A2.1, O2: ECIU University Citizen Science Consultation Report

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Beneficiaries

- Aalborg University, Denmark
- Dublin City University, Ireland
- Kaunas University of Technology, Lithuania
- Linköping University, Sweden
- Tampere University, Finland
- Hamburg University of Technology, Germany
- University of Aveiro, Portugal
- Autonomous University of Barcelona, Spain
- University of Stavanger, Norway
- University of Trento, Italy
- University of Twente, The Netherlands
- Institut National des Sciences Appliquées, France

Abstract

This document is one of the deliverables deriving from the restructured activities for Work Package 2 (Challenged-based Research). It presents the results of a consultation conducted among the ECIU research community on the topic of citizen science, and on the proposed ECIU University Citizen Science Hub. Results show that there is a strong appetite in the ECIU research community to promote citizen science as a core component of ECIU research activities whenever relevant. The document also outlines the contours of a vision for the proposed ECIU Citizen Science Hub, as well as suggestions for its mission, design, and functions. The document will be used by the Swafs SMART-ER project team as a foundation from which to develop citizen science activities for the ECIU University and a citizen science Hub.

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Abbreviations and acronyms

AAU	Aalborg Universitet, Denmark
DCU	Dublin City University, Ireland
ECIU	European Consortium of Innovative Universities
INSA	Institut National des Sciences Appliquées, France
KTU	Kauno Technologijos Universitetas, Lithuania
LiU	Linköpings Universitet, Sweden
TAU	Tampereen Yliopisto, Finland
TUHH	Technische Universität Hamburg, Germany
UA	Universidade de Aveiro, Portugal
UAB	Universitat Autònoma de Barcelona, Spain
UiS	Universitetet i Stavanger, Norway
UNITN	Università di Trento, Italy
UT	Universiteit Twente, Netherlands
AHSS	Arts, Humanities, and Social Sciences
STEM	Science, Technology, Engineering, and Mathematics

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1. Introduction

The ECIU University project seeks to transform research practices in the member universities. The project seeks to create a stronger link between research and education, provide more two-way knowledge exchange between society/industry and the universities, and develop more collaboration between the partners on how research is supported across the network to benefit both from the scale and expertise of the individual universities.

The focus on citizen science in Work Package 2 (WP2) as a means to foster collaboration and further integrate research from the member universities follows from the conclusions of Activity 2.4, completed in 2020. Activity 2.4 revealed that citizen science was practised by many researchers across the ECIU network, but only on an *ad-hoc* basis. A high level goal for WP2, and ECIU University, is to find methods to facilitate members to work in unison towards shared goals. The lack of an institutionalised approach to citizen science at any of the member universities provides an opportunity for all members, as ECIU, to develop one unifying citizen science approach to be implemented at all 12 universities. We therefore made the decision to focus one of the main goals of activity A2.1 (and A2.3) in this pilot phase towards the development of common structures and supports for citizen science for all ECIU member universities with the ambition to become a leader in the field. A focus on citizen science also complements one of the aims of the ECIU University to make a significant societal impact and engage with local communities. The long term ECIU Research and Innovation Strategic focus on SDG-related research activities provides an inherent logic for citizen participation in the process of identifying workable solutions. For example, in the recent announcement of the €1 billion final and biggest European Green Deal Call under Horizon 2020, Commissioner for Innovation, Research, Culture, Education and Youth, Mariya Gabriel, called for this investment to be utilized **to accelerate a just and sustainable transition to a climate-neutral Europe by 2050** and for specific actions **to engage with citizens in novel ways and improve societal relevance and impact.** The ECIU Citizen Science agenda is directly aligned with this European objective.

In 2020, the ECIU University was awarded further funding from the European Commission under the Swafs call to develop the ECIU University Institute for Smart European Regions (SMART-ER). Part of this project, which kicks off in February 2021, will see the development of citizen science activities and of a Citizen Science Hub (Work Package 5), strengthening the potential of the ECIU University to become a key player in that area.

2. Objectives

This document presents the results of an online consultation conducted in December 2020 among the ECIU research community on the topic of citizen science. It is structured around four main topics, which guided the consultation process itself. After a brief presentation of the format of the event and profile of the participants, the document outlines current citizen practices across the ECIU network. It then summarises the vision that emerged from the consultation for a common ECIU University approach to citizen science, before focusing on the proposed Citizen Science Hub. The latter is the object of the last two sections: the first one suggests some aims and objectives for the Hub, and provides a list of general recommendations that will need to be considered in its design and implementation. The second one adopts a longer-term view and discusses issues relating to the sustainability and monitoring of the Hub.

This document aims to lay the foundations from which the SMART-ER project team, and in particular Work Package 5, can work on the development of citizen science activities for the ECIU University, and on the proposed ECIU University Citizen Science Hub.

3. Consultation process

3.1 Format of the event

The consultation took place on 2nd December 2020 as a virtual event bringing together over 80 participants from across the ECIU network. It consisted of a roundtable discussion between citizen science experts and researchers with experience of citizen science methodologies, followed by a Q&A. During the roundtable discussion, the audience was invited to vote on questions related to the proposed ECIU University Citizen Science Hub, and more broadly, to the approach the ECIU University should adopt towards citizen science. Additional comments and suggestions from the audience were captured in the chat and have also been integrated in this report.

There were five invited speakers, all of whom have expertise in diverse citizen science practices: Professor Eglė Butkevičienė (KTU, Lithuania), Professor Veronica Lambert (DCU, Ireland), Professor Maurizio Marchese (UNITN, Italy), Dr. Fernando Vilariño (UAB, Spain), and Dr. Sabine Wildevuur (UT/ DesignLab, the Netherlands). The discussion was moderated by Dr. Xavier Ariño Vila (UAB, Spain).

3.2 Participants

All ECIU member universities were represented at the consultation, albeit with significant variation in numbers (Fig.1). Audience members comprised researchers, research support and research development staff, as well as other professionals currently working in an ECIU member institution. Most of the latter (categorised as ‘Other’ in Fig.2) were ECIU University project staff, for instance Local Ambassadors.

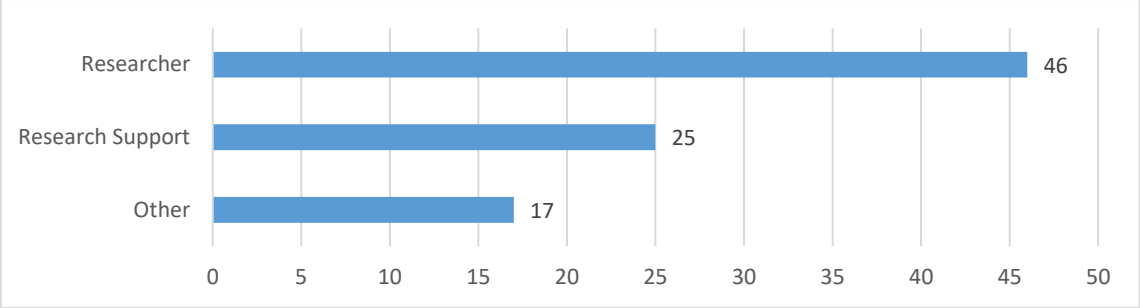

Figure 1 Number of attendees (incl. speakers and organisers) from each ECIU member university

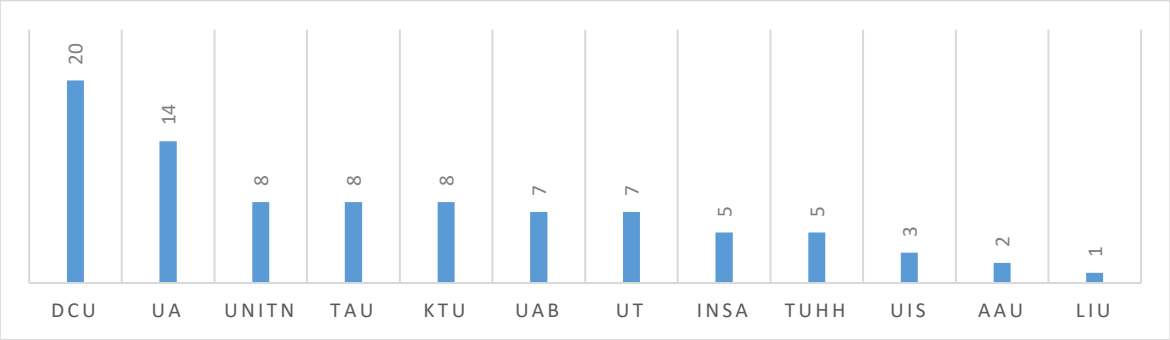

Figure 2 Breakdown of attendees (incl. speakers and organisers) according to their professional category

The presence of all ECIU member institutions and of several staff categories was the result of a concerted effort to bring a range of relevant stakeholders together, in the hope that this might produce a better-rounded appreciation of the ECIU community's vision for citizen science. Ahead of the event, each ECIU member institution was asked to suggest the names of several researchers and research support/development staff who might be interested in attending. Each was individually invited. Institutions were asked to consider the following criteria to guide their suggestions: professional category, gender, and career stage. Early-career stage was defined as less than 7 years post PhD for researchers, and less than 5 years' relevant professional experience for research support/development staff. Finally, for researchers only, institutions were also asked to consider the diversity of disciplines and AHSS and STEM backgrounds. Attendance was also open more widely to all postgraduate students, academic and professional staff currently working in an ECIU member institution, with internal promotion of the event left at the discretion of each institution – the latter in all likelihood playing a significant role in the discrepancy between institutions in terms of the number of attendees (Fig. 1).

