# ANALYSIS REPORT AND INITIAL RECOMMENDATIONS

## PRE-IMPLEMENTATION CONSULTATION AT BALTIC HEIs

## LibOCS Milestone 26

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# List of acronyms

BESPOC - Broad Engagement in Science, Point of Contact

CRIS - Current Research Information System

CS - Citizen Science

DMP - Data Management Plans

EE - Country Code for Estonia

ETIS - Estonian Research Portal

GDPR - General Data Protection Regulation

HEIs - Higher Education Institutions

HSS - Humanities and Social Sciences

KTU - Kaunas University of Technology

KPIs - Key Performance Indicators

LibOCS - This Project Acronym (stands for Libraries for Open and Citizen Science)

LT - Country Code for Lithuania

LU - University of Latvia

LV - Country Code for Latvia

NIVC - National Innovation and Business Center

OER - Open Educational Resources

OS - Open Science

PR1, PR2, PR3, PR5, PR6 - Workpackages specific to LibOCS Project

R&D - Research and Development

ROI - Return on Investment

TalTech - Tallinn University of Technology

UT - University of Tartu

VMU - Vytautas Magnus University

# Introduction

Citizen science, a dynamic intersection of public participation and genuine scientific research, has been rapidly gaining traction globally, with Europe at the forefront of this movement. The European landscape is characterized by an ever-growing network of enthusiasts, researchers, and institutions collaborating to harness the collective power of the public in addressing complex scientific questions. Recognizing the potential of this synergy, the European Union has been actively promoting citizen science initiatives, integrating them into broader scientific and policy frameworks. Yet, while some regions have more progress in embedding these practices within their academic and community ecosystems, others are still navigating the nascent challenges and opportunities presented by citizen science. The *BESPOC Model* (Broad Engagement in Science, Point of Contact) is designed to help research organisations to build a central service for citizen science. It is based on the *BESCPO Prototype* which follows a LERU recommendation from 2016.

The BESPOC Model is described separately in the Appendinx 1 of this document.

The potential of Citizen Science (CS) to solve pan-European Open Science (OS) challenges—making research open, shareable, and usable for societal benefit—is undeniable yet underutilized. Currently, the Baltic states have championed open science through their academic libraries for nearly a decade. While they have made strides in OS, the same cannot be fully said for CS. The bridge connecting citizen science (sometimes referred to as participatory research) to the open science practice is still under construction.

LibOCS Project seeks to address this disparity, primarily by mainstreaming CS in the Baltic countries (EE, LV, LT), renowned for their expertise in open science. The intent is to harness the latent potential of citizen science, make it accessible, and synergize it with open science for an enriched academic environment. This project not only aims to chart the progress of CS and OS implementations but also to share best practices and engage diverse public groups in collaboration and social engagement.

LibOCS is structured around five objectives, each coupled with a Project Result (PR):

- 1st Objective: to map drivers and barriers of civic engagement in Open Science and share in-depth insights on the role academic libraries can play in Citizen Science activities in the region (PR1).
- 2nd Objective: to start and maintain a dialogue and action plan among Higher Education teaching/research staff and librarians in the Baltic states, collaborating on a Citizen Science project that involves any volunteer. It will provide an opportunity to focus strategically on the position of libraries in contemporary information societies (PR2)
- 3rd Objective: to conduct LibOCS training to improve the Citizen Science and Open Science skills of academic and library personnel in the Baltics (PR3)
- 4th Objective: to create institutional change through testing and implementing a citizen science single point of contact in participating LibOCS universities. (PR5).
- 5th Objective: to create an Open Access toolkit for librarians on the topic of citizen science with all tools available as open educational resources (OER), open to (re-)use, and repurposing. (PR6).

LibOCS is primed to address three main target groups: university library staff, academic staff at HEIs, and the general citizenry aiming to reinvigorate the academia-society nexus. The consortium, consisting of five HEIs (namely, University of Tartu, University of Latvia, Kaunas Technical University, Vytautas Magnus University, Tallinn University of Technology; sometimes referred to altogether as *LibOCS HEIs*),

alongside Web2Learn and Immer Besser GmbH, is well prepared to make significant steps forward in connecting academia with society in the Baltic region and beyond.

The benefits of BESPOC implementations at the five Baltic institutions are manifold. Firstly, they have the potential to create a centralized interface, streamlining communication and information dissemination related to citizen science (CS) initiatives. This harmonization will facilitate easier collaboration between researchers, the public, and institutions, breaking down barriers and enhancing efficiency. Additionally, with the BESPOC framework in place, LibOCS HEIs could aim to better integrate citizen science with other open science activities, thereby promoting a more inclusive and accessible scientific process. By ensuring that citizen science projects are well-managed and transparent, the BESPOC will also foster trust and encourage more active participation from the community. Furthermore, its implementation is set to augment the capacity of these institutions to attract, manage, evaluate, and optimize CS projects, ensuring they align with both academic rigour and public interests. Lastly, by offering a unified platform and resources, such BESPOC implementations could position the 5 LibOCS HEIs as leaders in the European citizen science landscape, driving innovation and setting standards for best practices.

