A2.4, O1: Mapping Citizen Science activities in the ECIU University

Co-funded by the
Erasmus+ Programme
of the European Union

This document has been developed during the pilot phase of the ECIU University Erasmus+ project between 2019 - 2022.

Beneficiaries

- Aalborg University, Denmark
- Dublin City University, Ireland
- Kaunas University of Technology, Lithuania
- Linköping University, Sweden
- Tampereen Korkeakoulusäätiö sr, Finland
- Hamburg University of Technology, Germany
- Universidade de Aveiro, Portugal
- Universitat Autonoma de Barcelona, Spain
- University of Stavanger, Norway
- Universita degli Studi di Trento, Italy
- University of Twente, The Netherlands

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Symbols, abbreviations and acronyms

AAU	Aalborg University, Denmark
DCU	Dublin City University, Ireland
EC	European Commission
ECIU	European Consortium of Innovative Universities
KTU	Kaunas University of Technology, Lithuania
LiU	Linköping University, Sweden
TAU	Tampereen Korkeakoulusäätiö sr, Finland
TUHH	Hamburg University of Technology, Germany
UA	Universidade de Aveiro, Portugal
UAB	Universitat Autonoma de Barcelona, Spain
UiS	University of Stavanger, Norway
UNITN	Universita degli Studi di Trento, Italy
UT	University of Twente, Netherlands

1 Introduction

ECIU University has adopted a challenge-based approach to allow participant institutions to bring together different competences in innovative training and research, and to scale it up to a European level for the benefit of learners and stakeholders from any background. In the framework of this project, Work package 2 develops joint research structures and policies in support of the overall work plan of the alliance, focusing on UN SDG 11 during this pilot project phase. In turn, engagement in ECIU University activities provides a testbed for new services for research at the participating universities. This will lead to positive outcomes for the entire research communities at the member institutions in the long term. Within this initiative, **multidisciplinary co-creation and citizen science have been identified as key elements for a way of working**.

Activity 2.4: Supporting measures for engagement in citizen science
In the ECIU University project, Work package 2 focuses on challenge-based research, and concretely Activity 2.4 is about implementing supporting measures for connecting R&I with society, and more specifically for Citizen Science. This activity is subdivided in three tasks:

2.4.1 Selecting a number of innovative practices across the member institutions: Mapping ongoing activities, infrastructures, funding programmes and initiatives related to citizen engagement in research

2.4.2 Developing pathways by which researchers can engage with citizen science. This involves developing agreement on access to resources and sharing expertise across the network.

2.4.3 Developing a mechanism by which researchers can access citizens in the ECIU University member countries. This entails a long -term plan for a unified approach to encouraging citizen science across all sites.

2 Citizen Science

In 2014 the research and innovation programme Horizon2020 was launched. The European Commission (EC) adopted the ambitious challenge of creating a research and innovation policy guided by the needs of society and the engagement of social actors through participatory approaches, under the theme of **Responsible Research and Innovation (RRI)**. The EC published an informative document entitled "Responsible Research and Innovation. Europe's ability to respond to societal challenges'' (European Commission 2014)[1] in which the EC reaffirms **the need for research and innovation to be oriented to the needs of society and to involve its stakeholders**.

> RRI implies that social agents work together throughout the research and innovation process in order to align the process and its results with the values, needs and expectations of the European society (social challenges).

The H2020 programme incorporates RRI and co-creation as an emerging approach to address many of the challenges identified as priorities. This approach fosters creativity and collaboration between different social actors and co-creation for economic growth and social inclusion. It promotes the inclusion of end users, researchers, social entities, public authorities, companies, the creative sector and entrepreneurs in order to identify problems and provide solutions. One of the main aspects

addressed by RRI is the public commitment of society and institutions, including universities to ensure that the social challenges they address are based on the real economic and social concerns of society.

