recorded from the UK, Germany and Austria, which may also reflect the fact that, at the time of the survey, the citizen science communities in these countries were most connected and thus the survey might have gained more traction here.

In terms of the scale of the projects, many initiatives cross local and even national boundaries. Most of the projects are at the national (41 per cent) or global (19 per cent) level. A smaller number of projects is being carried out at the regional (14 per cent) or European (12 per cent) level.

Project focus and leadership

The disciplines of the projects range from archaeology and engineering to zoology. However, there is a clear focus on projects within the life sciences (76 per cent) including ecology, environmental sciences and biology (see figure 13.2). This is in line with Kullenberg and Kasperowski's (2016) meta-analysis of citizen science studies, which also found environmental sciences and ecology to be at the forefront of citizen science research (see also Owen & Parker in this volume). Almost half of the surveyed projects are coordinated by a scientific organisation (45 per cent), followed by educational organisations (14 per cent) and non-governmental organisations (11 per cent).

Level of engagement

More than two-thirds of the projects are contributory or collaborative (see figure 13.3; the categories are based on those developed by Shirk et al. 2012 – see table 13.1; see also Haklay; Novak et al. both in this volume). Thus, most citizens are mainly involved in data collection and sometimes in the project design or data analysis.

Regarding the length of the projects and involvement of participants, more than 40 per cent of the projects involve citizens continuously during the research process (see figure 13.4), which may last several years.

The number of people engaged in citizen science projects varies widely. The average number of citizens engaged continuously, over a long period, is about 1,800, while the number of those who engage occasionally averages at about 7,900 per project. It is estimated that at least 1.2 million people participated once (or more) across the 174 projects sampled in the survey.