# Methodology

The creation of this report, representing Milestone 26 of the LibOCS project, was a systematic and collaborative effort, drawing upon a variety of methods and tools. Our approach aimed to provide a comprehensive overview of the potential for adoption of a Citizen Science (CS) single point of contact at universities (BESPOC) while also exploring existing research management flows, public engagement activities at participant universities (LibOCS HEIs, *Higher Education Institutions*), and connectors between university's services, based on the BESPOC model.

This report is an outcome of the LibOCS Project, falling under PR5, for which Immer Besser GmbH holds responsibility. The blend of our methodology ensured that the report is not just informative but actionable, laying the groundwork for future endeavours in establishing a single point of contact for Citizen Science at universities.

The following outlines our methodology:

## Preliminary consultations

Our team engaged in a series of ten online consultations. These meetings facilitated the initial understanding of the subject and guided the further course of action. The consultations played a pivotal role in shaping the scope and direction of the report.

Round table discussions allowed for collaborative brainstorming sessions, where stakeholders - brought by LibOCS HEIs - from various backgrounds provided insights, shared experiences, and discussed challenges. These forums encouraged open dialogue and multi-faceted perspectives.

## Desk research

To underpin our analysis, we undertook an extensive desk research exercise. This entailed the examination of existing literature, websites, studies, and case examples, which provided a foundational knowledge base and highlighted best practices within the realm of Citizen Science in higher education.

## Group meetings

To gain a deeper understanding, we conducted various meetings with key LibOCS members who are experts in their field, especially library and information science. These meetings provided valuable insights, shedding light on their institution's practices and gathering missing information that enriched the content of the report.

## Collaborative documents and task management

Our team used collaborative cloud-based documents integrated with task management tools to streamline the information-gathering process, analysis, and report-writing process. This ensured that information was organized, tasks were systematically allocated, and that there was a consistent and unified approach to report generation.

## Continuous Review and Refinement

Throughout the report-making process, continuous reviews were undertaken. This iterative approach ensured the accuracy, relevance, and coherence of the content presented.

# Landscape analysis for LibOCS HEIs, related to research and the Citizen Science approach

## Brief profile of each university

### University of Tartu (UT)

Located in Tartu, Estonia, the University of Tartu stands as Estonia's oldest and most prestigious institution, having been founded in 1632. Over the years, it has gained recognition for its strong emphasis on research, especially in the sciences and humanities fields. As a member of the Coimbra Group, the Utrecht Network, and the LERU CE7 group, the university holds a significant position in the European academic scene. A diverse student population further enriches the vibrant academic and cultural environment of the University of Tartu. Numerous research institutes and centres affiliated with the university further underscore its commitment to research and innovation.

UT's Grant Office is aiding researchers, teaching staff, and students in obtaining research and teaching development grants. The office's primary roles include identifying funding opportunities, overseeing project management from conception to completion, and assisting in the drafting of project proposals. Their services extend to supporting international research collaborations and active participation in shaping research policies at both national and international levels. Their holistic approach amplifies the university's capability to secure external funding and elevate R&D performance.

### Tallinn University of Technology (TalTech)

Situated in the Estonian capital of Tallinn, TalTech, established in 1918, is distinguished as Estonia's only technical university. With a core focus on science, engineering, and business education and research, TalTech has been instrumental in fostering a culture of innovation in the region. The university is renowned for its contemporary approach to technology and engineering, frequently engaging in collaborations with industries and tech firms. Moreover, the institution's numerous research centres and institutes make it a hub for technological advancements, emphasizing the preparation of its graduates to meet the challenges of the 21st century.

At TalTech, research and development (R&D) operations are integrated within the framework of various faculties, managed by institutes and research institutions. The Vice-Rector for Research is primarily responsible for the R&D domain, whilst the Research Administration Office manages the day-to-day tasks. Centralising R&D data, TalTech utilises the Estonian Research Portal, ETIS, which is pivotal for funding applications, report submissions, and sharing research outcomes, such as publications and inventions.

### Kaunas University of Technology (KTU)

Based in Kaunas, Lithuania, the Kaunas University of Technology (KTU) was founded in 1922. As one of the largest technical universities in the Baltics, it has since played a central role in the scientific and technological advancements of Lithuania. Known for its applied sciences programmes, KTU has established strong industrial ties, ensuring its research and innovations remain relevant to real-world

applications. The university's wide array of innovative programmes, its support for start-ups, and its cutting-edge research centres further solidify its reputation in the region.