In this context, two years after the H2020 programme was launched, Carlos Moedas, the European Commissioner for Science and Innovation in Research, emphasized the concept of Open Research and Innovation and the use of digital technologies to make science and innovation more collaborative, international and open to the public. This idea is reflected in the document "Open Innovation, Open Science, Open to the World: A vision for Europe" (European Commission, 2016) [2] Eventually, the European Commission published the actionable recommendations of the Open Science Policy Platform (OSPP, a High Level Advisory Group established by the Commission to advise on the development of Open Science in Europe) on May 29, 2018. In these recommendations they identified eight priority areas, one of which is Citizen Science.

In fact, Citizen Science is basically a participatory process, dealing with social inclusion and engaging citizens in research and innovation-related decisions, about promoting science education and new models of R&I governance. It is, consequently, inherently linked to the RRI approach.

Citizen Science is a broad concept (*White Paper on Citizen Science for Europe*, Socientize 2014 [3] and refers to the active participation and engagement of society in the scientific research process in many different possible ways. Depending on their personal/professional interests, time, and technological resources, citizens are given the opportunity to decide on how to be involved. This process , properly designed has the potential to create an open, networked and transdisciplinary scenario, improving the interaction between the quadruple helix actors, leading in turn to a more democratic research based on societal challenges. Within ECIU University, we explicitly commit under activities **2.4.2** *Developing pathways by which researchers can engage with citizen science* and **2.4.3** *Developing a mechanism by which researchers can access citizens in the ECIU University member countries* to develop the most effective process to engage citizens in this research approach.

Consequently, there is no single definition of Citizen Science. It is a dynamic concept which is constantly evolving and implies new collaborative activities (closely linked to new technologies) and shared objectives between the main stakeholder groups.

Indeed, depending on the research aim or the scientific field, CS is not always an effective approach and this also needs to be considered in any deployment strategy.

> **Citizen Science is becoming increasingly important as a new driver of research**. Citizen Science seeks to include citizens in all aspects of the research process; providing challenges, collecting and analysing data, supporting the impact assessment, becoming funders or collaborating in the design of the research projects, being the objectives and amplifiers of research results, etc. This approach fits well with the challenge-based goals of ECIU to bring together all stakeholders, to meet the challenges. ECIU University offers the opportunity to pilot new joint supports for citizen science.

There are a number of societal and technologically enabled trends facilitating the increasing success of citizen science initiatives such as the increasing empowerment of society, the extensive use of the internet and social media, and the availability of digital tools such as mobile phones, which allow not only to obtain and manage data, but also provide a platform for cooperation and coordination of scientific projects requiring citizen participation across countries and continents.

3 Mapping & Analysis of CS in ECIU university

In this document we describe the first activity, Mapping & Analysis. It is a systematic process of determining the current situation of CS initiatives at partner organisations.

The mapping and analysis process with respect to the ECIU partners has been carried out in four phases:

3.1. Questionnaire: selecting relevant questions required to obtain an overview of initiatives and resources for citizen science at partner universities

3.2. Results: The online questionnaire was filled in by the appointed contact person for each university.

3.3. Citizen Science Practices in ECIU University: an overview of main activities with practical examples.

3.1 Questionnaire

This online questionnaire was sent to the points of contact of each partner university, and was completed with the support of individuals responsible for Research/Citizen Science, where appropriate.

Institution Name
In my institution:

1 There are Citizen Science projects/initiatives conducted by individual researchers/departments. (Y/N)
Citizens participate:
a. Collecting data
b. Analysing data - Crowdsourcing
c. In research design / performance
d. Impact / Communication
Please, give some examples (up to three) indicating project/initiative name and link to its website, if available:
- *Case 1:*
- *Case 2:*
- *Case 3:*

2 There is institutional support to promote Citizen Science project/initiatives

a. There are facilities and infrastructures to promote the interaction with society: Living labs / Innovation labs / Social labs (in the campus) (Y/N)
Please, explain the initiatives in the campus:

b. There are facilities and infrastructures to promote the interaction with society: Living labs / Innovation labs / Social labs (off-campus) (Y/N)
Please, explain the off-campus initiatives:

3 There is a virtual space (platform) to promote citizen's collaboration, e.g., challenges platform (Y/N)
Please, share further details