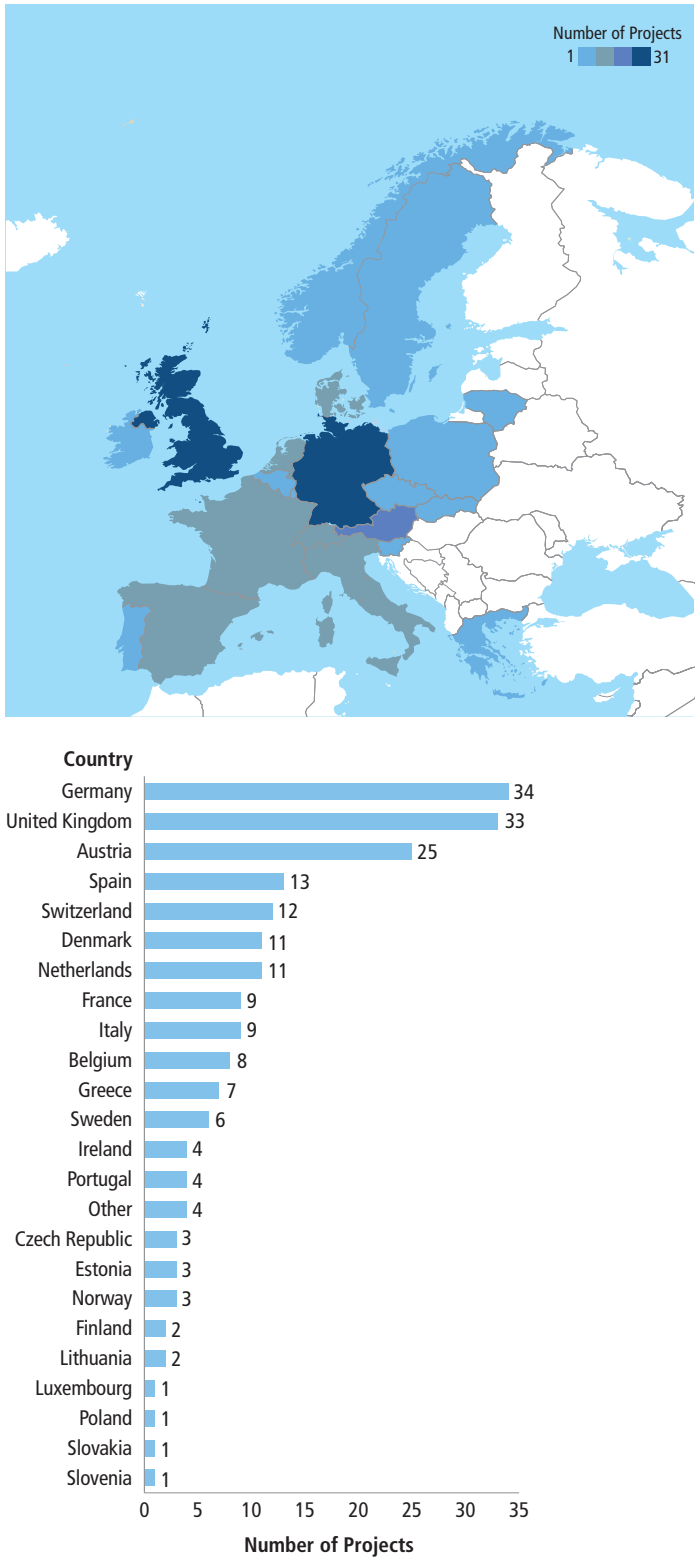

Fig. 13.1 Distribution of projects from the European Citizen Science Survey 2017

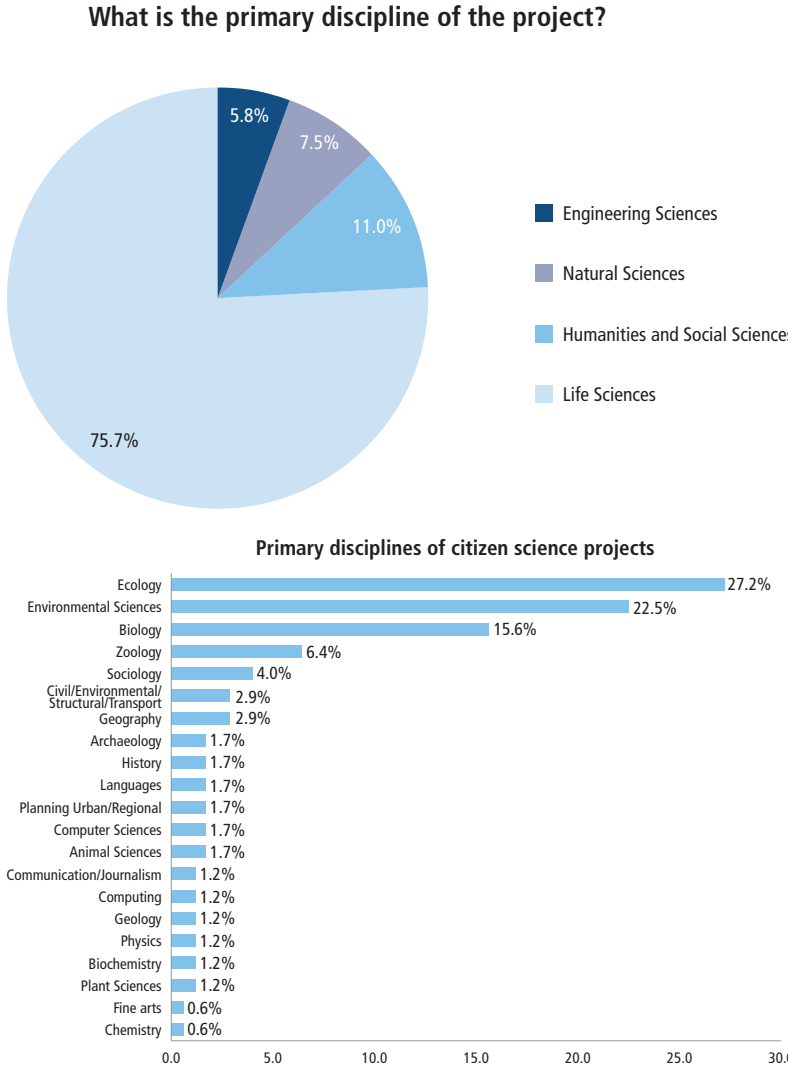

Fig. 13.2 Primary discipline of citizen science projects

Outputs and funding

The most common outputs of the projects are contributions to media (78 per cent of projects; see Hecker et al. 'Stories' in this volume), social media (72 per cent), conferences (72 per cent) and publications of the data (71 per cent) (see figure 13.5). Other common outputs include articles

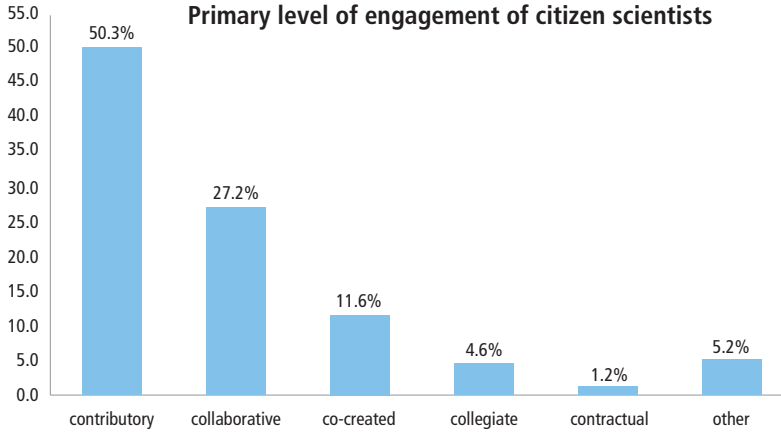

Fig. 13.3 Level of engagement in European citizen science projects (according to Shirk et al. 2012)

Table 13.1 Different types of participant engagement

Contributory	Scientists generally design projects to which members of the public primarily contribute data.
Collaborative	Scientists generally design projects to which members of the public contribute data but also help to refine project design, analyse data and/or disseminate findings.
Co-created	Scientists and members of the public work together and participants are actively involved in most or all aspects of the research process.
Collegiate	Citizens run projects with no professional scientist involvement.
Contractual	Communities ask professional researchers to conduct a specific investigation for them and report on the results.

Source: Shirk et al. 2012

in publicly accessible journals (61 per cent), public events (53 per cent), reports for participants (52 per cent) and teaching materials (48 per cent). Less common are contributions to newsletters (40 per cent), policy briefs (22 per cent) and articles in non-public journals (21 per cent) or guidebooks (15 per cent).

Around 25 per cent of the projects receive either no funding or less than €10,000 funding (see figure 13.6). Many projects (43 per cent)