Researchers formed the largest cohort of attendees by far (Fig.2). In this category, 28 were from STEM, and 18 were from AHSS, with 17 identified as early-career, and 29 as mid-to senior (Fig. 3).

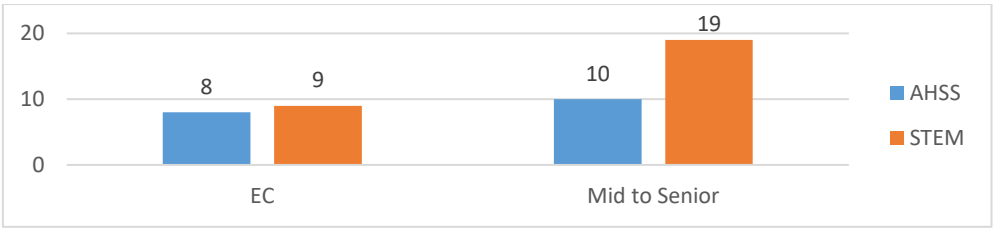

Figure 3 Breakdown of the researchers in the audience per career stage and discipline

Women were by far the most represented gender on the day (Fig. 4), and so in each professional category. Among research support and development staff, 20 of them were women, and only 5 of them men. Among researchers, 27 of them were women, and 19 men. Finally, in those categorised as 'other' (often working on the ECIU University project), 13 of them were women, and only 4 men. A similar gender imbalance also characterises the audience when the latter's career stages are considered: there were 21 female early-career participants for 6 men, and 41 women at mid-to-senior level for 21 men. The only instance of near-parity is (unsurprisingly) in the case of STEM researchers, with 15 men for 14 women. This imbalance partly reflects that of the list of suggested attendees by each institution (with a total of 23 men and 37 women), only to be reinforced in the open registration process.

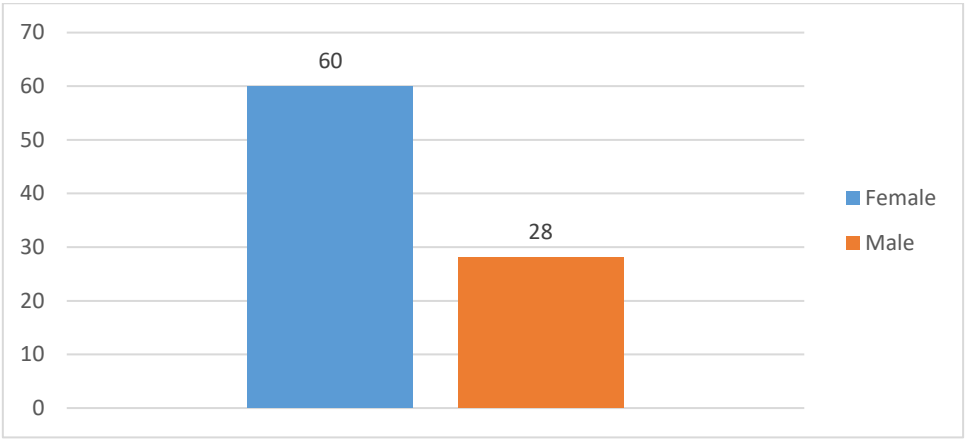

Figure 4 Breakdown of participants per gender

All in all, about 65 participants engaged with polling for each question throughout the session. It is also worth noting that the audience, because of the way it was initially targeted at invitation stage, will naturally tend to regard citizen science favourably: this, as well as the relatively small sample size, needs to be borne in mind when interpreting the results of this consultation and certainly of the polls.

4. Current citizen science practices across ECIU member universities

The first part of the consultation focused on current citizen science practices across the ECIU network, i.e. on how researchers working in ECIU member universities currently understand and use citizen science methodologies.

As exemplified in Fig. 5, **data collection and participatory experiments are by far the two main forms of citizen science used by researchers across the network**. 75% of respondents have involved citizens in data collection (or know colleagues who have done so), and 56% in participatory experiments. This is followed by problem definition (41% of respondents), research design (34% of respondents), assistance in the dissemination of results (28% of respondents), and ongoing reporting (25% of respondents). Activities related to citizen science less common across the ECIU network include volunteered thinking, volunteered computing and, by a large margin, serious games.

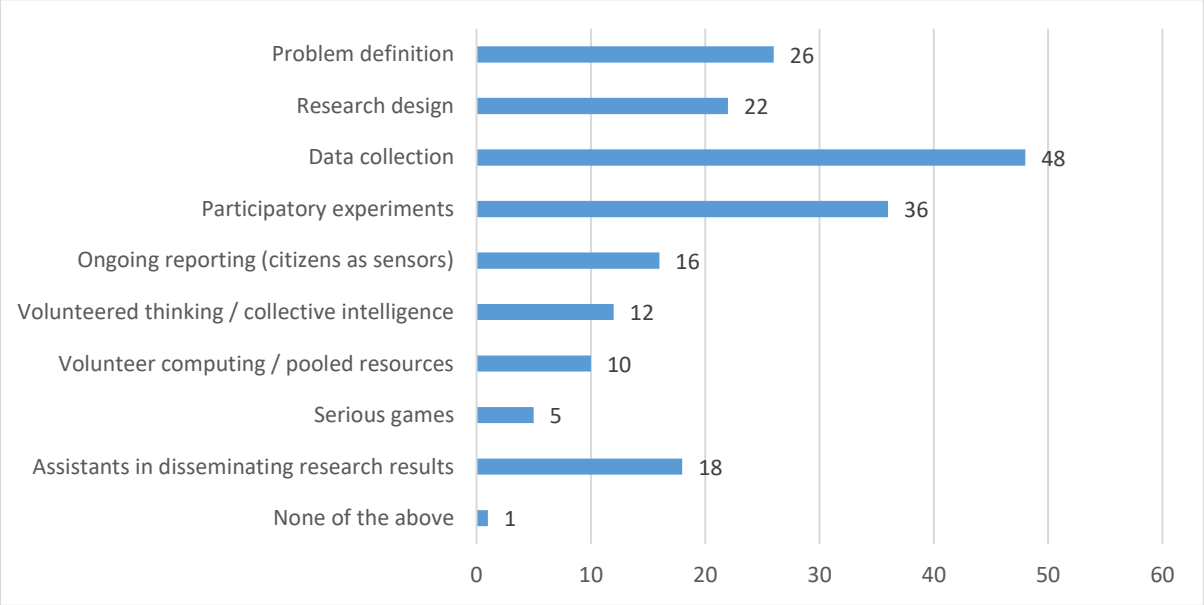

Figure 5 In what ways have you/researchers at your institution used citizen science?

The preponderance of data collection and participatory experiments as the most popular forms of citizen science is well established, across and beyond the ECIU network. Researchers at UNITN are for instance involving citizens in participatory experiments, and working with specific targeted groups (e.g. elderly people) in the design and validation of the usability of tools and protocols developed to meet their needs. At DCU, citizen science, notably data collection, is at the core of many projects based at the Water Institute.

Perhaps more surprising but welcome, is the relatively large percentage of respondents who have involved citizens at the problem definition stage of the research project lifecycle, or know researchers at their institution who have done so. Among the 26 people who selected 'problem definition' (i.e. 41% of the 64 respondents), 16 of them were researchers, 6 were research support staff, and 4 were classified as other (Fig.6).