4 There are platforms for crowdfunding (Y/N)
Please, list them:

5 There is a point of contact (office, unit, service, etc.) for Citizen Science (Y/N)
Please, explain how it works:

6 There are specific training initiatives for researchers, e.g., CS, RRI, Public Engagement (Y/N)
Please, share:

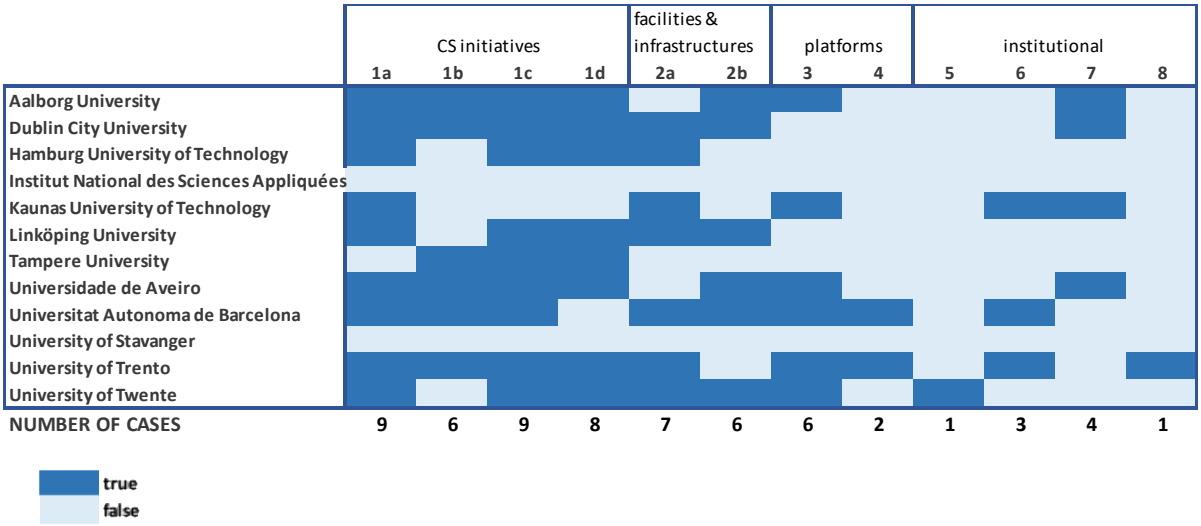
7 There are awareness campaigns among researchers to include CS in their research (Y/N)
Please, list the campaigns:

8 There is specific funding to promote CS projects and initiatives (Y/N)
Please, share the detail

3.2 Results

The questionnaire was completed by the twelve members of ECIU University. In addition to the Y/N questions, participants were asked for some examples (up to three representative cases for each university). These cases provided an interesting overview of the main initiatives carried out in the ECIU University institutions.

The next figure summarizes the results of the questionnaire.



- Most of the ECIU university members are performing initiatives in connection to Citizen Science, with different level of citizen engagement. In this sense, 75% are developing CS activities involving citizens in collecting data as well as collaborating in the research design.
- Around half of the ECIU University partners are using resources such as facilities and infrastructures direct or indirectly related to CS, including facilities on or off campus (55%), and digital platforms for collaboration (50%).
- Promotional campaigns or initiatives to promote awareness in CS are not very extensive (33%) and only 25% of the institutions have training programmes providing skills or competences connected to CS.
- Other CS enabling measures such as crowdfunding initiatives, specific funds to promote CS activities or the appointment of an institutional CS contact point are not widely in place at most institutions.

3.3 Citizen Science Practices in the ECIU University

Data collected from the survey reflect a relatively high degree of implementation of CS activities in the ECIU University. However, they also suggest that most of the activities of CS are rather linked to particular initiatives of some researchers and research groups rather than to institutional strategies, as there are very few systemic implementations of support measures and resources for CS.

As a consequence, this could represent a difficulty for sustained engagement with the community of CS practitioners, as those relationships are typically project based and diminish after the end of the project. In addition, much of the collected data are not stored in structured institutional repositories, and are essentially inaccessible after the end of citizen science projects, hindering further collaborations and/or long-term project applications.

