Drivers and barriers of citizen engagement in open science and the role of university libraries in the Baltics

Project Result (PR) 1

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Abstract:

University libraries in the Baltic countries have been actively involved in open science from the early stages of this European policy priority; however, involvement in Citizen Science has been underrepresented. open science can be broadly understood as a scholar policy and method to share knowledge and data as early as possible in the research process with all relevant actors. One of the components of open science is citizen science, as citizens are invited to participate in the research and innovation process, thus by increasing creativity and trust in science. In reality citizen engagement in open science is somehow underrepresented in the Baltic countries. The present report aims to identify the drivers and barriers of citizen engagement in open science and the role university libraries play. Researchers and teaching staff, librarians, and university students from Estonia, Latvia, and Lithuania were interviewed during three distinct roundtables in 2022. As a result, five general recommendations based on the interviews and literature on how to increase the link between academic libraries and citizen involvement in open science are released.

Keyword list: open science, citizen science, higher education, research libraries, citizen engagement

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Introduction

To reach its full potential, university libraries actively engage in fostering open science, which commonly refers to making publicly refunded research freely accessible to the society. This happens either as alone-standing (for example, through participation in relevant initiatives and working groups, involvement in policy-making and advocacy activities, input and expertise provision in public consultations, etc.) or through their role of supporting research and academia in the context of their university. By doing so, university libraries can advise, identify, and recommend tools and resources related to open science practices to teaching staff, researchers and students.

At the same time, they also have an educational role when it comes to developing skills in open science (such as research data management, copyright issues, open access publishing, and text and data mining). University libraries in the Baltics have experience in not only participating but also hosting open science events. As spaces open to the public, rather than just their staff and students, they provide an excellent opportunity for citizen engagement and connecting to society.

Yet, even though university libraries in the Baltics a) have the expertise and act as educators for open science, b) are experienced in designing and organising open science events and c) have the potential to link open science to society through citizen engagement, the number and impact of such activities remain low. The connection between citizen engagement and open science in the Baltics is clearly not well established.

Citizen science has the potential to bring forth many scientific and societal opportunities for Europe. It also offers opportunities for learning about new topics and personal growth.

This report aims to identify the drivers and barriers of citizen engagement in open science and the role of university libraries in the Baltics. To consider all perspectives, three separate roundtables were held for a) researchers and teaching staff, b) librarians and c) university students of Estonia, Latvia and Lithuania. The three perspectives will demonstrate variance in opinions and help address them on an institutional level.

To fulfil the aims, the following research questions were developed:

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RQ1. What are the current drivers that could enable academic libraries to participate in citizen science projects?

RQ2. What are the current barriers that have not enabled academic libraries to participate in citizen science projects?

RQ3. How to further develop collaboration between academic libraries and citizen engagement?

The following report is divided into four main chapters. The first chapter gives an overview of the essence of citizen science, brings examples of projects and analyses the drivers and barriers outside of Baltic countries. The second chapter describes the methodology of the study. The third chapter summarizes the study's results, and the last chapter draws conclusions based on the results and provides guidelines for university libraries in the Baltics on how to take advantage of the existing drivers and address barriers faced by academic staff, librarians and students.

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1. Theoretical background

1.1. Overview of citizen science

Oxford English Dictionary defines citizen science as "scientific work undertaken by members of the general public, often in collaboration with or under the direction of professional scientists and scientific institutions" (Oxford English Dictionary, n.d). However, a wide variety of terms and expressions are used to describe the context of citizen science. Eitzel and colleagues (2017) explored the term in a broad sense and included activities such as generating any theory or hypothesis, research, scientific data collection, and/or data analysis where the public is involved. They note that terminology has the power to include or exclude the participants, which might affect the project results (Eitzel et al., 2017).

Citizen science in Estonian directly translates to "kodanikuteadus", which could be interpreted as the science of the citizen. The term "harrastusteadus" is also in use; however, this directly translates to hobby science which can also have many interpretations. Citizen science in Lithuanian is "piliečių mokslas", but the term is relatively new, so it is not very well established (Vohland et al., 2021). Citizen science in Latvian translates to "sabiedriskā zinātne", but it is also used to describe social sciences (sabiedriskā zinātne), amateur sciences (amatierzinātne) and citizen science (pilsoņzinātne) which they see as part of open science (the University of Latvia, n.d). Therefore, there is much confusion over which terms to use and which actions can be described as citizen science.

The European Citizen Science Association (ECSA) developed some key principles that they believe to be good practices in citizen science:

1. "Citizen science projects actively involve citizens in scientific endeavours that generate new knowledge or understanding. Citizens may act as contributors, collaborators, or project leaders and have a meaningful role in the project.
2. Citizen science projects have a genuine science outcome.
3. Participation benefits both professional scientists and citizen scientists.
4. Citizen scientists may, if they wish, participate in multiple stages of the scientific process.
5. Citizen scientists receive feedback from the project.
6. Citizen science is considered a research approach like any other, with limitations and biases that should be considered and controlled for.

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7. Citizen science project data and meta-data are made publicly available and where possible, results are published in an open-access format.

8. Citizen scientists are acknowledged in project results and publications.

9. Citizen science programmes are evaluated for their scientific output, data quality, participant experience and wider societal or policy impact.

10. The leaders of citizen science projects consider legal and ethical issues surrounding copyright, intellectual property, data sharing agreements, confidentiality, attribution, and the environmental impact of any activities." (ECSA, 2015).

For this reason, the authors follow the guidelines proposed by ECSA when discussing citizen science projects but acknowledge that there is an ongoing debate around which term to use.

1.2. Geographical contexts for citizen science in the Baltic States

Although the term "citizen science" is relatively new, the public has engaged in science for as long as science has existed. Europe has a large community of citizen scientists. There is, however, a large imbalance in the development of citizen science projects among different countries in Europe. Countries such as the UK, Germany, Switzerland, and others in Western Europe have a much better-developed infrastructure for implementing citizen science projects than countries in Central and Eastern Europe such as Latvia, Lithuania, and Estonia (Vohland et al., 2021).

Manzoni and colleagues (2019) researched citizen science strategies in Europe and found that most projects take place in the environmental and life sciences. Very active, for example, are biodiversity researchers (Runnel et al., 2016). Engagement in scientific activities is higher in countries with higher democracy indices (Makarovs and Achterberg, 2018). Volunteering in Post-Soviet countries like the Baltics is influenced by their experience of forced collectivism, where volunteering was forced upon them (Vandzinskaite et al., 2010). However, citizen engagement can be supported by trust, informal networks, and democratisation in such societies (Vandzinskaite et al., 2010).

Scientific institutions mostly initiate projects, followed by NGOs and self-regulated communities, and are usually funded by public administration bodies (Manzoni et. al., 2019). In 2013, The European Citizen Science Association was established, which had 183 individual and organisational members by the end of 2020 (ECSA, 2021). However, many organisations and

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individuals still operate separately and are divided by country, language, methods and more (Runnel et al., 2016).