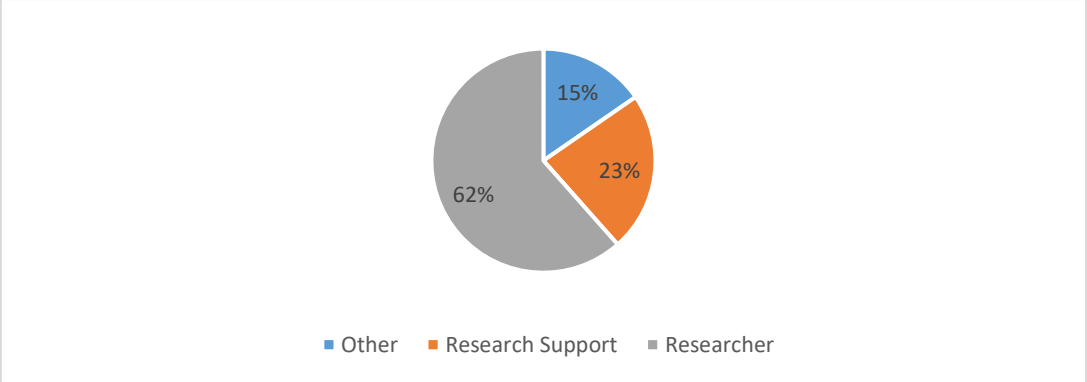

Figure 6 Staff category of those who have involved citizens in problem definition or know of colleagues who have done so at their institution

Who are those 16 researchers, who represent the large majority of the respondents who selected 'problem definition' in the poll? Overwhelmingly, they come from STEM disciplines (75% of them). They also represent 35% of all the researchers present in the audience, with significant disparities between disciplines. Bearing in mind that the small size sample precludes any definitive insight into the significance of this result for the ECIU University overall, further poll data analysis reveals that 43% of the STEM researchers in the audience have involved citizens in problem definition or know colleagues in their institution who have done so, while this is the case for only 22% of the AHSS researchers present on the day. Several of those AHSS projects that seek to involve citizens from the very beginning of the project lifecycle are based at UA, e.g. Sounds and Memories of Aveiro (SOMA) and Skopeofonia, both in the field of ethnomusicology. It might be worth conducting a larger survey in the future and comparing those results with other institutions and/or university alliances to determine whether the ECIU network differs from the norm in this respect.

Other activities related to citizen science but not captured in the poll include grass-root activities such as **fab labs** (e.g. at UNITN) and **research into citizen science** (e.g. at UiS, where EnviroCitizen examines how participation in citizen science activities can contribute to the development of environmental citizenship).

5. Citizen Science and the ECIU University: values and vision

Citizen science, it was largely agreed, can and should seek to facilitate the dialogue between society and science, and act as a bridge between the two. It is ultimately one of the solutions (together notably with open science) to start this dialogue and motivate citizens to participate in research. There is scope and potential to articulate the ECIU University's position on citizen science with the ECIU University 2030 vision, with which it seems to naturally align.

Citizen science for the ECIU University should be founded on a **balanced and collaborative partnership between researchers and citizens**, and between science and society: citizens and academics should be considered as **equally valuable partners in the research process**. This implies that efforts be made to *transform citizens from factors into actors*. Ultimately, citizen science should

be **a two-way collaborative dialogue**, where both citizens and researchers tackle societal challenges and benefit from working together and building relationships.[1]

> 'I see citizen science as a way to make bridges between science and society, to make both academia and citizens equally valuable partners in the research process.' Prof. Eglė Butkevičienė
>
> '[Citizen Science] is working towards bringing the top-down approach from the academic research, together with starting with societal challenges.' Dr Sabine Wildevuur, Director, DesignLab, UT
>
> 'We [researchers] need to understand why citizens get involved in projects, and allow them to have ownership over the process, understand the scientific methods we employ, understand the data they are collecting and what it means, and why their data is important, and how it is being used... and we need to be led by them also.' Participant

The emphasis placed during the consultation on citizens as valuable research partners is reflected in the strong conviction among participants that citizens should be involved at all stages of the research process, including from the time of problem definition (Fig. 7), with 75% of respondents answering that citizen science should be integrated across the whole research lifecycle.

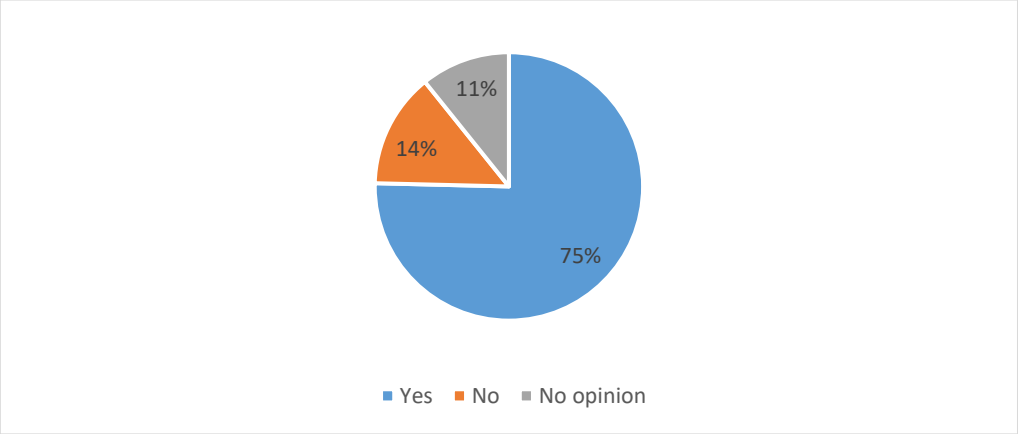

Figure 7 Do you think that citizen science should be integrated into the whole research lifecycle (from problem definition to dissemination of results)?

Who were those who believe that citizen science should be integrated to the whole research lifecycle? 21 of them were researchers, 19 of them were research support staff, and 9 of them were classified as others. It should be noted however that researchers constitute the vast majority of those who do not wish to see it happen (7 out of a total of 9 respondents), as opposed to other categories (research support and others both 1 respondent each).

[1] It might be worth noting at this point that while the term 'human empowerment' was widely used during the consultation, it was also the object of some criticism: the term 'empowerment' might be understood to undermine the equal nature of the relationship between researchers and citizens, and overlook the mutual benefit for both parties. 'Empowerment' might instead seem to suggest the existence of a one-way benefit, whereby only the citizen has to gain from taking part in the research process, and re-instate a hierarchy between science and society, scientists and 'ordinary' people.

Fig. 8 provides further illustration of the widely-held belief in the audience that citizens can make meaningful contributions at all stages of the research project lifecycle, with an important majority of respondents believing that citizens can make the most significant contribution to problem definition. This is the case in all professional categories represented in the audience, i.e. for researchers (both AHSS and STEM) and for research support staff.

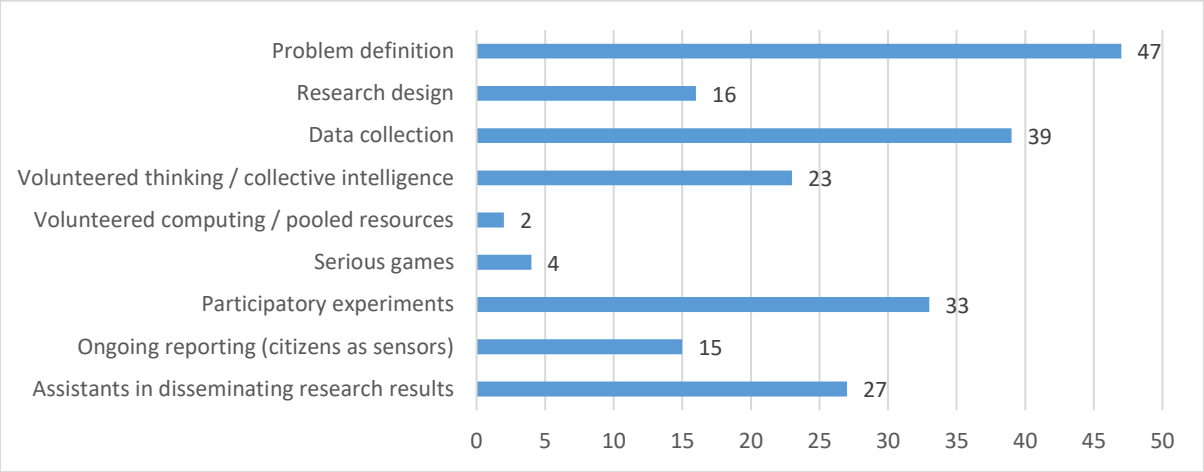

Figure 8 Where can citizens make the most meaningful contribution to research?

Researchers and research support staff indeed seem to agree on where citizens can make the most meaningful contribution to research, with problem definition as their first choice, followed by data collection, participatory experiments, dissemination, and volunteered thinking. Similarly, there does not seem to be much significant variation in the results between AHSS and STEM researchers, with problem definition, participatory experiments, and data collection coming in the top four most meaningful contributions for both groups of researchers (Fig. 9 and 10).