The partner institutions have provided a list of representative initiatives of citizen participation in scientific projects. It is not an exhaustive list and indicates that there is broad diversity of practices (Table 1). Many of them are based on citizen collection of data, some in co-creation processes and co-design of research. Some involve processes of education, training (usually in technologies) or working in specific facilities.

AAU	Integrating open and citizen science into active learning approaches in higher education. https://vbn.aau.dk/en/projects/erasmus-ka203-2019-004-integrating-open-and-citizen-science-into-
AAU	Open4Citizens. Empowering citizens to the make meaningful use of open data (https://vbn.aau.dk/en/projects/open4citizens-empowering-citizens-to-the-make-meaningful-use-of-o)
AAU	Living labs - an interventionist ethnographic approach to technologies of the future (https://www.tant.aau.dk/energy-environment-sustainability-future-making/Projects/Living+Labs%3A+An+Interventionist+Ethnographic+Approach+to+Technologies+of+the+Future/
DCU	BACKDROP project / DCU Water Institute https://dcuwater.ie/backdrop/ . See here for more projects: https://dcuwater.ie/education-outreach/outreach/
DCU	Let's Talk About STEM project / DCU CASTEL Centre http://castel.ie/LetsTalkAboutSTEM/
DCU	Database of Irish placenames (DCU Fiontar and Scoil na Gaeilge) https://meitheal.logainm.ie/en/
KTU	Citizen Science to promote creativity, scientific literacy, and innovation throughout Europe https://cs-eu.net
KTU	Building on scientific literacy in evolution towards scientifically responsible Europeans (EuroScitizen), http://www.euroscitizen.eu/what-is-euroscitizen/
KTU	Project "Citizen Science as an Innovative Form of Citizen Participation for Welfare Society Development" (CS4Welfare), a new project that is funded by Research Council of Lithuania
LiU	Seed Box – tracking the traces of environmental change, exploring emergent ecologies https://theseedbox.se/

LiU	Visualiseringcenter C: ”Exploranation” https://liu.se/artikel/stod-uppbyggnaden-av-varldsunikt-visualiseringslabb, http://visualiseringscenter.se/en
LiU	Urban climate resilience through participatory risk management systems. https://citizensensing.itn.liu.se/
TAU	Let's work together https://www.tuni.fi/en/research/lets-work-together/
TAU	RoboCivics for Sustainability https://projects.tuni.fi/robocivics/
TAU	ALL-YOUTH http://www.allyouthstn.fi/en/all-youth-2/
TUHH	Autonomous bus. https://www2.tuhh.de/tabula/
TUHH	Mobile Exclusion, http://mobileinclusion.projects.tu-berlin.de/mi/
UA	Skopeofonia - Participatory and Dialogical Research on Musical Practices in the Cova da Moura Neighborhood http://skopeofonia.web.ua.pt/node/2 /
UA	Clair-city - Citizen-led air pollution reduction in cities - http://www.claircity.eu/aveiro/
UA	Citizen Science project involving CESAM members - http://www.cesam.ua.pt/?menu=4468&language=eng&tabela=post
UAB	Harmonizing Remote Sensing and Citizen Science Vegetation Phenology Observations http://ritmenatura.cat/projects/phenotandem/index-eng.htm
UAB	Citizens Co-Creating the City’s Digital Cultural Heritage http://librarylivinglab.cvc.uab.cat/home/capitals/?lang=en
UAB	Data quality tools for increasing trust in citizen science projects Ground Truth 2.0 https://gt20.eu/
UNITN	"Round table with citizens": round tables with citizens organised to co-design research projects on relevant scientific topics. http://claster.soc.unitn.it/index.php/cittadini
UNITN	"Star initiatives": scientific coffees and research night, to promote the debate with citizens on specific scientific topics. http://claster.soc.unitn.it/index.php/iniziative-star
UNITN	"Schools": Participatory meeting to learn how science works. http://claster.soc.unitn.it/index.php/scuole
UT	Phenology research including a tick activity tool - https://www.tekenradar.nl
UT	A pilot to jointly measuring groundwater in the city of Enschede - https://www.utwente.nl/nieuws/2019/4/48231/resultaten-pilot-samen-grondwater-peilen-online
UT	http://www.nucleus-project.eu/ https://cordis.europa.eu/project/id/872526

Table 1. List of some activities of Citizen Science carried out at ECIU member universities

As previously outlined, citizen participation is becoming an increasingly important consideration in research and innovation policies and strategies. It also represents a challenge for universities in terms of how they fully embrace and integrate citizen science into the way they conduct their research activities in compliance with the European Commission commitment to Open Research and Innovation.