Some European countries have platforms dedicated to citizen science projects. In Germany, the platform is called *Bürger schaffen Wissen* (https://www.buergerschaffenwissen.de/), in Austria, a similar platform is named *Österreich forscht* (https://www.citizen-science.at/en/). The EU-Citizen.Science is an online platform that aims to provide different training materials and share information about ongoing projects in Europe. During the writing of this report, it listed only one Estonian, two Latvian and two Lithuanian projects (EU-Citizen.Science, n.d).

Of the three Baltic countries, only Lithuania has a platform uniting citizen scientists and their projects – *Piliečių mokslo asociacija (*https://www.pilieciumokslas.lt/) which is funded by EU-Citizen.Science (Piliečių mokslo asociacija, n.d). However, research conducted by Mačiulienė and Butkevičienė (2022: 11) showed that "the content of citizen science projects in Lithuania is characterized by high fragmentation and a small number of citizen science projects". They note that the international citizen science projects usually have more participants (Mačiulienė & Butkevičienė, 2022).

In Estonia, scientists and citizens have worked together for a long time, with the collaboration's roots in natural sciences. During Soviet times, the Estonian Naturalists' Society (https://www.elus.ee/) and the Estonian Ornithological Society (https://www.eoy.ee/) encouraged citizens to provide observation data. Both societies are still active today (Suškevičs et al., 2021). In 2018 the Estonian Naturalist Society founded the Estonian Citizen Science Union (Eesti Harrastusteaduse Ühing), which brings together individuals who wish to develop and strengthen amateur science (Eesti Loodusuurijate selts, n.d). Citizen science is a part of the Latvian open science strategy (Blūms, 2021). There are projects from various disciplines; however, research shows that volunteers in environmental projects mostly gather data (Prūse and Dātava, 2017). The following subchapter lists a few more well-known projects from each country.

1.2.1. Project examples

As part of this report, the partner institutions gathered information on citizen science projects in Estonia, Latvia and Lithuania. However, the list is incomplete since no database names all previous and ongoing projects.

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In Estonia, most projects that could be categorised as citizen science the authors found to take place in environmental and life sciences. One of the most known and international projects is "Looking for Cowslips" (https://nurmenukk.ee/), where people are asked to take photos of cowslips and enter the data about their growing environment on the project's website (Eestimaa Looduse Fond, n.d). Two of the longest annual projects are the winter and summer garden bird watching projects which the Estonian Ornithological Society organises (Tuule, n.d.; Uustal, n.d). Participants are asked to observe birds in their gardens and submit the data to the project coordinators (Tuule, n.d). There are also projects from other fields; for example, the Estonian National Archive has two ongoing projects, which they call crowdsourcing projects. "Vallakohtud" (https://www.ra.ee/vallakohtud/) is dedicated to typing in old municipal court documents (Vallakohtud, n.d) and "Vabadussõda" (https://www.ra.ee/vabadussoda) uses volunteers to create a searchable database of soldiers who took part in The Estonian War of Independence (Rahvusarhiiv, n.d).

In Latvia, there is a wide range of projects from different fields of science. The Latvian Fund for Nature and Latvian Ornithological Society has created the platform "Dabas dati" (https://dabasdati.lv/), where people can report their observations on wild plants and animals (Prūse & Dātava, 2017). "Nature SOS" (http://www.videssos.lv) is a mobile platform where anyone can report environmental violation activities (Prūse and Dātava, 2017). "Latvian Microbiome project" (https://latvijasmikrobioms.lv/) aims to characterise the microbiome of the Latvian population (Prūse and Dātava, 2017). Projects from humanities in Latvia also use citizen scientists. For example, the "Wizards of Centenary" (https://lv100.garamantas.lv/) asks people to help researchers transcribe ancient folklore and autobiographical materials in the digital archive of Latvian folklore (LU LFMI Latviešu folkloras krātuve, 2016). "Archive of Violence" (http://vardarbibasarhivs.lv/) documents the history of different types of violence in Latvia.

In Lithuania, public can participate in various environmental projects such as observing birds in the project "Paukščiai prie mano namų" (http://www.birdlife.lt/paukssciai-prie-mano-namu) or registering the population of particular insects (Lietuvos Entomologų Draugija, n.d.) In addition, there are projects such as "Atminimo knyga" (http://www.atminimoknyga.lt/) where people submit data about the graves and cemeteries in Lithuania (Lapkričio 2-osios draugija, n.d) and "Pasklidę po pasaulį" (https://vdkaromuziejus.lt/kariai) which gathers stories of soldiers' families (Vytauto Didžiojo karo muziejus, 2022).

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1.3. Citizen science in connection to open science and academic libraries

The mission of open science is to make scientific research, data and dissemination accessible at all levels (Ayris & Ignat, 2018). One aspect of it is producing and sharing knowledge in open and collaborative ways (European Commission, 2019). Citizen science is recognized as one of the eight ambitions of the European Commission's definition of open science. They state that "the general public should be able to make significant contributions and be recognised as valid European science knowledge producers." (European Commission, 2019: 1).

The Association of European Research Libraries (LIBER) proposed in their open science Roadmap (Ayris et al., 2018) the specific actions libraries can take to promote open science activities. They also focused specifically on citizen science. The Roadmap notes that research libraries should be actively promoted as partners in citizen science projects and build an infrastructure that enables them to support citizen scientists (Ayris et al., 2018: 28). In addition, they should develop a set of guidelines for libraries which outline their activity in citizen engagement. They recommend building specific skills that allow libraries to be strong partners, especially when it concerns scientific communication, information technologies and project management. Furthermore, libraries should make sure that citizen science projects follow responsible conduct and good scholarly practice. (Ayris et al., 2018: 28). This means that libraries need to be prepared that implementing citizen science activities might need a bigger investment (Ignat et al., 2018).

LIBER's Citizen Science Working Group is working on developing a guide "Citizen Science for Research Libraries". They have published the first section titled "Citizen Science Skilling for Library Staff, Researchers, and the Public" which gives a practical overview of all steps potential project starters need to take – research librarians or other stakeholders (Kaarsted & Worthington, 2021). LIBER recommends that libraries develop a framework that helps define ethical and legal conditions for projects involving citizen scientists (Kaarsted & Worthington, 2021). Another vital aspect they bring out is research libraries in connection to scientific literacy. As already leading educators of scientific literature in universities, libraries could teach and support citizen scientists by giving access to scientific information as well as creating and engaging in scientific activities. They write that the library could become an intellectual hub which connects scientific researchers with scientific literate citizens. (Kaarsted & Worthington, 2021).