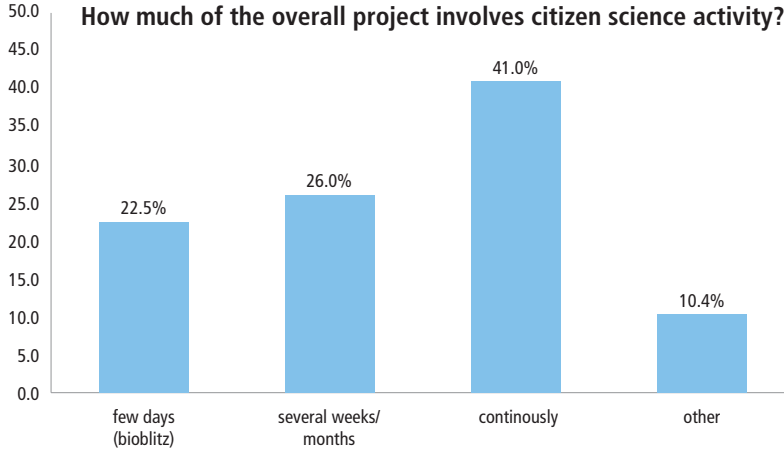

Fig. 13.4 Citizens' involvement within citizen science projects

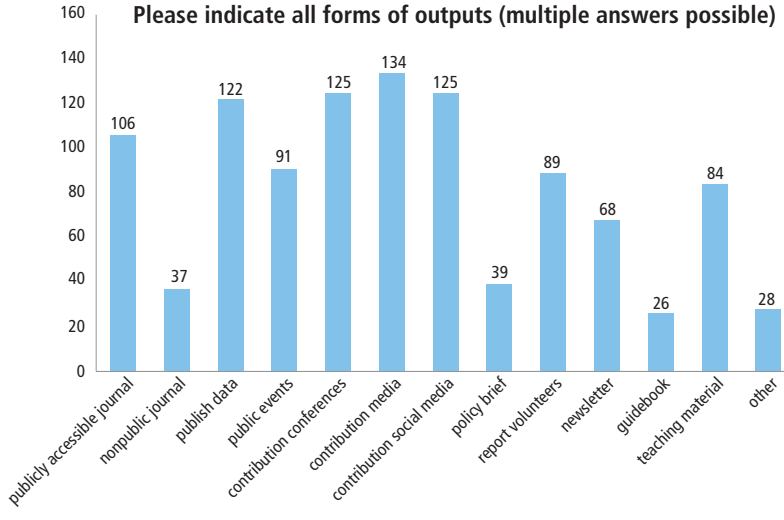

Fig. 13.5 Outputs of citizen science projects

receive between €10.000 and €250,000 in funding; while approximately a third (31.8 per cent) of the projects receive substantial funding of over €250.000, with 14 per cent receiving more than €1,000,000. Overall, most of the funding is from national research funds, nongovernmental organisations or EU research funds. Projects often have several sources of funding.

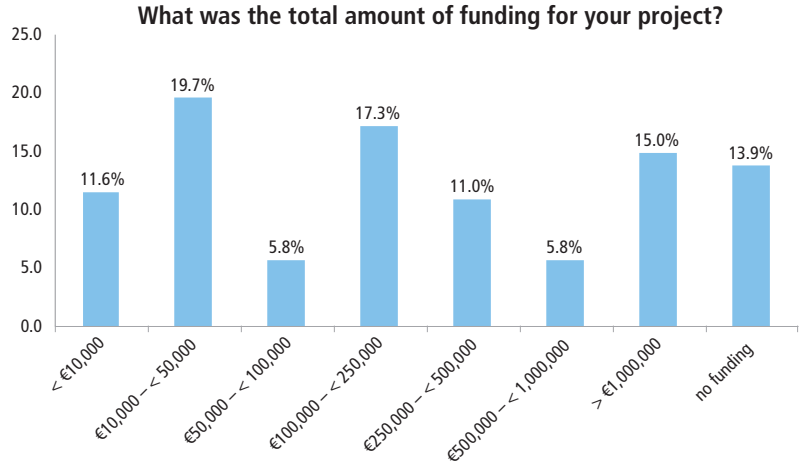

Fig. 13.6 Funding received by citizen science projects

Fewer than half of the respondents (38 per cent) agree (fully or partly) that the amount of initial funding is appropriate; only a minority of project co-ordinators (15 per cent) agree that the amount of long-term funding is appropriate.

Challenges and added value

When asked about challenges in citizen science, a clear majority of the respondents highlighted insufficient funding (75 per cent) and concerns over data quality (70 per cent) (see figure 13.7; and see also Williams et al. in this volume on data quality). In addition, there were concerns about the recognition of citizen science in co-ordinators' professional fields, with a lack of appreciation in academia (60 per cent of respondents) and of integration in education (68 per cent) the most pressing. The fact that citizen science projects are time consuming (65 per cent) was also considered a challenge.