For this reason, in this report a broad definition of Citizen Science is assumed expressed as **the active involvement of society in any activity of the R&I process**, including the activities for engagement and being as open as possible to different concepts and disciplines, and following the 10 principles of CS published in 2015 by the European Citizen Science Association [4].

In the same way, it is important to adopt a shared understanding of what activities do not constitute CS, and what criteria CS projects must fulfil to ensure high-quality participatory research. Here we propose some of the criteria, elaborated by F. Heigl, et al 2018 [5] which would not be appropriate to define CS in this context:

- Initiatives that exclusively involve people with project-specific professional and scientific backgrounds.
- Initiatives which merely collect data on participants or in which participants provide resources only passively (people are merely interviewed regarding their opinion / attitude, way of life, etc.)

One of the axis of the ECIU University project is the paradigm shift regarding research strategy, based on co-creative processes, creativity, innovation and design skills to meet the complex global challenges that confront society. **ECIU University** explores **new ways to promote dialogue between researchers and citizens**. In this context, CS is a powerful approach for an active participation, interaction and collaboration. Practices and cases provided by the partners of ECIU University provide some excellent examples of collaborative engagements between researchers and citizens which include:

- Creation of new scientific knowledge
- Support for science education and engagement with science
- Raising awareness about local or global concerns and problems
- Promoting inclusion
- Promote use, quality & reliability of data
- Training in new skills
- Working in collaborative spaces for co-creation.

In the following sections, examples of each of these ways of engagement are described along with specific examples of different ECIU University Citizen Science activities.

3.3.1 Creating new scientific knowledge

Citizen participation has enabled the expansion of data collection and data processing capacities, as well as new ideas and perspectives for research and innovation. “Scientific endeavour that generates new knowledge or understanding” is the first of the ten principles of citizen science published by the European Citizen Science Association. When careful attention is paid to scientific design, data quality, and participant engagement, citizen science can promote significant scientific discovery and findings [6], and open doors to broader knowledge exchange about the research in question.

Harmonizing Remote Sensing and Citizen Science Vegetation Phenology Observations
http://ritmenatura.cat/projects/phenotandem/index-eng.htm

PhenoTandem harmonizes new phenology products derived from high resolution optical satellite (Sentinel-2) images with the traditional phenological in-situ observations done by volunteers. Since current in-situ observation cannot always be perceived from space, the innovation consists in co-designing with citizen scientists a new protocol that will make in-situ observations interoperate with remote sensing products. This will greatly increase the spatial distribution of remote sensing phenology products sensitive to the effects of climate change in nature while increasing data quality through in-situ validations.

Social robots for digital civics
https://projects.tuni.fi/robocivics/

RoboCivics project investigates how social robots can be designed to motivate and facilitate civic participation by youths in the domain of sustainable development. In RoboCivics, social robots are co-designed with the youth (15-24 years) to gain understanding of the youth’s perspectives to desirable forms of social robot interaction – with sustainable development as the application domain. The main goal of RoboCivics is to create new scientific knowledge about interaction models of persuasive social robots that can motivate and facilitate youth civic participation.
In the research, the youth co-design robots and conduct empirical user trials both with existing social robots and with the prototypes developed based on the youth’s designs. The user trials take place in real life contexts such as youth spaces, schools and shopping centres. The researchers will also conduct a long-term user trial (6 months) to gain understanding of long-term user experience of the robots.

3.3.2 Science Education & Engagement

Citizen participation in research projects can stimulate their interest for science, and can be used as a new learning approach and other forms of informal science education [7]. At the same time, engagement in citizen science is enhanced by acknowledging these multiple dimensions and creating opportunities for volunteers to learn and find personal relevance in their work with scientists.