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The concept of a hub has been proposed by other authors as well. A study done in Vilnius University Library suggested that libraries could become central hubs which connect the university faculty to citizens and public institutions (Kuprienė & Petrauskienė, 2018). They could utilise already existing relationships with their patrons, such as faculty, staff, students, and others in the community, to collaborate on citizen science projects (Cohen et al., 2015).

Ayris and Ignat (2018: 18-19) proposed different ways how academic libraries could contribute to Citizen Science. They suggest:

- building a training programme which introduces citizen science to undergraduates;
- adopting a toolkit for citizen science development projects;
- creating different educational materials, protocols and data forms that are used in citizen science projects;
- offering support when it comes to data generated during citizen science projects and making it FAIR (findable, accessible, interoperable and reusable);
- offering up available infrastructure like rooms for meetings, repositories, servers;
- participating in the evaluation process of the project and
- communicate new findings and offer support to both scholarly and popular science communications.

Libraries can also benefit from working with citizen scientists. They can engage and empower their patrons and build stronger relationships with citizen scientists and researchers. They can access resources for STEM (Science, Technology, Engineering, and Mathematics) and offer needed materials, instruments, and resources to engage in projects (Cavalier, Nickerson, Salthouse, Stanton, 2019). By opening up its space and offering services to society as a whole, the library can redefine its role in the 21st century (Ignat et al., 2018).

1.4. Current barriers of citizen engagement in research libraries

Even though libraries already have the skills and infrastructure as well as much experience in implementing open science activities in their university, the number and impact of citizen science projects remain low. At the start of the LibOCS project in 2022, the partner libraries discussed why academic libraries have not been much involved with citizen science projects. Figure 1 describes their opinions. Lack of experience and skills were most often mentioned, next was lack of ideas and researchers' and universities' unwillingness to see libraries as partners.

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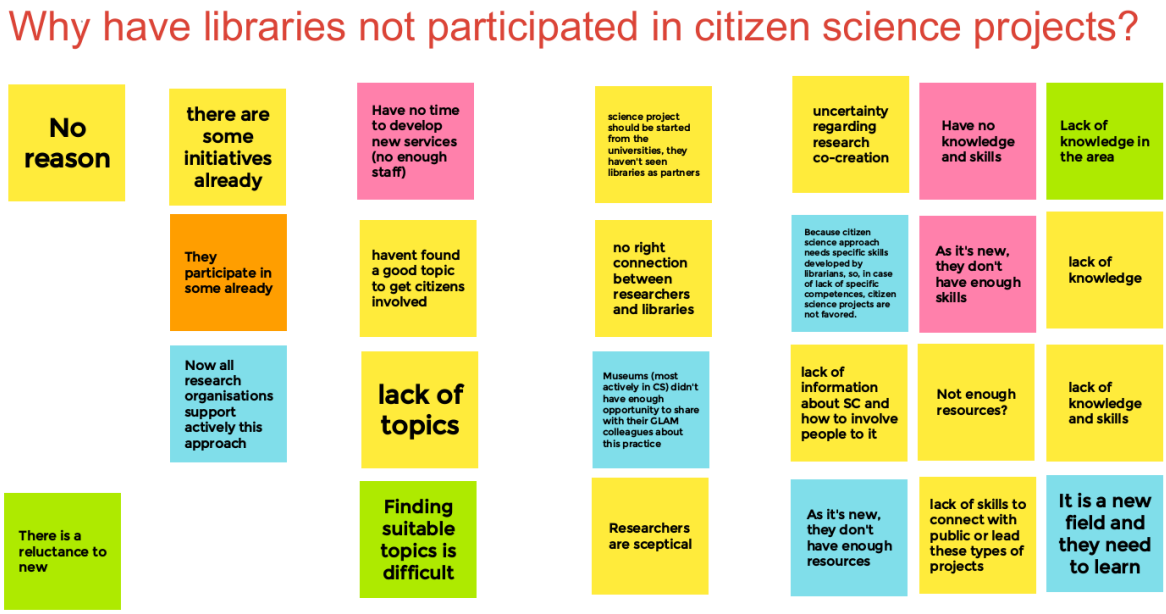

Figure 1. Results of the Google Jamboard discussion on current barriers with partner institutions.

Various studies have also noted that citizen science projects in the Baltics need more systemic institutional support (Suškevičs et al., 2021; Mačiulienė & Butkevičienė, 2022). As research libraries are operating under their universities, their work is tied in with the institution's priorities. They are also heavily regulated so introducing new processes such as citizen science takes time and political support from higher education policymakers (Mačiulienė & Butkevičienė, 2022: 10). So, to be more involved, they would need stronger support from both universities and policymakers. One aspect of it can also be teaching university students about citizen science in their classes or offering opportunities where they could be involved.

An analysis of the pedagogical underpinnings in open science, citizen science and open innovation activities found that various open science activities aim to teach knowledge on a particular topic; soft and technical skills which could be useful for open science practice; expertise in open data and understanding of scientific inquiry methods (Teo, 2020: 10). When universities incorporate citizen science projects into their teaching activities, they can increase their research and innovation if they involve students, citizens, and other stakeholders in the scientific process. This could potentially produce more citizen engagement as students have the knowledge and experience and can therefore initiate or participate in citizen science projects. (Nakata, 2022)

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There is also an issue with the visibility of citizen science projects. As the authors already pointed out, there is currently no platform which unites all projects on a national level in Estonia and Latvia, not to mention an international level in all Baltic countries. The communication and sharing of the information are crucial to all projects, the same with citizen science projects. Especially since they usually operate with lay people who might not have access to communication channels available to researchers in universities (Mačiulienė & Butkevičienė, 2022).

To engage in citizen science activities, libraries need a more thorough understanding of the skills, infrastructure, and resources needed for citizen engagement. As previous studies have not focused on the opinions of researchers, librarians and higher education students on the drivers and barriers of citizen engagement in research libraries in the Baltics, this study aims to fill that gap.

2. Methodology

This subchapter describes the chosen methodology for collecting data and how the data was analysed.

The study was carried out in March of 2022. First, the authors asked the project partner institutions to find potential participants from Estonia, Latvia and Lithuania. There were no strict criteria for participants, but they had to fall into one of our three stakeholder groups – librarians, researchers or higher education students. Once 21 people for each roundtable were found, the authors sent out an informed consent form which explained the scope of the interview and the confidentiality aspects of the data collected. The participants were informed that partaking in the study was voluntary, and no financial incentives were proposed.

Initially, it was planned to have seven people from each country in each discussion, meaning there were 21 participants in each roundtable. To assure that all participants could voice their opinion, the moderators created three break-out rooms on Zoom where the participants were assigned randomly. The only criteria were that each breakout room contained people from all three countries. However, some potential participants could not be present due to external factors. During the librarian discussion, two extra participants wished to participate. During the researcher's roundtable, the authors divided the participants into two break-out rooms and during the university students' roundtable, one student was unable to participate because of technical difficulties. The table reflecting each group's participants' role and the native country is presented further (Table 1).