The main added value for the majority of the respondents is the generation of large datasets (75 per cent). Around half of the respondents also value citizens providing expertise (47 per cent). Respondents strongly disagreed that citizen science saves time (84 per cent) or money (76 per cent) (See also Danielsen et al. in this volume). Seventy per cent of the respondents do not think that citizen science raises new research questions and only 30 per cent think that it produces knowledge other than

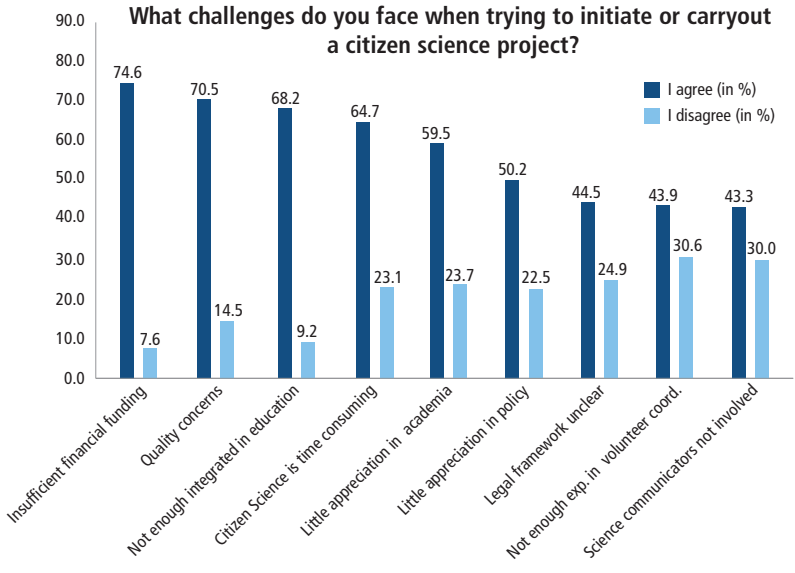

Fig. 13.7 Challenges for citizen science projects

scientific data. Slightly less than half of the respondents think that citizen science makes research more relevant (45 per cent).

This is slightly offset by the question on impact where respondents claim enhanced science-community interaction (77 per cent) and education (75 per cent) as the most important impacts of their citizen science projects (see figure 13.8). Enhanced community-policy interaction (40 per cent), enhanced science-policy-interaction (49 per cent), perceived behavioural change (43 per cent) and enhanced evidence (47 per cent) are also important perceived impacts.

Citizen science project leaders were also asked about their perception of the policy impact of their projects and where they perceive the project to have the most impact in the policy decision-making process. Forty-three per cent of the contributors stated that their project had a policy impact, whereas 50 per cent said that it currently had no policy impact but could have in the future. Only 7 per cent of the respondents did not think that their project had an impact or could have impact in the future.

Overall, respondents saw the possible influence of their project at all steps of the policy decision-making process, with the strongest potential linked to issue identification and measurement of effectiveness, which corresponds to the steps of agenda-setting and policy evaluation in the policy cycle (Howlett & Ramesh 2009) (see figure 13.9).