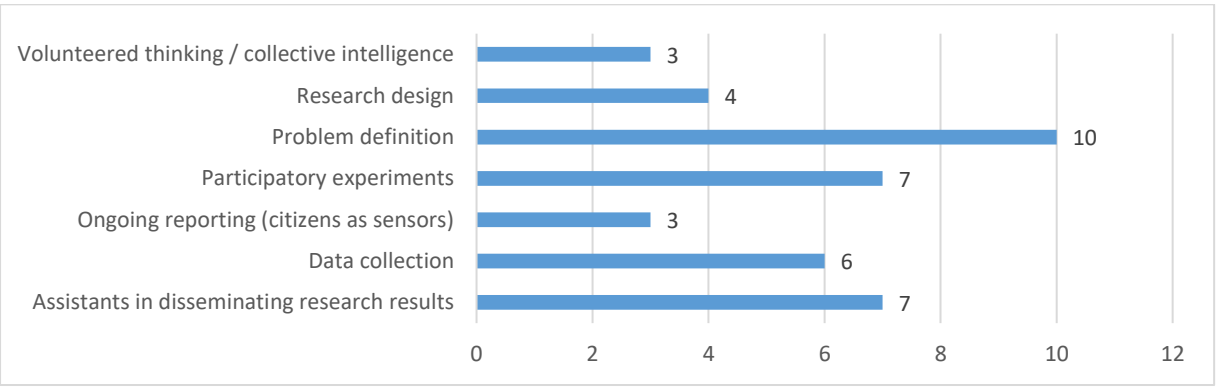

Figure 9 AHSS researchers: where can citizens make the most significant contribution to research?

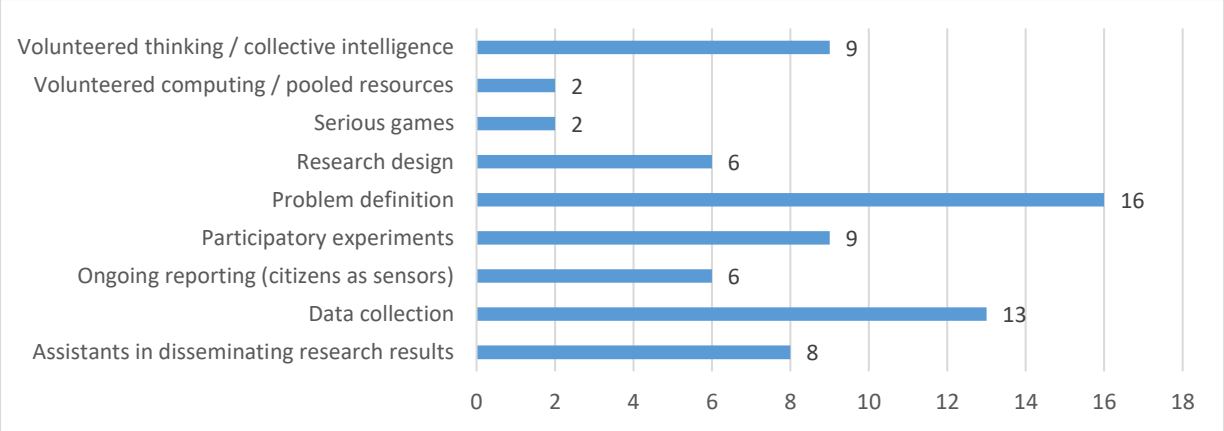

Figure 10 STEM researchers: where can citizens make the most significant contribution to research?

In light of those results, it is not surprising to see that **for nearly 75% of the audience members, citizen science should, as much as possible, be an integral part of ECIU University activities**, and occupy a central place in the university's research profile (Fig.11). The large majority of respondents in each of the professional categories represented at the consultation was found to hold this opinion. Of the 36 researchers who voted in this poll, 25 of them chose this answer. This was also the case for 16 out of the 21 research support staff who voted in this instance. There were no significant differences between AHSS and STEM researchers, with 11 out of 14 AHSS researchers who voted in the poll, and 14 out of 22 of their STEM colleagues, wishing citizen science to assume an important role in future ECIU University research.

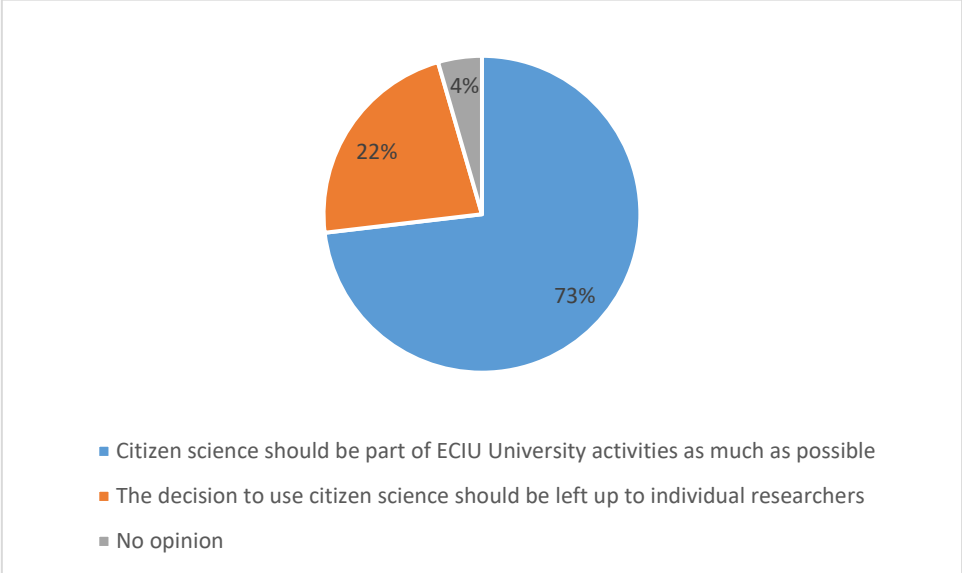

Figure 11 Within our new European University, how central should the citizen science approach be?

Those results however need to be read in light of the attendees' background, as explained earlier in this report: most audience members were invited to this event because they had been identified by their institution for their expertise and/or interest in citizen science, and those who subsequently registered will likely have chosen to attend for similar reasons. As such, they tend to be favourably biased towards citizen science, and this sample group may not be representative of the ECIU research community as a whole.

Despite this *caveat*, the results of this consultation indicate that there is a very significant appetite within the ECIU network for citizen science, and support for an ECIU University that invests in citizen science for all research disciplines and at all stages of the research project lifecycle. However, it was also made clear that citizen science is not applicable in all research projects, with degrees of applicability between fundamental and applied research. It was also apparent that there is no wish to make citizen science mandatory in *all* research conducted within the ECIU University. Rather, citizen science should be *encouraged* and *promoted* whenever relevant.

6. The ECIU University Citizen Science Hub

Work Package 5 of the Swafs SMART-ER project, which begins in February 2021 for a period of three years, will work on the development of citizen science activities for the ECIU University, and on the proposed creation of an ECIU University Citizen Science Hub. Work has yet to begin on the project. SMART-ER will also link to the Swafs INCENTIVE project, in which two ECIU partners (UT and UAB) are involved; INCENTIVE is developing citizen science hubs in four European countries and has already started with the foundation of the first Citizen Science Hub at UT on November 20th 2020.

This report does not seek to provide solutions, but to record some of the issues that will need to be taken into consideration in the proposed design and development of a Hub. The following points were mentioned during the consultation.

6.1 Aims of the proposed Hub

The ECIU University Citizen Science Hub aims to create a space which brings knowledge of and expertise in citizen science under the same roof. It also aims to be a place facilitating encounters and collaboration between academics and citizens. It should do more than keep track of existing citizen science projects across the ECIU University.

6.2 Points for further consideration

These points were raised during the consultation and will need to be considered in the design phase of the proposed Hub. The operative word here is diversity, which the Hub should seek to embrace: diversity of practices, disciplines, people, and national realities. These points include:

- To bridge the gap between different disciplines (transdisciplinary approach), which impact when and how citizens might most meaningfully engage with the research process. If their aspirations regarding citizen science seem overall similar, some of the poll results have highlighted differences in the way AHSS and STEM researchers have engaged with citizen science. Audience members have also stressed those differences in the chat. The wide range of disciplines and the ensuing diversity of citizen science methodologies will need to be taken into account in any future decision about an ECIU University Citizen Science Hub. Any ECIU common framework for citizen science will need to embrace this diversity. The European Citizen Science Association has outlined 10 principles which underlie good practice in citizen science, and can guide our understanding of what citizen science means across disciplines.
- The variety of valid citizen science practices, and different levels of engagement, which each have a place and a role to play in discrete projects. See Muki Haklay's 4 levels of engagement (2018): crowdsourcing, distributed intelligence, and participatory science, and 'extreme

citizen science' (e.g. citizens taking part in the peer review process for publications and dissemination of results).[2]

- The supports required for citizen science to 'happen', including funding, infrastructures (e.g. SISCODE and Living Labs), and political support. Funding was identified as one of the hurdles when trying to involve citizens in problem definition (i.e. in the very early stages of the research project, often before external funding has been secured), and to support the participation of citizens during the project (e.g. the Portuguese Foundation for Science and Technology's decision to cancel scholarships for people outside academia has serious implications for the type of citizens who will be able to participate in research projects without financial compensation).
- National differences, which impact on the level of engagement with citizen science. It was noted that Central and Eastern European countries are lagging behind: while citizen science is practised on the ground, it is not yet recognised at policy level in the region.[3]
- The remit of the word 'citizen': how do we define 'citizens'? Is this word exclusionary? Can we engage with *citizens* directly more often, and if so, how and who? Volunteering groups were mentioned as one of the solutions to bring citizens together (e.g. DCU's Water Institute, 5KLitterSnap project).