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Table 1. Description of the sample (table constructed by the author)

Roundtable	Participants role	Participants native country	Pseudonym
Focus group 1	Librarian	Latvian	I1
	Librarian	Latvian	I2
	Librarian	Lithuanian	I3
	Librarian	Estonian	I4
	Librarian	Lithuanian	I5
	Librarian	Latvian	I6
	Librarian	Estonian	I7
Focus group 2	Librarian	Lithuanian	I8
	Librarian	Estonian	I9
	Librarian	Estonian	I10
	Librarian	Latvian	I11
	Librarian	Latvian	I12
	Librarian	Lithuanian	I13
	Librarian	Lithuanian	I14
	Librarian	Lithuanian	I15
Focus group 3	Librarian	Latvian	I16
	Librarian	Latvian	I17
	Librarian	Estonian	I18
	Librarian	Lithuanian	I19

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	Librarian	Estonian	I20
	Librarian	Estonian	I21
	Librarian	Latvian	I22
	Librarian	Estonian	I23
Focus group 4	Researcher	Lithuanian	I24
	Researcher	Estonian	I25
	Researcher	Estonian	I26
	Researcher	Latvian	I27
	Researcher	Lithuanian	I28
	Researcher	Estonian	I29
	Researcher	Latvian	I30
	Researcher	Lithuanian	I31
	Researcher	Latvian	I32
Focus group 5	Researcher	Latvian	I33
	Researcher	Lithuanian	I34
	Researcher	Estonian	I35
	Researcher	Lithuanian	I36
	Researcher	Estonian	I37
	Researcher	Estonian	I38
	Researcher	Estonian	I39
	Researcher	Lithuanian	I40
	Researcher	Lithuanian	I41

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	Researcher	Latvian	I42
Focus group 6	University student	Estonian	I43
	University student	Estonian	I44
	University student	Latvian	I45
	University student	Lithuanian	I46
	University student	Lithuanian	I47
	University student	Latvian	I48
	University student	Lithuanian	I49
Focus group 7	University student	Estonian	I50
	University student	Lithuanian	I51
	University student	Lithuanian	I52
	University student	Estonian	I53
	University student	Latvian	I54
	University student	Latvian	I55
Focus group 8	University student	Estonian	I56
	University student	Latvian	I57
	University student	Estonian	I58
	University student	Latvian	I59
	University student	Estonian	I60
	University student	Lithuanian	I61
	University student	Estonian	I62

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All roundtables started in the main room with one moderator giving a brief overview of the study and explaining the rules to be followed. Then, the participants were divided into three break-out rooms which were moderated by the authors of this research. The moderators then proceeded with further introductory questions to get the participants talking. The questions were divided into three main themes – introduction to citizen science, drivers of citizen science and barriers of citizen science. While the introductory questions were more for warming up, the last two themes directly contributed to the research goal of this study.

The discussions in this study were semi-structured, so the moderators were able to add questions or leave some out during the interview, if necessary. The interviews were recorded with written permission from the participants and later transcribed for analysis. The authors informed the participants of this fact in the informed consent form as well as orally at the beginning of each roundtable. The additional data on each discussion is presented in Table 2.

Table 2. Additional information on each focus group (table constructed by the author)

Focus group	**Date**	**Length**	**Stakeholder group**	**Language**
1	21.03.2022	1h 07 min	Librarians	English
2	21.03.2022	1h 26 min	Librarians	English
		1h 15min	Librarians	English
	25.03.2022	1h 23 min	Researchers	English
	25.03.2022	1h 24 min	Researchers	English
	31.03.2022	1h 16 min	Higher education students	English
	31.03.2022	1h 18 min	Higher education students	English
	31.03.2022	1h 00min	Higher education students	English

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As Table 2 shows, the discussions were conducted within 10 days. Overall, the total recording length was 10 hours and 9 minutes. This resulted in 146 pages of the transcript. For the transcription of data, all participants were given a pseudonym, and all references to personal data such as names or places were redacted to ensure the protection of participants' interests.

The data was analysed with a six-step thematic analysis:

1. transcribing and familiarising ourselves with the data;
2. initial coding;
3. theme search;
4. systematisation of themes into a thematic map;
5. defining and naming the themes; followed by
6. analysis and writing the report.

The next chapter describes the results of the study.

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3. Results

The following subchapter aims to present the results of the study. Three main themes emerged – theme one explains the participants' personal experience in citizen science. Theme two describes the participants' opinions on the drivers that allow libraries to participate (if they already have not) in citizen science projects. Theme three describes the barriers in the participants' opinion of why libraries have not participated in citizen science projects. Quotes from the participants have been added to illustrate the findings, however grammatical errors were fixed for clarity.

3.1. Theme 1. Personal experience

During the first part of the interview the participants were asked about their understanding of citizen science, their personal experience in citizen science and whether they had participated in any projects.

3.1.1. What is citizen science?

Most librarians did not know how to explain citizen science because they did not have personal experience. One participant thought it had something to do with crowdsourcing and wouldn't call it professional science. One librarian had been actively involved in citizen science, therefore explained it as "*citizen science is a way to help researchers to engage in more massive studies, to be able to get massive amounts of data in a more simple way.*"

During the roundtables with researchers, their opinions varied. Many researchers mentioned that it means involving people in science activities like data collecting but were conflicted over where to draw the line between being a research subject or a citizen scientist.

"*I think citizen science is an active involvement of people. If I think, also, of course, that it's maybe up to debate in the more social science-oriented fields, because where is a boundary? If you, for example, interview people. Where is the boundary between citizen science and being a research object or something like that? But I think it's, it should be some kind of active element there that people themselves have the opportunity to do something.*"

One researcher suggested that it explores how different factors impact a citizen's life and being. Researchers thought that it is important for a citizen to participate in all aspects of science and not

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just collecting or analysing data, which is usually the most common involvement of citizen scientists but also launching their own projects.

The students thought that citizen science means engaging the public in science and collecting data was the most common activity they brought out. Two participants had no understanding of citizen science but were eager to learn more about it. One participant mentioned that it makes science more understandable for regular people.

"*/.../ it makes science more easy to understand - it's just to bring science closer to just people who don't understand actually that very much and for, for someone, it can be very difficult to understand what is it but when people are just joining and do something with the scientists together, they understand more what they are doing.*"

One participant thought that the most important aspect is doing science outside of institutions so their research is not strictly controlled and they can do what they want and what interests them.

3.1.2. Personal experience

Next, we asked the participants if they had ever participated in any citizen science projects. From the librarian roundtable it came out that only one librarian had personal experience –they had participated in bird watching. Researchers had more experience – two participants mentioned the Estonian project "Looking for Cowslips" and one mentioned historical research projects like gathering life stories and analysing collective memories. One researcher had more experience and had been involved in several European projects by "*mostly analysing situations of how citizens can be involved in research, collecting data and contributing data.*" They also had experience in leading a citizen science project. Another researcher had experience in leading crowdsourcing projects where people had to type in old documents.