KTU's research management is composed of several departments, notably Department of Research Affairs, which pertains to Research Groups, funding, and various projects. Other significant entities include the Research and Innovation Projects Centre, the University Research Strategy Committee, and KTU's National Innovation and Business Center (NIVC), which plays a role in knowledge transfer. These entities collaborate closely with stakeholders such as PhD schools and the Vice-Rectorate of Research and Innovation to ensure comprehensive and robust research management.

## Vytautas Magnus University (VMU)

Located in Kaunas, Lithuania, Vytautas Magnus University (VMU) traces its roots back to 1922, having been re-established in 1989. Named in honour of the renowned 15th-century Lithuanian monarch, Vytautas the Great, VMU is a liberal arts institution offering a diverse range of studies. The university's unique liberal study approach empowers students with a high degree of flexibility in their academic pursuits. From arts to sciences, VMU's extensive academic offerings and its vibrant multicultural environment, enhanced by several international programmes, make it a beacon of academic excellence in Lithuania.

Research endeavours at VMU are coordinated and steered by the Research and Innovation Department. This department shoulders the responsibility of research project oversight, securing funding, promoting collaboration, and aligning research with the university's strategic objectives. The university's commitment to a modernised research framework is evident in its use of the Current Research Information System (CRIS) based on DSpace. This centralised system, alongside various research portals, offers a streamlined approach to data input, research reporting, and evaluation. VMU also extends a range of research support services, such as guidance in grant applications and intellectual property rights, while fostering collaboration via the use of advanced platforms and tools.

## University of Latvia (LU)

The University of Latvia, based in the Latvian capital of Riga, was founded in 1919. As one of Latvia's primary academic institutions, it boasts a comprehensive range of faculties and academic programmes. LU's strong inclination towards academic excellence is evident in its research endeavours, particularly in the domains of sciences, humanities, and social sciences. As a cornerstone of Latvia's academic and cultural growth, the university has been a cradle for many of the nation's eminent professionals and experts.

The University of Latvia's academic and research vision is guided and moulded by the Council of Science. This advisory body, serving the university's rector and leadership, is dedicated to enhancing the research quality at LU and promoting increased scientific collaboration. Its wide-ranging responsibilities encompass offering insights into the university's academic development plan, doctoral study programmes, and pertinent documents. Moreover, the Council oversees other academic bodies, ensuring alignment with the institution's overarching vision. Members of the Council enjoy privileges that aid their advisory functions, such as access to essential documents and the ability to invite external experts to their meetings. Organised into specialised sub-councils that focus on various scientific

disciplines, the Council is populated by UL's scientists and representatives from affiliated scientific institutes.

## Key areas of research and expertise. What opportunities could be for citizen science?

In each university, the integration of citizen science not only depends on the discipline but also on the specific projects and the openness of researchers to public participation. It's a dynamic process that can foster richer data, community involvement, and a deeper understanding of the subject matter.

BESPOC, as a dedicated citizen science single point of contact for these universities, holds transformative potential in catalysing the adoption and success of citizen science initiatives. By centralising expertise, resources, and advocacy for citizen science, BESPOC could demystify the process for researchers unfamiliar with such methodologies. It can provide a structured framework, from project conceptualisation to execution, ensuring research validity and public engagement. Moreover, with BESPOC's oversight, universities can harness a more consistent, institution-wide approach to citizen science, leading to higher visibility, broader community participation, and, ultimately, enhanced outcomes for these collaborative projects. As the linchpin between academia and the wider community, BESPOC could be instrumental in fostering a vibrant, inclusive, and productive citizen science culture within these Baltic institutions.

Here is a short overview of the key research areas for each university involved in the LibOCS project and the possible areas of adopting citizen science approaches

### University of Tartu (UT)

- Natural Sciences: It offers studies in biology, geography, and geology, with the latter being exceptionally strong due to Estonia's unique geological formations.
- Medicine and Biomedicine: Institute of Biomedicine and Translational Medicine (https://biomeditsiin.ut.ee/en)
- Humanities and Social Sciences: The university is renowned for its strong emphasis on semiotics, folklore, and Estonian studies.
- Information Technology: Computer Science and Software Engineering are rapidly growing fields here, especially in AI and machine learning.

Within the University of Tartu, the fields of biology, geography, and geology naturally lend themselves to citizen science, given the hands-on nature of these disciplines. Engaging the public in data collection for environmental monitoring or tracking biodiversity changes could be immensely beneficial. Additionally, with the rise of health technologies and precision medicine, the public could contribute to large-scale health surveys or genetic studies.

### Tallinn University of Technology (TalTech)

- Engineering: TalTech has a robust presence in various engineering disciplines, especially in civil and mechanical engineering but also the Center for biomedical engineering (https://taltech.ee/en/centre-biomedical-engineering)

- Information Technology: Cybersecurity, e-governance, and digital technologies are focal areas given Estonia's position as a digital society.
- Business and Economics: Business administration, entrepreneurship, and finance are among the prominent courses.
- Natural and Applied Sciences: With faculties dedicated to chemical and materials technology and science, areas like chemical engineering and applied physics are notable.