'According to our experience we can develop citizen science if we have funds which put on the same level researchers from academy and researchers from the community. This means that we need funds for non-academic scholarships which is now impossible in our country due to a rule that only gives scholarships to academics.' Participant

'Each project is different (and what we understand by 'citizen science' is different for each project - asking citizens to digitise historical documents is different to asking citizens to record instances of different birds visiting their gardens).' Participant

'The engagement of citizens in all phases of the research inquiry is essential. Also we need to incorporate a range of methodologies that suit the contexts and preferences/abilities of citizens/researchers involved. The key is to simulate curiosity and ongoing engagement.' Participant

'At the moment, we are collecting challenges mainly from municipalities, territorial entities, or companies. It is clear that citizens could play a very important role, and we [as ECIU University] should involve them more.' Prof. Maurizio Marchese

6.3 General recommendations for the design and implementation of an ECIU University Citizen Science Hub

Existing citizen science structures across the 12 ECIU member universities **should form the basis from which to develop the proposed ECIU University Citizen Science Hub**. Existing structures that

[2] Haklay, M. (2018). Participatory citizen science. In Haklay M., Hecker S., Bowser A., Makuch Z., Vogel J., & Bonn A. (Eds.), *Citizen Science: Innovation in Open Science, Society and Policy* (pp. 52-62). London: UCL Press. Retrieved January 8, 2021, from http://www.jstor.org/stable/j.ctv550cf2.11

[3] Vohland K. et al. (2021) Citizen Science in Europe. In: Vohland K. et al. (eds) *The Science of Citizen Science*. Springer, Cham. https://doi.org/10.1007/978-3-030-58278-4_3

were mentioned on the day include: UT's new Citizen Science Hub and the Swafs INCENTIVE project, UT's and UAB's Living Labs, as well as DCU's Centre for Engaged Research. This list is far from exhaustive, and it will be important to identify which structures are already in place in each institution.

One of the challenges will stem from the need to move from those local structures to network level. In this respect, the development of the Public and Patient Involvement (PPI) Network in Ireland might be a useful example of the processes, difficulties, and ambitions involved. The programme has so far recorded two phases. The first phase focused on building capacity at institutional level across the country (PPI Ignite scheme funded by the Health Research Board and the Irish Research Council). The second phase, which will commence in March 2021, develops from the work achieved in Phase 1 at institutional level, and seeks to build a national network. The PPI Network aims to increase capacity and expertise via undergraduate and postgraduate training on the topic, to connect people via mentoring and the sharing of best practices, and to develop an accessible repository of resources and toolkits. It also seeks to design and create participatory spaces across institutions, communities, and disciplines. Major issues that have so far been encountered in the transition from the local to the network level touch on governance, and on how to make citizens and communities co-leaders at the heart of the network.

The Hub could initially **focus on key societal challenges** (e.g. UN SDG 11) before being scaled up.

Citizens and researchers should be involved in the development of the Citizen Science Hub from the design stage.

The proposed Hub (and all ECIU citizen science activities) should be designed with the following **three principles** in mind:

- **Inclusivity**. The issue of the identity, gender, and background of the 'citizens' with whom the SMART-ER team will engage at all stages of their project, and *how* a Hub would engage with them is crucial and needs careful consideration. The issue of language barrier was also mentioned: we cannot assume that English will be understood by all. The proposed Hub in its activities and structure will need to find a way to accommodate national languages, as well as English as a *lingua franca*. It will also need to take cultural differences into account.
- **Transdisciplinarity**. As mentioned several times in this report, the Hub will only be successful if it brings many different fields together, links them to societal challenges together, and offers a space for researchers to learn from each other. It is not envisaged at this stage that the proposed Hub would focus on any one set of disciplines.
- **International outlook**. The proposed Hub will provide a space for people affiliated with ECIU member universities to learn from each other and from national differences when it comes to citizen science best practices.

6.4 Structure and governance

The ECIU University Citizen Science Hub could be **exclusively a virtual structure**, or it could be both physical and virtual. The COVID-19 pandemic has shown that, while the virtual dimension of the Hub will be key to its success, there may not be any need for it to be a physical office at all. Particular attention should therefore be paid to **logistical and organisational issues** from the outset. Questions such as the impact of the Hub on the way research is conducted, on the organisation of the universities and of the ECIU University will need to be considered.

The Hub should comprise **administrative support**. This support would ensure the sustainable and professional running of the Hub, and would also be helpful in supporting the research community in making societal impact.

The issue of data collection and **open science** was raised. Should the Hub follow the principles of open science? If so, how? What are the implications of this decision on the data infrastructure of the Hub?

Citizens should participate in the design, co-creation, and running of the proposed ECIU University Citizen Science Hub. Careful consideration will be required when deciding how to reach out and engage with citizens at the beginning *and* how to keep them involved in the project. The issue of *who* the 'citizens' are and who will be involved in the process is crucial, and the team will need to make sure that the Hub is an inclusive entity. This includes notably equal representation of all genders.

6.5 What should the proposed ECIU University Citizen Science Hub do?

6.5.1 Objectives of the proposed Hub

The Hub should be more than an office keeping track of citizen science projects across the ECIU University. Instead:

It should seek to **build capacity**. This comprises the **inclusion of citizen science in teaching activities**, which will need to be further considered in the context of challenged-based education.

It should **provide an easily accessible repository** of previous successful funding applications, either on citizen science as a topic or using citizen science methodologies, and of completed projects including documentation, software packages, experience etc. This would contribute to lowering the barrier for other researchers to set up citizen science projects on their own. This repository would also be made accessible to the public.

It should **train** both researchers and citizens. This is an important aspect that the SMART-ER project team will need to address in the development of citizen science activities for the ECIU University.

It should play a significant **role in establishing connections with external bodies** (e.g. public administrations, industry) and building partnerships. The Hub has a role to play when it comes to **linking citizen science and innovation**. There must be a mechanism in place for knowledge transfer. Examples of projects where citizen science has led to innovation and impact on external partners include:

- UAB; Planttes: the data collected by citizens on allergenic plants and allergy levels via the mobile phone application is used by the Catalan government at strategy and communication levels;
- UAB; public digitization of the capitals of the Romanesque cloister of Sant Cugat. The project, developed in partnership with the municipality, enables 3D reproduction using only mobile phone scanning, and its success has now led to other municipalities being able to use the same method to preserve cultural heritage.
- DCU's Water Institute has experience in partnering with a UK NGO as well as industry. The Water Institute has received funding from industry for discrete projects, with some of the workforce from the funding company also involved in the research.
- UT; TOPFIT/CitizenLab is working on a citizen science methodology developed for and by citizens that can actually be applied in practice in the healthcare sector.

6.5.2 How to encourage more researchers to adopt citizen science: some general directions

Audience members were asked what would encourage more researchers to adopt citizen science approaches, and what an ECIU University Citizen Science Hub should initially prioritise. Results to the first question reveal the importance of a wide range of possible activities (Fig.12), with all five propositions overall being considered valuable.

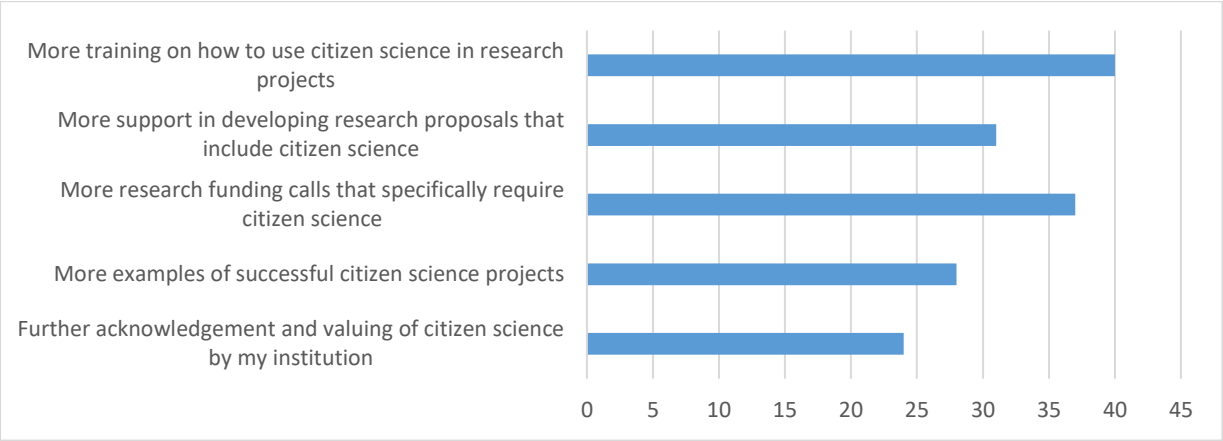

Figure 12 What would encourage more researchers at your institution to adopt citizen science approaches in their research?