EuroScitizen: Building on scientific literacy in evolution towards scientifically responsible Europeans

http://www.euroscitizen.eu/what-is-euroscitizen/

The Action will, for the first time, leverage the strengths of diverse stakeholders (evolutionary biologists, education researchers, educators, museum professionals and the media) in order to generate and analyse approaches used to improve the public's scientific literacy. As citizens, we are confronted with a deluge of information and misinformation from the internet and the mass media. Scientific literacy, i.e. the ability to critically evaluate, apply and understand scientific knowledge and how it is produced, is therefore vital for responsible citizenship. It is a prerequisite for generating a knowledge-based society and for allowing citizens to make informed decisions.

Integrating open and citizen science into active learning approaches in higher education

https://vbn.aau.dk/en/projects/erasmus-ka203-2019-004-integrating-open-and-citizen-science-into-

The aim of the INOS project is to combine Higher Education (HE) curricula with open and citizen science activities and thus upskill HE academic and library staff, and students in sustaining technology-mediated social participation inside and outside the University and at different sectors (Applied Sciences and Social Sciences and Humanities (SSH) disciplines). Subsequently, the objective is to cross-fertilize academic and citizen practice as a means of strengthening the HE role to the knowledge base of science with and for society.

3.3.3 Raising awareness

The CS initiatives often help to raise public knowledge and awareness of social challenges (environmental, socio-economic, health, etc.), which can lead to stronger public measures to address the issue or changes in personal behaviour. Citizens can gain expertise and awareness through citizen science participation and diffuse acquired skills and experience through social networks, influencing other non-scientist citizens and through an active advocacy network [8]

Urban climate resilience through participatory risk management systems

https://citizensensing.itn.liu.se/

Urban citizens continually make a multitude of decisions related to climate-related risks e.g. extreme temperatures, precipitation, flooding, water and air pollution and their impacts and these are most often made without clear knowledge of locally specific conditions. With new technologies such as citizen sensing, there is an emerging opportunity for citizens to enhance urban resilience, both as providers of locally situated data (e.g. bacteria levels in drinking-water, infrastructure damage or ecological changes) and as receivers of specific recommendations of how to respond to climate-related challenges.

BACKDROP project

https://dcuwater.ie/backdrop/

BACKDROP aims to engage people to measure water quality along different parts of the river Liffey, which runs through Dublin, on a monthly basis and become citizen scientists. The measurements are simple to carry out and data collected can be uploaded using a mobile phone. The data citizen scientists produce can be used to address specific local water challenges (monitoring and safeguarding local fresh water bodies like canals, lakes, rivers, streams and ponds) and for researching global water issues.
DCU Water Institute run projects in collaboration with EarthWatch that aim to incorporate the entire community into the research activity.

3.3.4 Promote inclusion

CS contributes to the inclusion of groups and individual citizens in the policy process, it encourages civic skills and civic virtues, it leads to rational decisions based on public reasoning (deliberation) and it increases the legitimacy of the process and the outcome.

Digital technology facilitates this interaction, but cannot be the sole source of this research activity. There are also examples of how these projects can play an important role in the integration of vulnerable people with high risk of exclusion.

Skopeofonia
http://skopeofonia.web.ua.pt/

This project aims to create a participatory research group to study the musical practices of Kova M, a neighbourhood of Cape-Verdian majority that has been seen by the Portuguese authorities as well as by the Portuguese mass media, as a "critical" neighbourhood, widely associated with criminality and drugs traffic.
The project was based on the creation of a multidisciplinary team, including senior and early stage researchers in ethnomusicology, design and communication sciences and unemployed musicians who were residents of Kova M with no academic training. Thus, part of the week took place at the university where researchers from Kova M had the possibility to attend classes/seminars and learn and develop new skills especially in the field of audio-visual documentation and music, and, the second part of the week took place at the neighbourhood developing fieldwork and building an archive to promote its music and to safeguard its expressive heritage.
Musicians from the Kova M neighbourhood evolved as knowledge producers instead of being "passive researchers" and this had a strong transformative impact in their lives and led to a new citizenship conscientiousness during the research process that endured after the end of the project.