At TalTech, the domains of cybersecurity and e-governance stand out as areas ripe for citizen science. As Estonia is a pioneer in digital society innovations, crowdsourced efforts to identify digital vulnerabilities or to improve e-governance platforms could be fruitful. Furthermore, the environmental aspects of civil engineering projects could involve the public in monitoring infrastructure impact on local ecosystems.

### Kaunas University of Technology (KTU)

- Engineering: KTU is known for its expertise in mechanical, chemical, and electrical engineering.
- Natural Sciences: Physics and chemistry, especially in materials science, are strong points.
- Architecture and Design: With its faculty dedicated to civil engineering and architecture, KTU has significant research in sustainable construction and urban planning.
- Business and Public Management: Areas such as business strategies, management, and economics are of prominence.

For KTU, sustainable construction and urban planning within the architecture and design faculties are excellent avenues for citizen science. Residents can provide feedback on urban designs, and local communities could be involved in sustainable planning initiatives. Additionally, materials science projects, particularly those with environmental implications, could benefit from public data collection or monitoring.

### Vytautas Magnus University (VMU)

- Humanities: Linguistics, cultural studies, and philosophy are some of the central research areas.
- Arts: VMU has a strong emphasis on areas such as music, theatre, and fine arts.
- Social Sciences: Political science, sociology, and psychology, especially in the European context, are key areas of expertise.
- Natural Sciences: VMU dedicates significant resources to environmental science, biology, and bioinformatics.

Vytautas Magnus University's strengths in environmental science, biology, and bioinformatics are particularly suited for citizen science endeavours. Engaging communities in environmental conservation projects, biodiversity counts, or even bioinformatics challenges could provide valuable data. Social science research is another potential area for citizen science initiatives. For example, it could be related to citizens' engagement with research on cultural memory, traumatic experiences (Soviet and post-Soviet). As well as citizens in the context of the social sciences would be able to collect data on disinformation, digital and information literacy. Moreover, given VMU's emphasis on the arts, there's potential for public collaborations in cultural projects or oral history collections.

### University of Latvia (LU)

- Natural Sciences: Biology, physics, and medicinal chemistry are central to LU's research identity.
- Medicine: Medical research, especially in pharmacology and public health, is a growing field at LU.
- Social Sciences: There's a considerable focus on areas like pedagogy, sociology, and law.
- Humanities: The university has traditionally been strong in areas such as philology, history, and cultural studies.

The University of Latvia's emphasis on biology, physics, and medicinal chemistry suggests great potential for citizen involvement, especially in community-based health surveys or environmental monitoring projects. Additionally, in the domain of pedagogy, there's an opportunity for citizen science to play a role in community education initiatives or in researching pedagogical strategies at a grassroots level.

## How BESPOC is addressing PR1's and PR2's findings related to drivers and barriers for citizen science at LibOCS' HEI partners

The PR1 report on the Drivers and Barriers of Civic Engagement in Open Science[1] underscores the latent potential within research libraries in the Baltics, especially in promoting and facilitating citizen science projects. Integrating these findings with the establishment of a BESPOC (a single point of contact for citizen science activities) at each university presents a compelling strategy to amplify the impact and reach of citizen science.

The report findings emphasise that research librarians possess an array of skills that are necessary to the success of citizen science projects, such as research data management, communication, and digital literacy. By establishing a BESPOC at universities, these skills could be harnessed in a more organized and efficient manner. A BESPOC would serve as a centralized hub that can channel the expertise of research librarians directly to citizen science projects, ensuring that they have the necessary guidance and resources at every step.

Moreover, the prevailing perception of libraries, especially among students, as mere study spaces or repositories for scientific literature highlights an opportunity. BESPOC can play a transformative role in changing this narrative. By acting as a tangible interface between universities, libraries, and citizen science endeavours, BESPOC can spotlight the multifaceted roles that libraries play, not just as knowledge repositories but as dynamic, collaborative science support centres.

Furthermore, the identified challenges in the study, such as the general lack of awareness of citizen science among librarians and students and the need for systemic institutional support, can be directly addressed through BESPOC. With a designated point of contact at each university, there will be a focused effort to bridge knowledge gaps, facilitate collaborations, and champion the cause of citizen science at the institutional level. This will inherently involve forging stronger partnerships between libraries, researchers, and citizen science enthusiasts.

[1] Kaseorg, Svea, Neerut, Lilian, Lembinen, Liisi, & Arust, Evelin. (2022). Drivers and barriers of citizen engagement in open science and the role of university libraries in the Baltics. Zenodo. https://doi.org/10.5281/zenodo.6997820

BESPOC can also serve as the much-needed platform that the study's participants highlighted. By consolidating information on citizen science, providing resources, and spotlighting available projects, BESPOC can morph into a holistic hub for citizen science. Furthermore, given the report's recommendation for libraries to play a pivotal role in this platform's creation and maintenance, BESPOC could act as the collaborative bridge, ensuring that libraries are at the forefront of this transformation.