Training and funding calls are seen as the most important initiatives that would encourage researchers to further adopt citizen science, with respectively 63% and 58% of voters selecting those options. More support for research proposals, and examples of successful projects are also deemed valuable, with 48% and 44% of voters respectively, while institutional acknowledgment comes last, but with a non-negligible 38% of voters thinking that it would make an impact on the development of citizen science in their institutions. Further analysis of poll data does not highlight much significant difference between staff categories, nor between early-career and mid-to-senior-career researchers, with institutional acknowledgment coming last in all categories while still representing a sizable portion of votes.

> ‘Citizen science scientific validity starts with good project design and the use of appropriate methodology. That's why training is so important.’ Participant

62% of the researchers who voted in the poll believe that more research funding calls requiring citizen science would be helpful, placing the onus on funding agencies. Training, support and examples of successful citizen science projects are also deemed valuable (Fig. 13). A quick comparison with the results of the poll for research support staff shows that while training is deemed more important in the latter category (with 85% of voting research support staff selecting the option), the results for the other options are broadly similar (Fig.14).

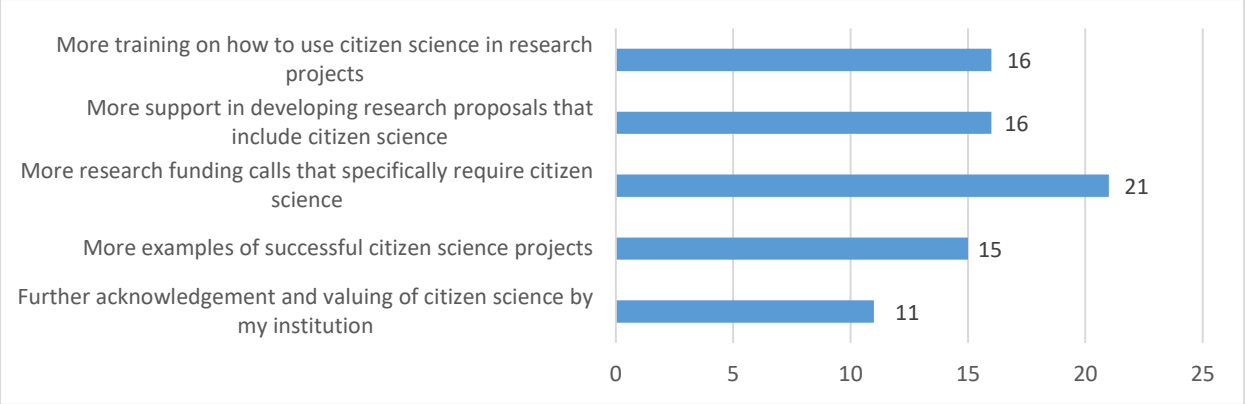

Figure 13 Researchers: what would encourage researchers to adopt citizen science practices in your institution?

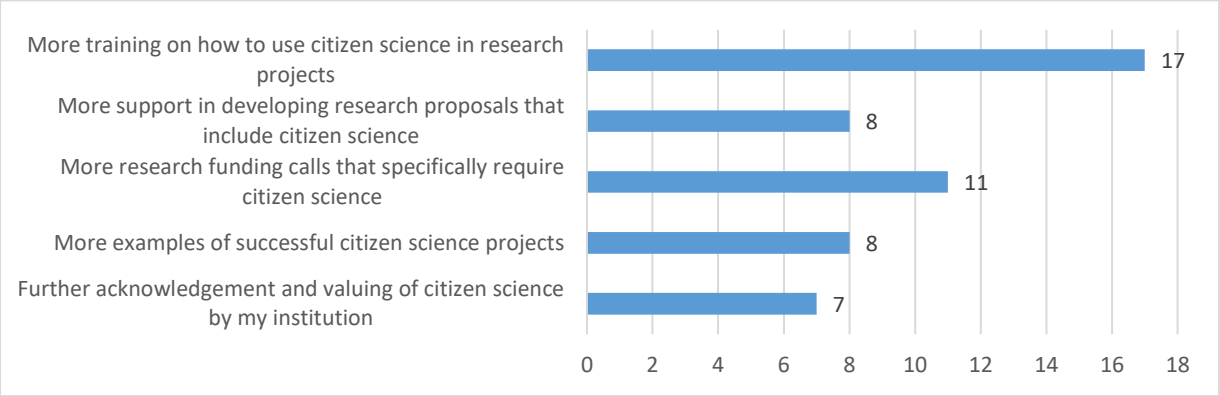

Figure 14 Research support staff: what would encourage researchers to adopt citizen science practices in your institution?

A comparison of the results between early-career and mid-to-senior-career researchers shows that, as might be expected, early-career researchers value training opportunities and support for the development of research proposals more than their more advanced counterparts, who themselves place more emphasis on the state of the funding landscape (Fig. 15 and 16).

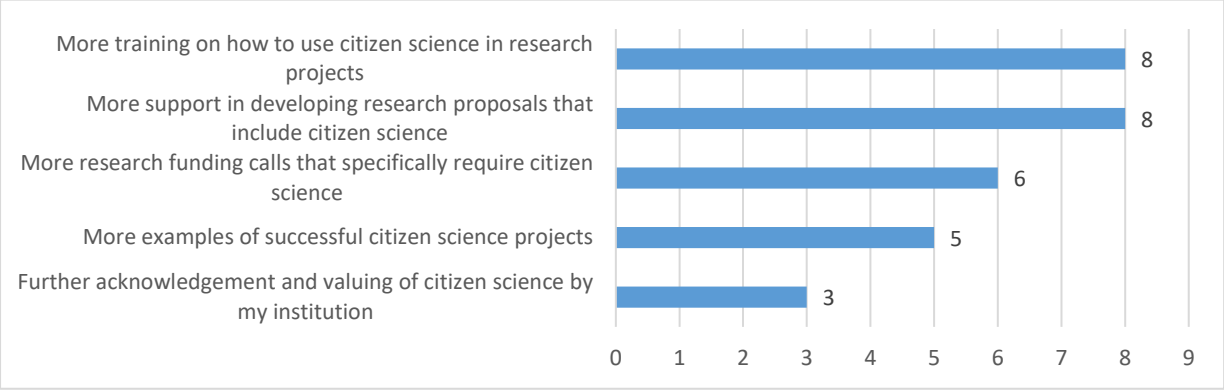

Figure 15 ECR: what would encourage researchers to adopt citizen science practices in their institution?

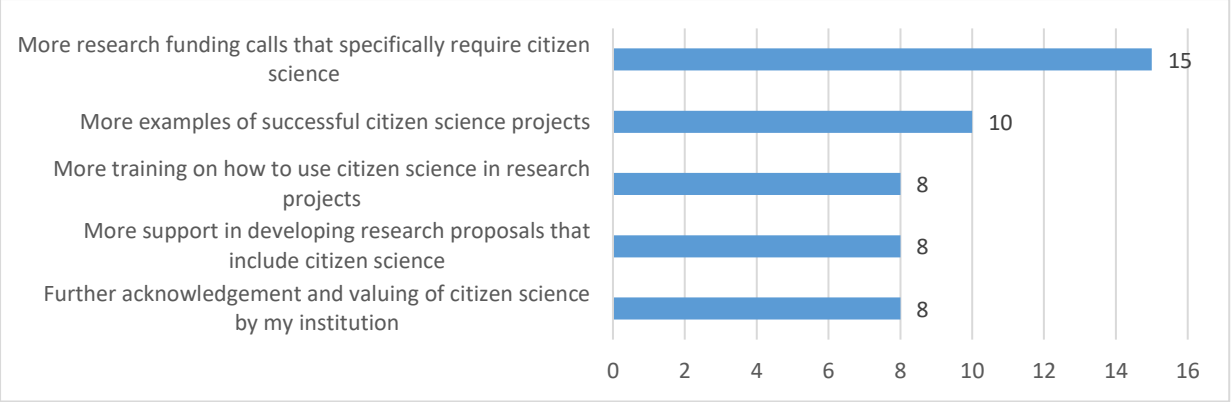

Figure 16 Mid to senior career researchers: what would encourage researchers to adopt citizen science practices in their institution?