The students had less experience – five of the participants had no experience, two had participated in bird watching, one had taken part in a history project about local streets, one had volunteered but did not specify in which project and one participant had used data gathered by citizens in their research. Others did not respond. Out of the 20 respondents, only one student had learned about citizen science in university.

When asked if any participants had experience in working with libraries in citizen science projects, most librarians had none, however, a few mentioned digital participation with their own libraries

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collection, crowdsourcing for digital humanities and more general experience in open science. Only one researcher had experience in working with the library by developing a data management module for publishing DOIs. Students also had no experience in working with libraries, however, one mentioned a course where students were taught how to use databases which the participant thought to be a very important skill for citizen scientists.

3.1.3. Library as an initiator or supporter

Lastly, we asked the participants if they thought libraries should initiate citizen science projects, offer support or do both. A quarter of librarians thought that the library should be in a supportive role as they do not have enough resources at the moment to initiate projects. The same amount of participants thought that libraries could both initiate and offer support, however, some had stipulations. One librarian thought that it depends on the focus of the library.

"*Perhaps it also depends on the specific focus of the library. So perhaps for projects which are more medicine related, we could be more of an initiator, but for other types of projects, we could probably be more useful in a supportive role.*"

Another thought it depends on the size of the library and one suggested that libraries should mostly offer support but lead projects that deal with their collections. Two librarians did not know how to answer and one commented that "*I think university libraries are supposed to support students and professors in their scientific work and study work. And I don't know how citizen science relates to that.*"

From the researcher's roundtable, one researcher commented that libraries have the potential to initiate projects.

"*/.../ libraries have huge potential to also to initiate citizen science projects because we have, first of all, great infrastructure in many in many, in many countries and universities, but also cities, libraries, we have the infrastructure, we have educated people, and the old role of libraries like only you know, giving books or sharing the books, so it's a little bit changing because people get a lot of information through the internet.*"

Others did not offer any opinion. Most students did not know how to connect libraries with citizen science projects, but one student thought that libraries could initiate some projects, for example

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organising data online. Another student suggested that the library could be an information centre where people could get information about different projects.

3.2. Theme 2. Drivers of citizen science

During the second part of the roundtables, the questions focused on the drivers of citizen engagement in open science and how libraries can be involved.

3.2.1. Skills

The participants were asked what kind of skills and knowledge librarians already have that could be of use. The librarians mostly mentioned skills dealing with data – data collection, data curation, data analysing, and data management. Many also thought communication skills are essential, saying that librarians know how to make information easily understandable for people. They suggested that academic librarians have great digital literacy skills, therefore could teach them to others as well. As university libraries have to deal with different stakeholders, the concept of being a bridge between the stakeholders was also mentioned.

"*Since we still remain as the main communicators, I believe that communication and finding the most important touch points between the stakeholders is our main skill.*"

One participant pointed out that in their opinion even though public libraries are already involved with different citizen science projects, their librarians lack the research skills that academic librarians have, therefore should also be involved.

Researchers mostly focused on infrastructure and did not offer comments on the skills librarians already have. Students were unaware of what skills librarians already have, therefore they offered suggestions on what kind of skills a person should have if they are involved in citizen engagement. A few participants mentioned that it depends on their role:

"*If you're coordinating, of course, communication, time planning, everything is important. But if you are participating, I think basically, it's your enthusiasm.*"

Time management skills were mentioned most often, also leadership skills and communication skills. When it came to participating and not leading, students suggested that a person needs to be curious, wish to learn more and share the knowledge they already have.

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3.2.2 Infrastructure

Next, the participants were asked what kind of infrastructure in academic libraries could be useful for citizen science projects. The librarians mentioned rooms and libraries as a physical gathering places most often.

"*We have rooms, rooms are open for learning, for training, for conferences, seminars, hackathons.*"

As librarians already mentioned different skills concerning data, they also pointed out that libraries have different repositories which could also be used to store citizen science data. Researchers mentioned data storage as well. One researcher commented that if a project has some kind of output, they can use the libraries' data repositories to store the collected data and apply for a DOI in the same system. This way the data and the output are all stored in one place. Like librarians, researchers also suggested the library as a meeting place:

"*The library has intersection spaces for different events, informational resources, and dissemination, which is very important because not many people know that they can join citizen science.*"

As can be seen from the previous comment, researchers believe the library to have great access to different types of people through their networks and channels, therefore could be used for disseminating information about projects to different groups of people. One suggested using the international network already established, another also mentioned taking advantage of the libraries' database of registered users.

"*For example, in many of the citizen science projects, you need to have some kind of measuring device or something that some research group might have. But they don't have the infrastructure to share without, for example, here in our lab, we have like a very simple Excel, but if you lend it to the university library that then uses their system to give it to the citizens, then maybe it would be like a good use of already existing databases of user accounts and whatnot. /.../ So perhaps the library could approach them and say Look, we have this, this system already thought out, you give us the devices, we give it to the people, they bring it back to us, we can monitor this or the library can at least kind of penalise the person for not bringing it back.*"

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During the students' roundtable, it came out that they were not aware of what kind of services libraries provide. They commented on the library being a place for borrowing physical books and as a study space. One person suggested that libraries have databases which could be used in research, however, commented that there should be a manual or a person who teaches how to use these databases.

3.2.3. Library as a partner

Lastly, during this section, the three different groups were asked what kind of partner they imagine an academic library could be.

Librarians thought that as academic libraries already hold courses for researchers and university students about how to manage their data, how to find relevant information, how to use databases and so on, they could be the stakeholder that trains citizens if they need specific skills to take part in citizen science projects. Many participants mentioned the communication aspect again – they thought that academic libraries could be the stakeholder who gathers people and disseminates information about the project to different stakeholders.

"*So I believe that libraries are and always were, like academic libraries, like a bridge between researchers, between students, between university administration's, like a bridge. So I believe that academic libraries could also aid in extending communication to the public.*"

One participant also suggested that academic libraries should be willing to support citizen science projects dealing with data and later publishing the results – be it by offering the platform where to publish the output or covering the costs of APC (article-processing charge).

Researchers thought that libraries should be the stakeholder who is in charge of data collections – this includes data management, curating, and preserving, but also keeping it safe.

"*But there are some nuances, of course, because of this data protection. Librarians would be maybe good gatekeepers or who could manage how this information would be available for the broader public and how it would be protected from any harm possible.*"

Researchers also mentioned the library's role as an educational centre. One researcher suggested that librarians could be the first ones to check the data that citizen scientists collect. If someone makes mistakes, the librarians would be able to train them again to get the best quality data.

