

Change – The transformative power of citizen science

Stakeholders' motivations for supporting environmental citizen science

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Abstract

Citizen science is moving from traditional scientist-public partnerships to larger multi-partner enterprises engaging new sectors of society. For citizen science to recruit and retain stakeholders, it is essential to understand what motivates partners to facilitate projects. Twenty-six people from 10 different stakeholder groups in the UK were interviewed about their personal and organisational motivations for supporting environmental citizen science. Template thematic analysis revealed five key motivational themes: (1) business-centric, (2) participant-driven, (3) scientific, (4) personal and (5) environmental motivations. These findings suggest that stakeholders have a range of motivations that go beyond the dominant narrative of science and the environment.

Keywords: citizen science, collaboration, motivations, partnerships, stakeholders.

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Introduction

Different groups of stakeholders may bring different skillsets and knowledge to citizen science (CS). Therefore, recruiting and sustaining partnerships with a broad diversity of stakeholders is valuable for developing CS projects and increasing project outputs. This paper defines stakeholders as individuals

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and organisations who facilitate or fund projects or use the data produced. As many stakeholder groups voluntarily support CS, it is critical to understand their motivations. Compared to the literature on citizen scientists' motivations (e.g. Ng et al. (2018) and Tinati et al. (2017)), there is limited research investigating stakeholder motivations (Geoghegan et al. 2016). Previous studies have evidenced that CS stakeholders have a range of motivations, including improving knowledge, contributing to science, informing conservation, providing education and improving partnerships (Elferink 2023; Geoghegan et al. 2016). This paper contributes to this topic by examining the motivations of UK environmental citizen science (ECS) stakeholders.

Methods

This study utilised online semi-structured interviews between April and July 2021 using Microsoft Teams. ECS stakeholders working in a UK-based organisation were recruited via targeted emails, snowball sampling, listservers and social media. All stakeholders signed consent forms and completed screening surveys before participating in the research.

The results are taken from a wider ongoing qualitative project to examine stakeholders' perceptions and understanding of ECS (Wilson 2022). The results presented in this paper focus on the 26 interviewees' answers to the question: "What first motivated you and/or your company to support ECS?" Interviewees were encouraged to provide an answer as both an individual and as a representative of their organisation. The interviews were recorded and transcribed using orthographic transcription.

Template thematic analysis (described in King (2012)) was conducted in NVivo (release 1.5.1) by the author. Words and sentences were organised hierarchically into themes, factors and sub-factors. First, sections of text that relate to a topic were grouped into factors or sub-factors. Second, several factors with broadly related topics were placed into themes. A code-confirming approach was used to check reliability. An independent qualitative researcher reviewed the themes, factors and sub-factors (codes) for a small sample of the data (4 interviews). At the end of the review, there were no disagreements about the codes or their definitions.

Results

The interviewees represented 10 stakeholder groups (see Table 1). Table 1 displays the five themes identified from the analysis of the interview transcripts and the factors discussed by four or more interviewees. A full coding template is found in supplementary materials 1.

Business-centric motivations

Three factors are discussed within the theme business-centric motivations. First, resources, particularly financial resources, were seen as important to relieve financial restraints and to improve funding opportu-

Table 1. The five motivational themes (bold), their definitions, and associated factors discussed by four or more interviewees (*italicised*) are presented in the table. The stakeholder groups who discussed the themes and factors are indicated with a tick (✓).

Theme/Factor	Definition of the Theme	Type of stakeholder*									
		A	BE	P	EE	F	Gov	NGO	RC	ST	O
Business-centric Motivations	Motivations related to the advantages received by the organisation or company.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Resources</i>			✓	✓		✓	✓	✓	✓	✓	
<i>Novelty</i>		✓	✓				✓				✓
<i>Publicity</i>				✓						✓	✓
Participant-driven Motivations	Motivations associated with providing benefits to the citizen scientists.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Engagement</i>		✓		✓	✓	✓	✓	✓	✓		✓
<i>Education</i>			✓	✓	✓	✓		✓		✓	✓
<i>The environmental citizen</i>		✓	✓	✓	✓	✓	✓	✓			✓
Scientific Motivations	Motivations associated with the scientific outcomes of a project.	✓	✓			✓	✓	✓	✓		
<i>Data and scientific advancement</i>		✓	✓			✓	✓	✓	✓		
Personal Motivations	Motivations related to benefits stakeholders (the interviewees) gained.	✓	✓	✓		✓		✓		✓	
<i>Career-driven</i>			✓	✓						✓	
<i>Enjoyment</i>				✓				✓		✓	
<i>Personal interest</i>		✓		✓						✓	
Environmental Motivations	Motivations linked to the environment.		✓				✓	✓	✓		

* Type of stakeholder: A = Academic; BE = Business employee; P = Practitioner; EE = Environmental educator; F = Funder; Gov = Government employee; NGO = Non-governmental organisations/charities; RC = Records centre; ST = School teacher; O = Other.

nities. Second, interviewees were motivated by the potential publicity that may come from supporting ECS including winning awards and increasing memberships:

“...with schools, it’s the publicity now that comes with it (ECS)... We’ve had three awards...”
– School teacher 4.