Let's Work Together – action group
https://www.tuni.fi/en/research/lets-work-together

The Let's Work Together – action group collects together students and staff from the Tampere University as well as adult and vocational education actors in the Pirkanmaa region interested in integrating the asylum seekers and refugees. It invites people and organizations to participate in the planned activity and to generate new forms of activity. Let's Work Together -action group serves the communication of the participants and coordinates the activity. The aim is to integrate the asylum seekers and refugees in Finland by offering them meaningful activity together with native Finnish people.

3.3.5 Promote Use, Quality & Reliability of Data

Another essential part of the process, is the development of procedures and mechanisms to ensure the quality of such initiatives. Data and their scientific rigour are fundamental in ensuring that CS initiatives have the credibility and social impact they deserve [9]while at the same time being a source of new knowledge worthy of publishing in high-impact scientific journals, and is therefore vital for engaging researchers in participating in collaborative projects with the public.

One of the challenges that usually arise in citizen projects is how researchers make data gathered by citizens publicly available. Researchers should be aware of how this data can be shared taking into account legal frameworks and ethical aspects.

Data quality tools for increasing trust in citizen science projects
https://gt20.eu/

In the H2020 Ground Truth 2.0 project, a quality assessment tool is being developed that can potentially be applied to any citizen science project that exposes (I'm not sure this is the right word) the data following the SWE4CS practices. The tool downloads a subset of the data and represents it in the form of a map. Then, it is possible to select a quality test that is appropriate for the kind of data presented and to assess data quality. The citizen science community can react and filter the wrong observations or changing their procedures and publish a new quality assessment that demonstrates their progress. The whole process improves the documentation of the dataset while increasing the trust in citizen science data. The tool is contributing to the Citizen Science Interoperability Experiment that is supported by the H2020 project WeObserve and conducted under the OGC innovation programme.

Open4Citizens. **Empowering citizens to make meaningful use of open data**

(https://vbn.aau.dk/en/projects/open4citizens-empowering-citizens-to-the-make-meaningful-use-of-o)

There is a clear gap between the opportunities offered by the abundance of open data and the citizens' capability to imagine new ways of using such data.

This project aims to reduce such gap. It involves citizens in a co-design process (Hackathons), together with IT experts, public administrations, interest groups and start-up companies, in order to develop new services to improve urban quality and certain aspects of their everyday life. The aim of the project is to raise citizens' awareness about the opportunity offered by open data and create a new culture of innovation in public services.

The project will also create physical or virtual locations (OpenDataLab) that will become the reference point for all citizens and interest groups that want to propose innovative applications based on open data.

3.3.6 Training in new skills

There is the double requirement to identify and solve training needs in citizen science:

a) those of participants: depending of the profile of the participants, with their ability to understand material with a reasonable level of complexity and sophistication, while creating inclusive material and encouraging people who are currently outside the area of participation in projects to join.

b) those of the researchers or project promoters: availing of training sessions to learn the different approaches to citizen science projects, how to engage citizens in their research at any point of their research activities, and how to deal with legal and ethical aspects, especially in relation to data management. Several ECIU institutions are providing this type of training.

All Youth Want To Rule Their World Research Project

http://www.allyouthstn.fi/en/all-youth-2/

ALL-YOUTH – All youth want to rule their world is a multidisciplinary research project which explores the capabilities of young people (aged between 16 and 25) and the obstacles that hamper their engagement with society. It also explores the visions of youth regarding sustainable future, economic growth and well-being.

The main goal of the project is to create possibilities and, through a training programme, to enable young people to participate in developing their own communities and the wider society. The key ideas for sustainable growth are responsive governance and rule of law, digital innovation and sustainable development interventions such as the bioeconomy.