In essence, while the report paints a vivid picture of the potential and challenges within the current landscape, introducing a BESPOC at each university provides a tangible solution and strategy. It not only capitalizes on the existing strengths and resources within research libraries but also addresses prevailing challenges, paving the way for a more integrated and impactful citizen science ecosystem in the Baltics.

The results of a second LibOCS Study (PR2 study), “The Transformative Role of University Libraries and other Memory Institutions for Citizen Science and Open Science in the Baltics”[2] show similarities with the results of PR1 report, offering this way consistency to our first report. It also confirms the high usefulness of the BESPOC for the promotion of citizen science. PR2 indicates the need to pay attention to the weaknesses mentioned in the questionnaire's responses regarding the citizen science projects such as the lack of knowledge on citizen science and research processes, quality of data, communication and collaboration issues, insufficient people, infrastructure and other resources, lack of competences in the implementation of citizen science projects. BESPOC is the model that has a high potential to solve these issues both by showing different aspects and by combining them, arranging and showing parallels between these aspects.

# Infrastructure preparedness for Citizen Science

Each university, though renowned in its domain, presently does not have a dedicated position or infrastructure explicitly centred on Citizen Science in its library or overarching institution. This absence, while a challenge, also underscores a significant opportunity to pioneer and institutionalize citizen science activities. While robust and vast, their existing knowledge infrastructures have not been tailored to specifically support and adapt to citizen science projects.

Moreover, while their lab services are among the highest developed in Europe, there isn’t a dedicated design or pan-university initiative explicitly addressing the equipment, resources, and support for citizen science. Lastly, the current infrastructure lacks some specific logistics planning and spaces designed to facilitate citizen science meetings, workshops, and community engagements, although it’s fair to say that the 5 LibOCS HEIs are not completely unprepared to adapt for such events.

While all LibOCS HEIs currently lack a dedicated position related to Citizen Science in their library or in other departments, they have an opportunity to fill this gap by implementing the BESPOC model. Serving as a single point of contact for citizen science activities, this model would coordinate and facilitate such projects, offering support and guidance to researchers and community members.

Each university's existing knowledge infrastructure could be modified to better accommodate citizen science efforts. According to the BESPOC model, the university might consider developing resources tailored to citizen science projects. This could include a project catalogue, volunteer engagement platform, citizen science-related templates, collaborative spaces, and guidelines for legal and ethical

[2] Rozenberga, G., Liepa, M., & Saviča, M. (2022). THE TRANSFORMATIVE ROLE OF UNIVERSITY LIBRARIES AND OTHER MEMORY INSTITUTIONS FOR CITIZEN SCIENCE AND OPEN SCIENCE IN THE BALTICS (Version 1). Zenodo. https://doi.org/10.5281/zenodo.7593936

issues. This adjustment would enhance the ease and efficiency of citizen science activities, facilitating meaningful scientific collaboration for researchers and community members.

When considering infrastructure for citizen science activities, the emphasis should be on accessibility, collaboration, usability, communication, and fostering creativity. Recommended infrastructure components include maker spaces equipped with electronics, prototyping, and crafting tools. Strong IT infrastructure is essential, including web platforms, mobile apps, data management systems, collaboration tools, and video conferencing capabilities. Continuous training and technical support should back this infrastructure, alongside clear usage policies, safety procedures, and data policies. The ultimate goal is to establish an open, collaborative, and inclusive citizen science community.

## Possible areas of infrastructure development to support Citizen Science

**Strategic Vision and Planning**

1. Where does the university see its citizen science programme in the next 5-10 years?
2. How does it plan to scale and evolve its infrastructure to match its long-term vision?
3. What existing infrastructure can be repurposed or adapted for citizen science projects?

**Implementation and Resource Management**

4. How will the BESPOC model be integrated into the existing university framework?
5. What resources (human, technological, financial) will be required for its successful implementation?
6. How much budget has been allocated for the development and maintenance of infrastructure for citizen science?

**Operational Support and Data Management**

7. What training and support mechanisms are planned for researchers and participants in citizen science projects?
8. How will the university handle technical issues and provide ongoing support?
9. How will data collected through citizen science projects be managed, stored, and accessed?

**Ethical and Infrastructure Considerations**

10. What specific infrastructure is needed to address the specific ethical considerations, especially concerning data privacy and participant consent, that are raised in citizen science projects?
11. What are the anticipated financial challenges, and how can they be mitigated?

**Communication, Engagement, and Evaluation**

12. How will the university communicate and promote its citizen science initiatives both internally and externally?
13. What infrastructure is needed for volunteers' engagement, including recruitment but also using the new evidence?
14. How will be collected and used the feedback from participants and researchers (related to citizen science infrastructure)?
15. What mechanisms are in place for continuous improvement and iteration of the citizen science infrastructure?
16. What metrics and key performance indicators (KPIs) could be used to measure the Return on Investment (ROI) for such infrastructure?