Third, interviewees discussed the novelty aspect of ECS. For example, its use in new sectors or subject areas and the use of new technology.

Participant-driven motivations

Three factors are noted within the theme participant-driven motivations. Interviewees wanted to engage citizen scientists in the natural environment, their CS project or a specific organism:

“...(ECS is) an excellent way for getting people involved in physically being out and about in the marine environment...” – Environmental educator/Practitioner.

Interviewees stated that the education of citizen scientists was rewarding, a way to share their passion for the environment and improve ECS participants' knowledge and awareness. The factor "the environmental citizen" contained the sub-factor's connection to nature, inspiring people about the environment, giving people ownership of the natural world, raising awareness of environmental issues, promoting environmental behaviours and empowering participants.

Scientific motivations

One factor, collecting data and advancing science, was present in the theme scientific motivations:

"...citizen science kind of combines, for me, my desire to share the excitement around Natural History but also derived data to get a greater understanding of our natural world." – Academic 2.

Personal motivations

Three factors are present within the theme personal motivations. Enjoyment was discussed as an important motivator:

"I love it and actually a (place name) particularly is a delightful place to do citizen science..."
– NGO 1.

This was linked to the factor "personal interest", where stakeholders discussed wanting to share their passion for the environment and CS topic. Career was also an important motivator, and included being able to publish results and teachers thought ECS was beneficial to their students.

Environmental motivations

Although environmental motivations are not divided into factors (because no factor was discussed by four or more interviewees) they should be considered important. Factors present in the other themes, such as collecting environmental data and improving environmental attitudes, overlap with this theme.

Discussion

This research has identified that stakeholders have a range of motivations, which supports previous research by Elferink (2023) and Geoghegan et al. (2016). Five key motivations were identified within this paper, (1) business-centric, (2) participant-driven, (3) scientific, (4) personal and (5) environmental motivations. The diversity of motivations uncovered is noteworthy, as whilst scientific and environmental outcomes are often the focus of CS publications (Follett and Strezov 2015), this research suggests that stakeholders are

driven to support ECS for reasons beyond the dominant narrative of science and the environment. These findings are valuable for the recruitment and retention of important partnerships.

This research recruited a diversity of stakeholders to provide a general overview of their motivations. However, stakeholders are not homogeneous and motivations may differ between stakeholder groups. It is advised that future research on motivations focuses on singular stakeholder groups. Recent research on specific CS stakeholder groups includes Aristeidou et al. (2022) work examining teachers' motivations. It is advised that consistent methodologies be used when investigating the motivations of different stakeholder groups to allow for direct comparisons to be made in the future.

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Ethics statement

Full ethical clearance was provided by Loughborough University (reference: 2021-4933-3719).

References

- Aristeidou M, Lorke J, Ismail N (2022) Citizen Science: Schoolteachers' Motivation, Experiences, and Recommendations. *International Journal of Science and Mathematics Education*. 21(2067-2093). <https://doi.org/10.1007/s10763-022-10340-z>
- Elferink E (2023) "We do not measure for fun" The Motivations of Stakeholders Participating in Citizen Science: A Single Case Study on an Air Pollution Project. Masters Thesis, University of Twente, Enschede, The Netherlands.
- Follett R, Strezov V (2015) An Analysis of Citizen Science Based Research: Usage and Publication Patterns. *PLoS ONE* 10(11): e0143687. <https://doi.org/10.1371/journal.pone.0143687>
- Geoghegan H, Dyke A, Pateman R, West S, Everett G (2016) Understanding Motivations for Citizen Science. Final report on behalf of UKEOF, University of Reading, Stockholm Environment Institute and University of the West of England. <https://www.ukeof.org.uk/resources/citizen-science-resources/MotivationsforCSREPORTFINALMay2016.pdf>
- King N. (2012) Doing Template Analysis. In: Symon G, Cassell C (Eds) *Qualitative Organizational Research: Core Methods and Current Challenges*. SAGE Publications Ltd, London, 426–450.
- Ng CS, Duncan JR, Koper N (2018) Who's "hooting"? Motivations and scientific attitudes of Manitoban citizen science owl surveyors. *Avian Conservation and Ecology* 13(2): 9. <https://doi.org/10.5751/ACE-01265-130209>

- Tinati R, Luczak-Roesch M, Simperl E, Hall W (2017) An investigation of player motivations in Eye-wire, a gamified citizen science project. *Computers in Human Behavior*, 73: 527–540. <https://doi.org/10.1016/j.chb.2016.12.074>
- Wilson C (2022) Stakeholders in environmental citizen science and the benefits of partnership. In: Kragh G, Nielsen KH (Eds) *Engaging Citizen Science Conference 2022*, Aarhus (Denmark), April 2022. *Proceedings of Science, Trieste*. <https://pos.sissa.it/418/040/pdf>