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Many mentioned that academic libraries could be hubs for citizen science, as people are already used to coming to the library if they are looking for some information. Therefore, there is already an established relationship between citizens and libraries as institutions. This could be beneficial to find participants for citizen science projects if the task does not take long. Lastly, one researcher suggested that libraries could be a place where citizen scientists borrow different specific hardware so they do not have to buy it to be involved.

The majority of the students thought that the library should be the place where a person who is interested in citizen engagement, gets the information about different projects.

"*Um, I think the best way to like kind a market these projects would be through social media. And I think that's actually where the libraries can come in and help*."

Students mentioned using already established social media channels that have a following but also direct targeting like sending emails to registered users and putting up posters in libraries.

"*I think that it would be nice if in libraries of universities, there would be information, posters, and these little little booklets with information about the projects, how to participate, and all the times.*"

Next, they saw academic libraries as educational centres. The students thought that librarians have great digital literacy skills, therefore could teach citizen scientists how to find and evaluate information, and how to use different programs and apply them to their research. One student commented that if a person is interested in taking part in citizen science projects, they should be able to go to the library and get information about the project but also get trained to participate. This also included learning what citizen science is and having a specific book section dedicated to it.

Students mentioned actions dealing with data less than librarians and researchers, and a few commented that they do not know what kind of services the libraries offer that can help with data, be it collecting, managing, curating or publishing data. One student suggested that since librarians deal with different people every day, they see what are the most common questions people have, therefore could bring together researchers and citizens and offer them a research topic.

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3.3. Theme 3. Barriers to citizen science

The last theme focused on the barriers to citizen engagement in academic libraries.

3.3.1. Main barriers

The librarians were asked why their library had not participated in citizen engagement. Most agreed that they do not have enough workforce: "*Because there's never enough hands and, and heads to do anything.*" Secondly, they commented that they know very little about citizen science, and therefore have no experience. One person suggested that libraries should have a specialist who focuses on citizen science and as they do not have money to hire such a specialist, they simply will not participate. Even if some academic libraries had a specialist who focused on open access, they were already engaged with training researchers and students and did not have enough time to focus on citizen engagement.

The third most mentioned issue was visibility – there is not enough information about different projects and how libraries can be involved.

And I think it might be also because these kinds of citizen science projects from what I understand can come from one of two sides, either the researchers maybe think of a project where they would like to have citizen involvement. And then they kind of maybe do some surveys or find people who can participate. Or it's a project that comes from a community of people who are very interested in this one topic. And if you don't know about it, then then yeah, it's not that visible. So maybe it's a visibility issue."

They also commented that it is a new movement, therefore even citizens do not know of the projects where they could be involved. Librarians from all Baltic countries also suggested that if citizen science was a priority for the university, the libraries would be more involved.

"*The barrier is the engagement of the universities itself. Because we still are a part of universities. So our works are priorities, I mean, dictated by the priorities of the university.*"

One librarian commented that citizen engagement is more suitable for public libraries since they deal with all people and academic libraries are focused on academics and students.

Researchers thought that libraries have not been involved because there is a stereotype about what libraries do. One researcher commented that people think that libraries are only for borrowing

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books, so for libraries to be involved in open access activities, the stereotype needs to be changed. Another commented that librarians need to take more initiative and not wait for projects to be offered to them.

Students thought that the main barrier is the fact that it is not taught in universities.

"*But we should first, we as librarians, or information specialists, would need first to learn about citizen science to teach it or inform the students about it./.../ And I think it must be included in some, maybe for example, in my study program, information management, it has to be included.*"

One student thought that if it is not taught in universities and a new librarian goes to work in the library, they cannot help citizens with questions that deal with citizen engagement or personally take part in citizen science projects. They did not think it should be taught as a full module but suggested covering the topic within the lectures about library science. However, when it came to offering training on citizen engagement, one participant thought that libraries are not seen as active educational agents, therefore they should first change their image from just being an institution where you get books. The image and perception of an academic library was the next barrier that was most often mentioned. Students were unaware of what kind of services libraries offer.

"*Before they start to make this project, there has to be something done to like, promote kind of libraries and remove that stigma that you know, the library is only for books and only for, you know, coming and reading but it's also a place where you can actually get get the all those data and all the data and that can help your product, your like thesis or or you know, projects that you are making and they can help they can initiate projects.*"

Since they figured that the old stereotype of libraries persists, libraries need to actively work on promoting the other activities they do, so more people would come to the library. One student thought that since academic libraries are usually under a larger institution, citizen scientists are not willing to cooperate with them because they will set too many rules for the project or will not agree to support the project if it will not bring results to the whole society.

"*Because this defines the purpose of actually doing sciences out of the structure, because libraries are very much, you know, parts of extensions of educational and scientific structures, and they are kind of very old school in a way.*"

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Lastly, one student thought that libraries would have issues with very specific data whereas they do not know how to handle it and therefore cannot be useful for citizen science projects.

3.3.2. Breaking barriers

The last block of questions focused on how to break the current barriers so academic libraries would be more involved in citizen engagement.

Academic librarians thought that they needed to improve their research-related knowledge and how to collect data to take part in citizen engagement and give support to citizen scientists.

"*I definitely need to improve my skills about ethical aspects and how to collect data.*"

They mentioned brushing up their knowledge on research methods and the ethical aspects of research as they felt that they do not know enough about data protection in research activities. Next, they also commented that librarians need to be trained in project management skills and organisation skills as well as have good oratory skills.

When it came to the projects themselves, librarians thought that they need to be more visible to the public and also the professional community of universities as they are very important stakeholders in these projects.

"*It should be the policy of universities that we are going in this direction. Otherwise, the researchers will not pay attention to that.*"

When the university is more engaged, librarians thought that it could lead to more engagement and resources. They also brought out that it is important to think about the expected results and consider them when choosing the part of the community you will be working with. As one participant said, "*we have to be sure what we are starting before we start if we start.*"

Collaborating with other stakeholders was also seen as a way to break barriers. One librarian commented that the project coordinators should join forces with students and other memory institutions because this will create a better infrastructure for the project.

Lastly, they also saw value in the process itself. When first starting out, it is important to enjoy the process and learn from others and then personal experience as well.

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"*But the first time when you do this, just learn from experience and perceive this as a benefit as it's in itself that you will learn from it and you will learn from your mistakes and then that you will reach new people who were not your audience perhaps before and you you meet each other and maybe something new will spring from that.*"

Researchers focused on changing the stereotype about libraries. Since academic libraries have the infrastructure and specialists working there who could be useful in citizen science projects, one participant suggested that libraries turn into multifunctional centres.