17. Are there plans to develop dedicated spaces for citizen science activities, such as labs, collaboration spaces, or community centres?

# Funding for Citizen Science

Our initial analysis showed that each LibOCS HEI has its own funding opportunities that could be relevant for supporting a long-term implementation of a single point of contact for citizen science. However, most of the preliminary consultation activities generally suggest that, in large parts, LibOCS HEIs currently lack dedicated funds for systematic, pan-university Citizen Science support. This initial observation should be confirmed by looking into more details and establishing conversations with all possible involved departments.

Even if this observation is confirmed by forthcoming consultancy activities, there is potential to secure funds and create a pathway to gradually increase funding as the university gains expertise in citizen science and attracts more projects, leading to greater societal impact. To start with smaller funds allocation, the LibOCS HEIs can take proactive steps to engage with other departments and advocate for the inclusion of the BESPOC (the library, a leading faculty) in future citizen science projects, even with a smaller role initially. By collaborating with other departments, the BESPOC can demonstrate its value in supporting citizen science initiatives and secure some funds for employment, training, activities, services, or other offerings related to citizen science.

Here are some initial recommendations:

- Among other financial allocations related to Citizen Science, the LibOCS HEIs should prioritize the implementation of the BESPOC model as a single point of contact. This will provide a central hub for researchers and community members to access information, resources, and support related to citizen science projects. Securing initial funding for the BESPOC model will be key to building capacity for more citizen science initiatives.
- The LibOCS HEI libraries should actively engage with various departments and research groups across their institution to promote the benefits of citizen science and advocate for its inclusion in future projects. By participating in interdisciplinary collaborations, the LibOCS HEIs libraries can demonstrate how they can support citizen science activities, thus attracting some initial funding from these projects.
- Also, at the initial stages, the LibOCS HEIs libraries and supporting faculties can explore budget relocations within the university. Such relocations can fund further development of the BESPOC modules, training programmes, outreach activities, etc. These small achievements will lay the groundwork for larger initiatives.
- As the BESPOC gets involved in supporting citizen science projects and gains expertise, it is essential to showcase its impact and success. By documenting its impact along with the outcomes and benefits of citizen science activities, the BESPOC can build a strong case for increased funding and support from the university and external funding sources.
- As LibOCS HEIs gain more experience in citizen science, the BESPOC (through the library or supporting faculties/departments) can explore opportunities for external grant applications and partnerships with funding agencies or organizations that support citizen science initiatives. These avenues can provide additional resources to scale up citizen science activities and create a more significant societal impact.

In conclusion, we believe that LibOCS HEIs should start with smaller funds allocation for a citizen science single point of contact (BESPOC) and gradually increase such financial resources in correlation with the assessments of its impact. A functional BESPOC could enable the LibOCS HEIS to establish themselves as leaders in citizen science, help them attract more projects, build capacity and make a lasting impact on society through collaborative and inclusive scientific research.

Consider these steps forward:

- Overview of current funding sources and mechanisms.
- Potential funding opportunities and strategies to tap into them.

# Building a team and improving skills for BESPOC staff

During the preliminary consultancy, it appeared clearly that in order for the LibOCS HEIs to support more citizen science activities, staff development is very important.
Converting some existing positions to support citizen science could be a viable approach, providing new career offerings and specialized training for existing personnel. Offloading staff from current tasks and responsibilities to focus on citizen science is necessary to make this transition effective. Although recruiting new staff to the library solely for citizen science might not be feasible from the beginning, actively attracting resources for targeted part-time recruitment for citizen science positions can help build capacity gradually.

Another conclusion is that the library and the university should explore funding opportunities and partnerships to enable the growth of citizen science roles within the organization.

In addition to the staff conversion and targeted part-time recruitment strategies mentioned earlier, the LibOCS HEIs could implement the following staff development strategies to support more citizen science activities. Such staff development strategies (not limited to) can contribute to creating a supportive environment for citizen science, empower staff to actively participate or support meaningful public engagement in research projects, and generate a completely new level of societal impact for LibOCS HEIs.

1. Professional Development Workshops.
   Organize workshops and training sessions on citizen science methodologies, data collection, and community engagement for interested staff members. These workshops can equip them with the necessary skills and knowledge to actively support (even generate) citizen science projects.
2. Internal Collaboration.
   Foster interdisciplinary collaboration among different departments and faculties to encourage knowledge sharing and expertise exchange. Encouraging staff from various fields to work together on citizen science initiatives can lead to innovative solutions and broader perspectives.
3. Recognition and Incentives.
   Establish recognition programmes and incentives to reward staff members who actively contribute to citizen science projects. Recognizing their efforts and achievements can motivate them to pursue career conversion, or it could motivate others to get involved and create a culture of support for citizen science.
4. Partnering with External Experts.
   Collaborate with external experts and organizations experienced in citizen science to provide specialized training and mentorship for your staff. These partnerships can offer valuable insights

and best practices in conducting successful citizen science projects and can pave institutional collaborations (a BESPOC principle).