'As academics, […] the only way in which we can fully develop citizen science is: 1) if we have the right scientific acknowledgment for our contributions, and 2) if it appears within the indicators contributing to the rewards scheme for our performance evaluation and career development.' Dr Fernando Vilariño

'The challenge is how to balance the strict requirements of science regarding quality and "disciplinarity" and the flexibility needed to bring the results of science to citizens and society in general. How to ensure that researchers can find jobs regulated by number of publications when they are putting their efforts into doing science with and for society?' Participant

That institutional acknowledgement and valuing of citizen science comes last in all poll data analyses should not be read as an indication that it can be left aside in the development of the ECIU University's approach to citizen science. Individual researchers, in particular those with an intrinsic interest in citizen science as is the case for the consultation's audience, may not rate its importance as much as they may do for other forms of support in their *individual* decision to integrate citizen science in their work. However, **for *systemic* change to happen, citizen science will need to be rewarded in metrics at European, national, and institutional levels**. In the current reward system which privileges the number of scientific publications, there is little external motivation for researchers to invest time and effort in citizen science and adopt new methodologies. **The ECIU University will need to participate and invest in a culture change**, with more academic recognition and concrete incentives rewarding engagement with citizen science, notably its inclusion in promotion criteria and career progression. The issue of metrics will be revisited as part of Activity 2.3 in 2021.

6.5.3 First priorities for the proposed ECIU University Citizen Science Hub

In the context of the ECIU University more specifically, training and connecting researchers across institutions are envisaged as the most important functions of the proposed Citizen Science Hub, and possibly what it should initially focus on – with again, as in the previous poll question, value also placed on all the proposed activities (Fig. 17). Training should target both researchers and citizens in order to build capacity. Training for researchers can focus on ways in which to include citizens in research and how to 'find' them, as well as on the benefits of citizen science for research. The latter

topic specifically targets researchers who are still reluctant to embrace citizen science and criticise the data quality of those projects. As for citizens, they should be educated as to why and crucially how they can contribute to research.

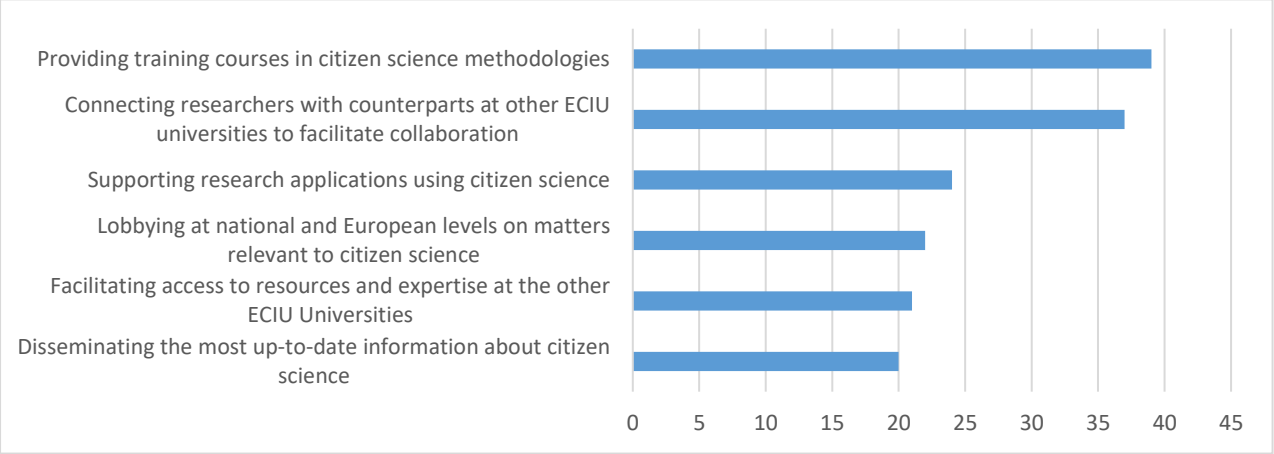

Figure 17 What do you think would be the most important functions of an ECIU University Citizen Science Hub?

Early-career researchers and mid-to-senior researchers, as exemplified in Fig. 18 and 19, offer broadly similar answers. The proposed Hub should first be a place that facilitates collaboration across the ECIU University, and helps researchers connect with each other. Research support and training are also highly rated.

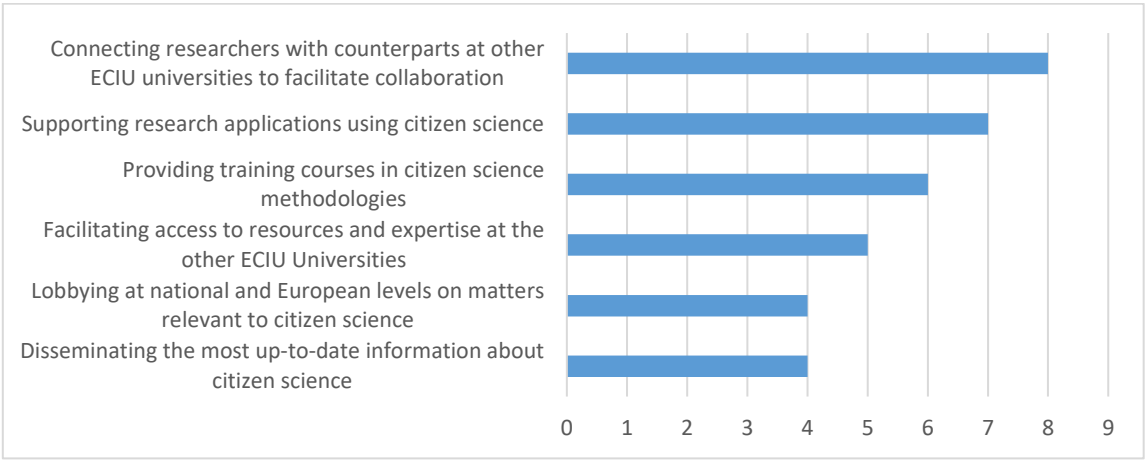

Figure 18 ECR: what are the most important functions of the ECIU University Citizen Science Hub?

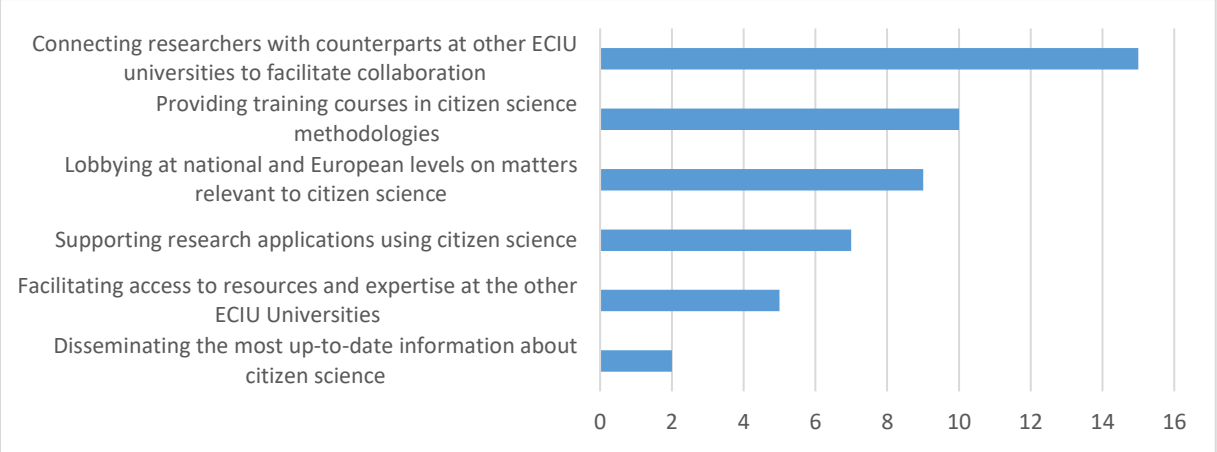

Figure 19 Mid-to-senior-career researchers: what are the most important functions of the ECIU University Citizen Science Hub?

By contrast, research support staff place much more importance on dissemination of relevant up-to-date information. 50% of research support staff who took part in the poll selected this option, while this is the case for only 18% of researchers. Research support staff also place greater value on training, with 85% of them selecting this answer (Fig. 20).

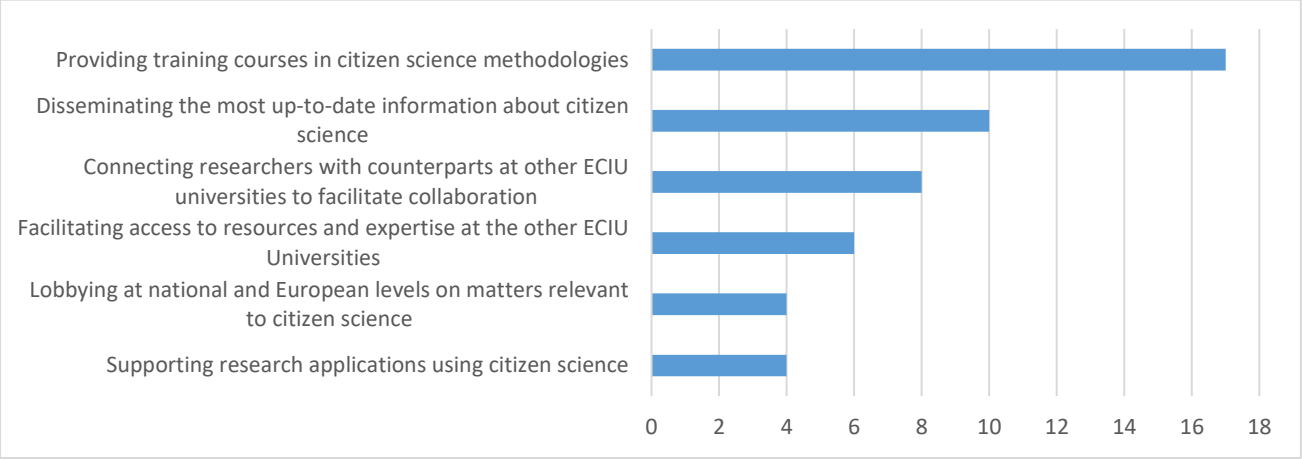

Figure 20 Research support staff: What are the most important functions of the ECIU University Citizen Science Hub?