"*So maybe libraries could turn into certain multifunctional centres, especially in relation to science, you know, having data, giving data, you know, to encourage this participation of citizens in science, in data making and so on. So, definitely, we have to move from one paradigm to another in relation to libraries.*"

By establishing a connection to citizen engagement in people's perception, libraries could connect potential participants with other stakeholders and researchers. One researcher commented that there should be more projects which connect university libraries in the Baltics because "*we need to create the tradition that people have to know that it can happen in the library*."

University students suggested that librarians need to be trained on how to use databases so they could instruct citizen scientists on how to use them as well. They also thought that university libraries should invest in specialists who focus on citizen engagement. Many students commented that they do not know of a platform that unites information about all ongoing projects in their home country. They thought that the library could create a webpage that publishes the information as they are seen as an institution where you can get information.

"*We don't have any list of citizen science projects. So I had to Google a lot with different keywords to find what citizen science project we have. So maybe libraries could have this webpage? Where are drawn together this information about citizen science projects, and what are the opportunities and, and also some databases and so on.*"

A couple of students also suggested that libraries could engage students in citizen science projects by giving credit points for participation. They thought that if the topic is presented in an interesting way and also gives something back to the participants – be it their name on a published paper, thank you notes, credit points, or free travel – people would be more willing to take part in a citizen science project.

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4. Discussion and guidelines for academic libraries

The purpose of this report was to identify the drivers and barriers of citizen engagement in open science and the role of university libraries in the Baltics. Academic libraries in Baltic countries have been actively involved in open science activities for over ten years and have gained vast experience in supporting the research community and making science more open for society. However, integrating citizen engagement into the open science cycle is still at its initial stage.

As the current LibOCS project aims to raise awareness and mainstream citizen science activities in Baltic countries, it is crucial to get an in-depth look at the views and experiences of academic librarians but also researchers and higher education students who are potentially very important stakeholders in citizen science projects. The authors proposed three research questions that focused on the strengths, limitations and how to further develop collaboration between academic libraries and citizen engagement. Based on the interviews conducted with three separate stakeholder groups – librarians, research staff and university students, this chapter presents the main findings of the study.

The study revealed that research librarians already have many skills that could be useful for participating in citizen science projects. The most value was seen in their data management, communication and digital literacy skills. All three are important for the success of citizen science projects. Mačiulienė & Butkevičienė (2022) found communication to be essential for citizen science projects and this includes both outward and inward communication. The library can act as a liaison between participants, scientists and the media. As libraries have already established national and international networks, experience in disseminating information in regards to their own events, and a strong connection and motivation to move towards a society where science is open for all, they could use their channels to disseminate information regarding different projects. This was also proposed by Ayris and Ignat (2018) in their recommendations for research libraries.

Participants suggested that research librarians could teach citizen scientists about data management and digital literacy. They considered scientific literacy under this as well which is in accordance with LIBER's guide on "Citizen Science Skilling for Library Staff, Researchers, and the Public" (Kaarsted & Worthington, 2021). Furthermore, libraries could ensure that citizen science projects follow good scholarly and ethical practices. (Ayris et al., 2018).

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Research libraries also have infrastructure like rooms, repositories and servers which could be of use. Offering up their infrastructure was also proposed by Ayris and Ignat (2018). All three stakeholder groups saw the library as a physical meeting space. As they are by nature open to the public without any restrictions, libraries could offer their rooms for meetings and trainings. This way the library could become an intellectual hub as was proposed in the LIBER guide (Kaarsted & Worthington, 2021). Researchers thought that the library should be responsible for citizen science data. First, the library could offer their institutional repositories to keep the data, perform quality control and publish it in accordance with the FAIR principles. Second, they could provide citizen scientists with training regarding open data skills.

Interestingly, students were unaware of all the different services the library already provides and therefore found it difficult to bring out which services could be of use to citizen scientists. This showed that there is a stereotype of libraries being only study spaces and for scientific literature, instead of multifunctional science support centres, in the respondents' perception.Researchers suggested that changing the stereotype would bring more opportunities for collaboration to research libraries.

The main limitation of research libraries' participation in citizen engagement was a lack of knowledge of citizen science. Both librarians and HE students noted that they simply know too little about citizen science, different projects and how they could be of use to participate. This was reflected in the lack of cooperation between the libraries and researchers who participated in the study as they commented that the library should take more initiative. Therefore, it can be presumed that the lack of collaborative projects is not due to little interest but little knowledge.

Another limitation was the lack of support from universities. There are a few aspects to it. First, as research libraries operate under their universities, their finances and assignments depend on the universities' strategy. If citizen science is not a priority for them, research libraries lack the resources to be more actively involved. This confirms findings from previous studies that citizen science projects in the Baltics need more systemic institutional support (Suškevičs et al., 2021; Mačiulienė & Butkevičienė, 2022). This includes universities but also policymakers who allocate funds for higher education institutes.

The second aspect of it is the lack of specialists. Even though academic libraries could help with data management, curation, and collection, there are not enough specialists who could offer

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support to citizen scientists in addition to their regular assignments. Many libraries have a data steward but if there is only one person per organization, they simply do not have time to deal with citizen science projects next to helping researchers and students. Participants thought if citizen science would become more of a priority for universities, there would be more resources to hire more specialists.

The third aspect deals with teaching about citizen science activities in universities. Almost all students who participated in the study had not learnt about the topic at the university. If some had been involved in any citizen science projects, it had not been a part of their curriculum or any requirements from class. Ayris and Ignat (2018) proposed that libraries could develop a training programme which teaches undergraduates about citizen science. This would help strengthen the collaboration between the university and the research library, and also teach students the necessary skills for participating in citizen science. Teaching undergraduates will also have the benefit of new potential citizen scientists.

All participant groups mentioned the need for a platform which unites both general information about citizen science and different ongoing projects. As the authors' research showed, there currently is no such national platform in all Baltic countries except for Lithuania. This was something that the participants of the study imagined a research library could take on. While they are already supporting people on scientific literacy, if the library could provide information and resources necessary to participate in citizen science projects, the role of a citizen science hub could be achieved.

4.1. Guidelines

The interviews revealed a number of ideas that could be useful for future projects and collaboration. The following guidelines are general recommendations based on the analysis of the interviews and literature on how to strengthen the connection between academic libraries and citizen engagement:

1. Train the staff of research libraries on data collection, management, and curation.
2. Establish new positions in research libraries focused on citizen engagement.
3. Appoint a liaison person at the research library who is responsible for uniting citizen scientists with the university faculty.

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4. Stress the need for stronger support from the universities.

5. Establish a central platform which unites information about how to participate, which skills are needed and which projects are looking for volunteers.

4.2. Limitations

The report has some limitations which could be improved in the future. As the participants in this study had varied experiences, some important drivers or barriers might have been missed due to the limited knowledge of citizen science in the Baltics context. Also, since the working language was English, potential participants who could not speak the language were automatically left out of the sample. Comparing the study results with the theory gives valuable input, however, it needs to be considered that it reflects the opinions of stakeholders and have not been tested in practice by the authors of this study as of yet.