5. Supporting Research Proposals.
   Encourage staff to incorporate citizen science components into their research proposals (whether at the library or elsewhere if they are part of it). As BESPOC implementation evolves, you will be able to provide guidance and resources to help them design and implement citizen science activities as part of their projects.
6. Networking Events.
   In addition to specific workshops (aforementioned), organize networking events and seminars that bring together researchers, practitioners, and citizen science enthusiasts. These events can facilitate knowledge exchange, idea generation, and potential project collaborations. Such events could be online or on-site.
7. Integration into Curricula.
   Explore opportunities to integrate citizen science principles and activities into educational curricula across various disciplines. This can promote student engagement in citizen science projects and foster a culture of citizen science at LibOCS HEIs.

## Skills to be acquired for supporting Citizen Science

New skills are needed to be developed for the existing staff in order to develop competence for supporting Citizen Science. Depending on the role your Library wants to play in future citizen science projects, here are some new skills that need to be acquired:

1. Information management.
   The BESPOC staff should extend their strong information management skills or create specific applications of those skills in areas such as cataloguing and disseminating citizen science-related information (grants, principles, project outcomes), organizing and classifying citizen science projects at your university, cataloguing and disseminating scientific literature for researchers and volunteers, datasets, and other relevant resources
2. Research assistance for researchers.
   The BESPOC staff can provide research assistance to researchers by helping them navigate research databases, suggesting appropriate resources, and guiding them through the research process (as much as possible - if desired - using Open Science principles). They can also assist with literature searches, citation management, and accessing specialized research tools.
3. Research assistance for volunteers.
   The BESPOC Staff can provide research assistance to volunteers by helping them to understand their tasks, such as data collection protocol, suggesting appropriate practices, and guiding them through their relationship with the research group. Similarly, as they do for researchers, they can also assist the volunteers with literature searches, citation management, and accessing specialized research tools.
4. Information literacy instruction.
   The BESPOC Staff can offer training sessions or workshops on information literacy skills tailored specifically for citizen scientists. This can include instruction on effective search strategies, critical evaluation of sources, and understanding of research methodologies. It is important for your staff to emphasize the role of peer review, especially related to pre-print servers and how citizen scientists could determine if a publication is fully peer-reviewed or if it is still waiting for the editorial decision.

5. Data curation.
   The BESPOC Staff can support citizen science projects by assisting with data curation and management. This includes helping with data organization, formatting, documentation, and preservation, ensuring the long-term usability and accessibility of the collected data.
6. Data management plans and training.
   The BESPOC Staff can assist and help researchers develop data management plans that are adapted for citizen science projects and remain compliant with them, providing guidance on data organization, documentation, metadata standards, and data sharing practices. Additionally, the staff can help researchers develop data work training for citizen scientists and implement a training delivery plan.
7. Collaboration and networking.
   The BESPOC Staff can foster collaboration between citizen scientists, researchers, and other stakeholders by facilitating connections and promoting networking opportunities. This can include organizing workshops, seminars, debates, roundtables or any other conference formats related to citizen science. The BESPOC staff should be very creative in determining the format of the event and make sure they reach both the expectations of researchers and volunteers. We warn that academic formats are not always a good fit for public-facing events.
8. Technology proficiency.
   Staying updated on technological advancements relevant to citizen science is important for the BESPOC staff. They should be proficient in using digital tools and online platforms that support project implementation, communication, dissemination and impact maximization. This may include presentation software, video and photo processing software, poster design, social media technology, etc.
9. Communication and outreach.
   The BESPOC Staff can engage in effective communication and outreach activities to promote citizen science projects within their home institution and the wider community. This can involve creating media dissemination plans, convert-to-action techniques for the digital world, informative materials, participating in relevant events, and collaborating with community organizations or educational institutions.

# Data Management preparedness for Citizen Science projects at LibOCS HEIs

In the era of increasing digitalization, data management plays a leading role in ensuring the credibility, reliability, and accessibility of research. Moreover, research data represents a key intervention area for Open Science, some calling for open data, some others for FAIR data (that is Findable, Accessible, Interoperable and Reusable). FAIR data doesn't necessarily mean open data, but it's a set of principles that embed data scrutiny and the reproducibility of research. When looking at citizen science, the issue of data management gains an added layer of complexity due to the involvement of non-traditional research actors, often generating diverse datasets of varying quality.

The initial consultations with the five Baltic universities indicated a solid foundation in research data management (RDM) at each of their institutions. Data Management Plans (DMP) are established practices for their research endeavors. All of these indicate strong good practices around research data at the LibOCS HEIs. Moreover, the proactive stance of these institutions toward FAIR data and data sharing indicates a positive shift toward transparency and open-access philosophies. This meticulous

practice ensures that data collected, whether by seasoned researchers or citizen scientists (less experienced), follows structured, clear, and pre-determined guidelines.