Citizens Co-Creating the City's Digital Cultural Heritage

http://librarylivinglab.cvc.uab.cat/home/capitals/?lang=en

The 144 capitals of the cloister of the Monastery of Sant Cugat del Vallès are one of the masterpieces of the Catalan Romanesque. They represent biblical scenes, vegetal motives, fantastic animals and delicate geometric figures. The Library Living Lab users have developed a protocol for scanning the capitals, in order to obtain the first ever catalogue in 3D of the masterpieces. This will allow both the web visualization of the 3D models and the creation of physical replicas with 3D printers. The capital scanning process is based on basic photogrammetry techniques. Anyone with a mobile phone can take a sufficient number of images to completely capture the 3D aspect of an object. One of the strengths of the project, is that it enables every mobile phone user to generate a 3D image by taking multiple photos. These photos are processed by specific software, and once the 3D model has been generated, they are archived on a website or could be used to make 3D impressions.

3.3.7 Collaborative spaces for co-creation

Another interesting issue is the involvement of citizens through "local arenas of collaboration". A list of such facilities is shown in Table 2. They are described under different names (Living Labs, Ideas Labs, Social Labs, Innovation Hubs), with the common objective of identifying and tackling challenges, and discuss new ideas for development. The processes carried out in these spaces is based on the collaboration of the Quadruple Helix actors, through interactive and co-creative workshops.

UAB	UAB Open Labs: Design lab and digital lab (https://www.uab.cat/open-labs/)
DCU	DCU in the Community https://www.dcu.ie/community/index.shtml
UNITN	C-Lab Trento. http//clabtrento.it/en
LIU	Innovation and education lab: Visualisation center C: http://visualiseringscenter.se/wisdome-projektet
UT	Smart Living Campus, DesignLab https://www.utwente.nl/en/designlab/
LIU	Co-creation and innovation lab, King's street. https://liu.se/en/research/sustainability-means-inclusivity
UAB	Library Living Lab - Barcelona L3 –. http://librarylivinglab.cvc.uab.cat/?lang=en
UA	Fábrica Centro Ciência Viva de Aveiro https://www.ua.pt/fabrica/page/22057
DCU	The North-South Social Innovation Network http://northsouthsocialinnovation.org/index.php/north-south-corridor/
LIU	Co-creative and explorative smart city lab Vallacity https://liu.se/artikel/sa-kommer-liu-att-finnas-med-pa-expot
UT	EnschedeLab https://www.enschedelab.nl/
AAU	https://www.communitydrive.aau.dk/

Table 2. List of some "arenas of collaboration" for citizen participative initiatives, at ECIU member universities

In some ECIU universities, challenges are introduced and shared on a **collaborative platform** where members (students, researchers, faculty, citizens, institutions and public organizations) can participate and interact. The platform describes challenges, and provides a virtual environment to work through the challenges creating a network of collaborators. It also provides challenges to be solved by students, based on experience, age, previous skills, abilities, knowledge and interest (challenge based learning).

DesignLab

https://www.utwente.nl/en/designlab/

Societal challenges - from environmental and (ethical) health questions to rapidly evolving technology - bring forward tensions that cannot be resolved with traditional models of innovation. That's where DesignLab comes into play. We are a collaborative platform for creative changemakers, firmly rooted across the University of Twente ecosystem. DesignLab connects scientific, technological and creative insights, and works on impactful solutions for societal challenges.

So how do we make things happen for and with society? We facilitate and develop research, education, collaborations and events on a daily basis. This we do in multidisciplinary teams, with researchers, teachers, students, governments, businesses, and citizens. We use our own method in the process: Science2Design4Society, based on principles of design thinking.

Library Living Lab

http://librarylivinglab.cvc.uab.cat/?lang=en

The initiative "Library Living Lab –" (L3) explores the links between culture, technology and society. This lab is located in a Public Library and is a facility for the collaboration of the Quadruple Helix, but basically focused on the challenges of the neighbourhood. It is characterized by:

CITIZEN CENTRED SOCIAL CHALLENGES: All the Living Lab Actions tackle a social challenge identified by all the stakeholders and define a return for the society (a new service, prototype, open source, etc.).
INCLUSIVITY: All the citizens can participate in the activities with different degrees of implications in an inclusive way
SCALABILITY: The tested prototypes can be quickly delivered to society through the Network of Libraries, Public administration or local companies

4 References

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Co-funded by the Erasmus+ Programme of the European Union