The results to those poll questions and the conversation that took place in the virtual room, between the speakers and in the chat, strongly suggest that one of the main functions of the proposed ECIU University Citizen Science Hub would be to build capacity. This implies a focus on training as well as on fostering collaborations, and working with researchers as well as with citizens. However, as this section of the report also shows, the consultation has not clearly established which activities would need to constitute firm priorities, leaving much scope for the SMART-ER team to refine what an ECIU University Citizen Science Hub would look like and do.

7. Sustainability; the ECIU University Citizen Science Hub in the longer term

The final section of the consultation focused on metrics and KPIs that could be implemented to measure the success of the proposed Citizen Science Hub, and on its sustainability. As the proposed

Hub has yet to be designed, it is impossible to define precise KPIs; what follows instead is a list of suggestions from which the team who will design the Hub can draw.

7.1 Measures of success

One of the key measures of success supported by both audience members who voted on the final question (Fig.21) and panellists was the **degree of collaboration across ECIU member universities**. The sharing of best practices between institutions is seen as a key element of the proposed Hub.

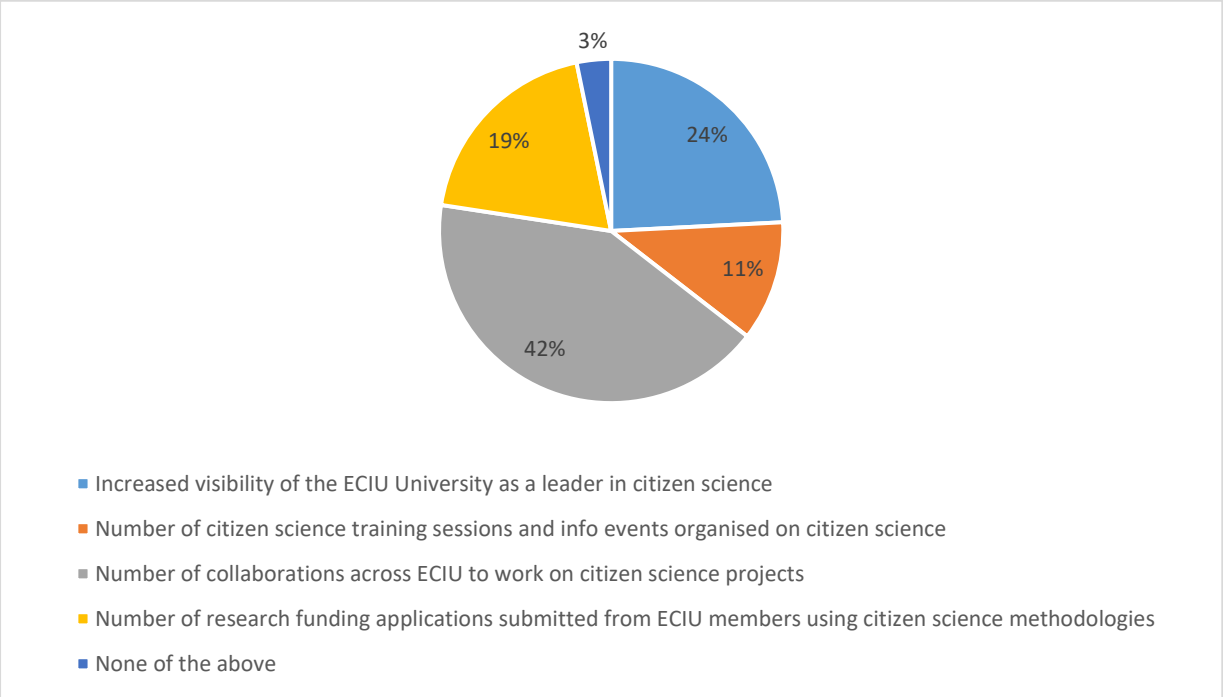

Figure 21 How would you judge whether the ECIU University Citizen Science Hub has been successful?

It was also made clear that the proposed Hub will need to design some metrics to measure the **impact of its activities on citizens and society**. Those measures could include:

- The number of citizens involved in the Hub and/or citizen science projects supported by the Hub
- The number of public administrations involved, and/or the number of agreements with public administrations
- Measures that capture the improvement or advancement of skills and knowledge in the citizens that have engaged in Hub-sponsored activities and citizen science projects
- Measures that capture societal development

> 'The impact that the work will have on citizens themselves, or on society: how do we capture that as a metric?' Prof. Veronica Lambert

Other KPIs suggested during the consultation were:

- The number of new start-ups generated from the projects, measuring the impact of the Hub on innovation
- The number of Q1 publications, measuring scientific excellence

- Alt-metrics, and any measure that can capture changes in the reward system for researchers and academics towards a recognition of the value of citizen science
- The number of news items in journals and newspapers, to measure public visibility
- Measures that capture how the Hub has changed research practices at institutional level

7.2 Sustainability

The Hub should be built for the longer term – and **sustainability needs to be factored in from the very beginning of the SMART-ER project**. This should include a reflection on its ethical dimension as well as on its data structure and organisation.

The proposed Hub will need to secure institutional and governmental support. Both political and institutional commitment to citizen science are seen as key to securing future funding beyond the remit of the SMART-ER project. Ideally, the Hub would not be financially reliant on competitive external funding calls or on project funding in the longer term.

8. Conclusion

Diversity and inclusion have emerged as key words in this consultation. The proposed ECIU University Citizen Science Hub will need to be transdisciplinary, and welcoming to researchers from the largest spectrum of disciplines, from different stages of their career, and with varying degrees of expertise in citizen science. It will also need to put citizens and societal impact at the core of its mission and activities, and engage with citizens of all backgrounds and genders. It will also engage with companies, policy makers, and public administrations with the objective of linking research and innovation, and transforming society in line with UN SDGs and, in particular, the ECIU strategic focus in the pilot phase on SDG 11 research topics.

The proposed Hub will seek to build capacity and will rely on existing structures and expertise identified across the ECIU network, at this event as well as via the ECIU University Work Package 2 and the SMART-ER project. With a strong focus on collaboration, the sharing of best practices, education and training, the Hub will concretise a common ECIU framework for citizen science that will meet the needs of our diverse communities.

While this consultation has gathered the perspectives from the ECIU research community, both researchers and research support and development staff, it has become apparent that **we will need to engage with other stakeholders, and crucially with citizens**, to learn from their views as to what the proposed Hub should look like and what it should do before we can proceed with the actual design phase.

> ‘Today’s discussion reflects only research community point of view regarding citizen science. It’s important. But we need to hear and understand the citizens’ (society) point of view to citizen science. How they understand this? Maybe then there will fewer movements (e.g. regarding vaccination) in social media which deny benefits of research results to society.’ Participant

Key Points

- The consultation gathered the perspectives of the ECIU research community. All 12 member universities were represented, with a combination of researchers, research support staff, and other professionals in attendance.
- There is a strong appetite among the ECIU research community for the development, promotion, and institutional support of citizen science methodologies in research whenever relevant, and for the ECIU University to develop as a leader in the field.
- The ECIU University's framework for citizen science should embrace diversity and inclusivity. It should cater to the diversity of disciplines, levels of engagement, and national realities. It should seek to engage with a diverse cohort of citizens from the local communities.
- The SMART-ER project will develop citizen science activities for the ECIU University, and work on the proposed creation of the ECIU University Citizen Science Hub. This will require additional work on the structure, mission, and functions of the proposed Hub. Preliminary findings from this consultation suggest that it should initially focus on capacity building (incl. training of both researchers and citizens) and on facilitating collaboration.
- The SMART-ER project will work harmoniously with existing relevant structures and projects in each institution, e.g. existing citizen science structures in member universities, and the Swafs INCENTIVE project.
- Citizens should be involved in the design and development of the proposed Hub.
- The ECIU University Citizen Science Hub needs to be built for the longer term from the outset (with planning of future funding streams and institutional support).
- Next steps include: widening the consultation to gather the perspectives of citizens, and identifying the all existing citizen science structures in place in each institution. Those steps are for SMART-ER WP 5 to act upon.