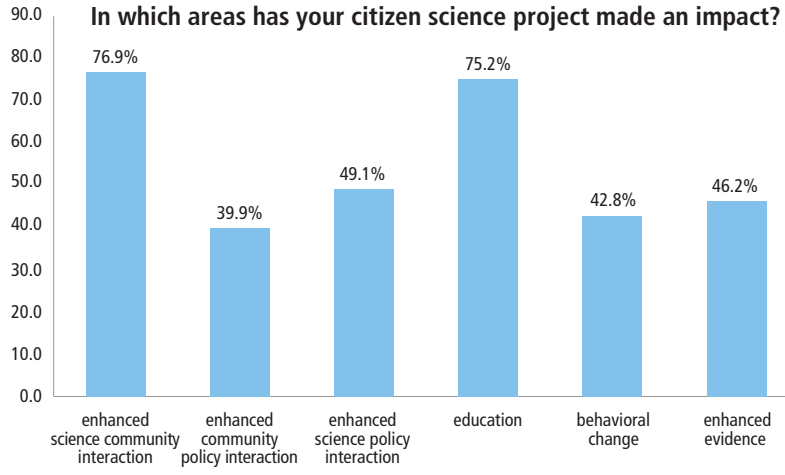

Fig. 13.8 Areas of perceived impact of citizen science projects

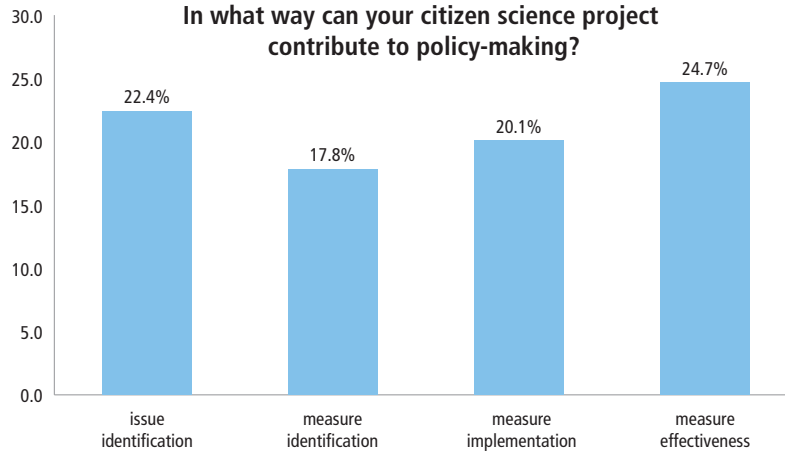

Fig. 13.9 Possible impacts of citizen science projects on policy decision-making

Conclusion

The survey results show that the European citizen science landscape is currently dominated by contributory and collaborative projects that are mainly related to the life sciences. Unlike the citizen science landscape in the United States or Australia where projects share English as a common

language, communication in the citizen science projects in the EU is mostly carried out in the respective national language of the home country of the projects. Enhancing the interoperability of projects through adaptation into different national languages may facilitate greater participation, but these survey results may reflect participants' preference to be involved in national projects. National interfaces for citizen science projects may facilitate international contributions and thereby enhance scientific results (e.g., the Living Atlas of Australia – Brenton et al. in this volume). However, as pointed out by Ballard et al. (in this volume), the different spatial scales of projects may serve different purposes with respect to scientific and socio-political goals, which may require smaller scales of interaction.

Respondents indicated that only one-fifth of the projects publish their results in non-publicly accessible journals while project data was published in some form by the majority of projects (72 per cent) and the results were communicated at conferences. This may either reflect the early stage of many projects or a current lack of capacity to publish scientifically, since the number of citizen science publications in general is rising (Kullenberg & Kasperowski 2016). It may be important to provide scientific training suited to citizen science projects as well as avenues to make data available for scientific analyses by others, so that they can also be published in scientific journals and thereby advance science (see Richter et al. in this volume).

Regarding social innovation, most projects were understood as having an impact, although only half of all projects saw their contribution as being to policy-making (Haklay 2015). This potential may not yet be fully realised by the primarily scientific co-ordinators, while the European Commission and Environment Protection Agencies view this as an important facet of citizen science (Nascimento et al.; and Owen & Parker, both in this volume). It will therefore be important to tailor citizen science projects so that they can contribute to ongoing policy processes without compromising their creativity. Early interaction with local or national agencies may help to develop the project design so that outcomes can be useful to promoting innovation in policy. Overall, it will be important to monitor developments in citizen science communities over time, and to observe the advances and maturity of the European citizen science landscape.

If you are interested in the raw data, please feel free to contact the authors.

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