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5. Conclusion

The purpose of this report was to identify the drivers and barriers of citizen engagement and its connection to the Baltic libraries. To do so, the authors interviewed the librarians, teaching staff and researchers, and higher education students of Baltic countries in the spring of 2022. Based on the analysis conveyed, it can be concluded that the main drivers are research librarians' data management, communication and digital literacy skills; large international and national networks which could be used for communication and dissemination activities; existing infrastructure such as physical meeting space, internal repositories and servers, and experience in training different stakeholders.

The main barriers to citizen engagement at research libraries are lack of knowledge, experience and information about different citizen science projects; lack of ideas and how libraries could be of use; not enough support from universities and policymakers, and people's perception of how libraries are seen in the 21st century. More action is needed to change the research libraries' role in society so it could be seen as a supportive unit not just for their own university but for the citizens at large as well.

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Appendix A. Roundtable interview plan for librarians

Introduction

1. To warm up - what is citizen science for you?
2. Have you or your library taken part in any citizen science projects? You can also name some other projects from your country, and share them in the chat.
3. How do you see the role of academic libraries in these projects? Should the library be the initiator of CS projects or in a supportive role or both?
4. How can libraries provide support? For researchers, for participants, who else? Does anyone have any experience?
5. What will libraries directly gain from taking part in CS projects?
6. How can we engage members of the community in CS projects?

Supportive aspects

1. What skills do librarians already have that enable them to participate in citizen science projects? For example, what skills do you have or do your colleagues have that can be beneficial?
2. What infrastructure can academic libraries provide for citizen science projects? For example, what services can we provide that are relevant for these projects?
3. We have discussed many different aspects of academic libraries that allow us to take part in CS projects. But from your own perspective - do you feel prepared to take part in citizen science projects? What would motivate you?

Barriers

1. Why have libraries not been actively involved in citizen scienze projects?
2. What are the main challenges academic libraries face when starting or participating in a CS project?
3. What skills and knowledge do librarians need to acquire/develop in order to take part in citizen science projects?
4. Literature says that one of the main issues is the lack of funding. What do you think, where should the money come from? What would motivate the outsourcing partners to finance citizen science projects?

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Appendix B. Roundtable interview plan for researchers

Introduction

1. To warm up - What is citizen science in your opinion?
2. Have you been involved in any projects? You can also name any projects you know of in your country, share them in the chat.
3. Some of you have already mentioned that they have taken part in citizen science projects. What motivates you to take part in citizen science projects? Even if you haven't, what would motivate you to take part in citizen science projects?
4. Some of you mentioned that you have been involved with citizen science projects. Have you engaged students in citizen science projects? If you have not taken part in any citizen science projects, would you involve students in your citizen science projects? What kind of skillset is expected of students that take part in citizen science projects?
5. If you have been involved in any projects, who have been the other partners?
6. Do you see the library as one of the partners?

Supportive aspects

1. What do you expect from the librarians? How can libraries provide support? For you as researchers, for participants?

a. What infrastructure can academic libraries provide for citizen science projects? For example, what services can we provide that are relevant for these projects?

2. Do libraries have appropriate supportive resources to be part of citizen science projects in all fields of research? Are there any barriers concerning the specific research field?
3. How can libraries bring together citizens and researchers?

Barriers

1. One of the main problems that scientists face is the poor quality of data that citizens are collecting. What do you think, can you use the data collected by citizens in science projects? How can the library provide support for raising the data quality?
2. What discourages you from working with the public on your projects?
3. What are the reasons you have not worked with libraries before?

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4. Research shows that the main issue is the lack of funding. Who should fund citizen science projects?

5. What would motivate outsource partners (government, private sector etc) to finance citizen science projects?

6. What is your dream project?

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Appendix C. Roundtable interview plan for students

Introduction

1. To warm up - What is citizen science in your opinion?
2. Have you been involved in any projects? Or have you heard of any projects? You can also name any projects you know of in your country, share them in the chat.
3. Some of you have already mentioned that they have taken part in citizen science projects. What motivates you to take part in citizen science projects? Even if you haven't, what would motivate you to take part in citizen science projects?
4. Would you participate in a citizen science project if it is related to your studies? How could it be incorporated into your own studies?
5. What citizen science projects would you be interested in working on?
6. Should citizen science projects be in universities' curriculums?

Supportive aspects

1. What skills would you need to take part in a citizen science project?
2. Who should teach these skills? (Should the library teach these as well?)
3. How else can libraries provide support?
4. Should libraries initiate their own projects and involve students? Should students gain something (like credits, acknowledgement etc)?
5. Would you consider working with the library? Do you see the library as an important partner?
6. How can libraries get more students to be involved in citizen science projects? How can we engage students so they will be the future initiators of citizen science projects?

Barriers

1. So some of you mentioned that you have taken part in a citizen science project in university. Did you feel like it was voluntary or did you feel obligated to participate?
2. Imagine you are taking part in a new citizen science project. What do you find the most difficult?/Where do you struggle the most?
3. Why do you think libraries have not participated in many citizen science projects so far?
4. To end this interview - What is your dream project?

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Appendix D. Informed consent form

Title of the project: „University libraries strengthening the academia-society connection through citizen science in the Baltics“

Project nr: 2021-1-EE01-KA220-HED-000031125

Project Coordinator: Liisi Lembinen, University of Tartu Library, Development Director

Project moderators: Lilian Neerut, University of Tartu Library, Head of Department of Subject Librarians, lilian.neerut@ut.ee

Svea Kaseorg, University of Tartu Library, Information Specialist, svea.kaseorg@ut.ee

Evelin Arust, University of Tartu Library, Data Manager

Please read the following consent form carefully. By signing this form, you will agree that you understand the purpose of your involvement and that you agree to participate in this research. By signing this consent form you certify and agree with the following:

- the roundtable will take 1h 30 minutes
- the participation in this research is voluntary
- there will be no reward or payment in compensation for this participation
- the participation can be withdrawn and discontinued anytime without penalty
- any uncomfortable/unsuitable questions may be left unanswered without penalty
- the virtual roundtable will be recorded and a transcript will be produced
- access to roundtable transcripts will be limited to co-authors of the research
- the transcript of the roundtable will be analyzed by the research authors
- any content or citations from the roundtable will be anonymized when made available through academic publications
- participant's name and other identifiable information will not be revealed
- confidentiality of the participant will remain secure
- uses of records and data will be subject to standard data use policies which protect the anonymity of individuals and institutions
- the recording and transcripts of the roundtable will be saved in a sealed data repository and not made available
- all or part of the roundtable can be used for academic papers, articles, and presentations

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By submitting this form, you agree that you have read the written participation terms and understood them. You agree to participate in this research voluntarily.

1.Name _____

2. Country _____

3. I want to be notified when the report is published _____

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