Given that European research institutions are actively steering toward embedding Open Science principles, it is important to note that the LibOCS HEIs are not lagging behind. While they are in the nascent stages of fully integrating Open Science principles, it is evident that strides are being taken in the right direction, with a strong commitment.

While the LibOCS HEIs exhibit commendable practices in RDM, the unique nature of citizen science necessitates a more tailored approach to data management. By embracing the recommendations mentioned below, these institutions can not only enhance their data management preparedness but also foster an environment of trust, collaboration, and participatory science.

## General Recommendations

- Tailoring DMPs for Citizen Science: While the general practice of RDM is well known, it is advisable for universities to consider tailoring specific DMPs for citizen science projects. Given the diverse nature of data sources in citizen science, specialized plans can help in addressing unique challenges such as data quality, participant privacy, and data heterogeneity.
- Training workshops: Universities should conduct training sessions for both researchers and citizen participants. These sessions can focus on best practices for designing data protocols for non-scientists, data collection training, understanding the importance of data consistency, and the ethical considerations in data sharing.
- Lay Citizens Data Champions: The unique perspective of non-trained scientists is best described by themselves. Understand who are your Lay Citizen Data Champions, reward them and work with them to extend their positive experience to others while at the same time engaging with researchers to improve the citizen-specific workflows. These individuals can spearhead the activities related to data, providing guidance, answering queries, and disseminating the latest in citizen science data practices.
- Engage specifically on data matters with the volunteers: By actively engaging with the community of citizen scientists (either from active projects or past projects), universities can gain insights into their data management needs, challenges faced, and potential solutions. Regular feedback sessions can be instrumental in refining DMPs and other data-related protocols. Don’t hesitate to create international contacts with similar projects and ask them to share with you their experiences and learnings. Differently than the broader project engagement related to awareness, recruitment, etc, this data-specific engagement will improve the data management processes.
- Collaborative platforms: Investing in or collaborating with existing platforms that allow easier data collection, licensing and reports can be beneficial. These platforms can allow researchers, students, and citizen scientists to access and contribute data, facilitating interdisciplinary collaborations. If you decide to license or partner existing platforms, the BESPOC implementation could facilitate assessing such platforms, create interoperability and negotiate better terms and conditions. If you decide to invest in your own platform, the role of BESPOC is - among other activities - to lead the need assessments, gather resources and test its features both with volunteers and researchers

# Specific Recommendations

## Data Collection Consent:

- Informed consent: At the heart of data collection, especially in citizen science projects, lies the principle of informed consent. Participants should be provided with detailed information about the project, its objectives, how their data will be used, and any potential risks involved. They should also be made aware of their rights, including withdrawing their data or participation at any stage.
- Plain language: Consent forms should be written in clear, simple language that is easily understandable by the general public. This ensures that participants truly understand what they are consenting to.
- Transparency: To maintain trust, it's essential that all participants, especially those from the citizen science community, are aware of how their data will be used. Clear communication regarding data usage, storage, and sharing should be established from the project's onset. Be upfront about the project's goals, data storage methods, duration of storage, and potential future uses of the collected data. If there's a possibility of the data being used in future research or commercial applications, this should be explicitly mentioned.
- Opt-In vs. Opt-Out: Whenever possible, use an opt-in system for specific uses of data (e.g., sharing with third parties, long-term storage, commercial use) rather than opt-out. This ensures that participants actively give their permission.
- Anonymity and confidentiality: Clearly specify if the data will be anonymized or if any personal identifiers will be removed. If data is to be kept confidential, outline the measures that will be taken to ensure this.

## Licensing for Data Collected by Volunteers:

- Open licenses: Consider using open licenses that allow researchers full rights to use, modify, and distribute the data. Licenses such as the Creative Commons licenses, especially the CC BY (Attribution) or CC0 (No Rights Reserved), are particularly useful in such contexts.
- Share-Alike clauses: If you want derivative works to be shared under the same open terms as the original data, consider licenses with share-alike clauses, like the CC BY-SA.
- Attribution: If data is shared or used in publications, there should be clear terms on how volunteers should be credited or acknowledged. If using a licensing model that requires attribution, clearly specify the format in which it should be given.
- Derivative works: Specify if the data can be used to create derivative works and under what conditions.
- Commercial use: Clearly state if the data can be used for commercial purposes or if its use is limited to non-commercial research.
- Data retention and deletion: The license should specify the duration for which the data will be retained and the conditions, if any, under which it might be deleted or destroyed.
- Third-party sharing: If there's a possibility of sharing data with third parties, this should be clearly mentioned in the license. Specify the terms under which third-party sharing is permitted.

Consider these steps forward:

- Overview of existing data management practices.

- Best practices for citizen science data collection, storage, and analysis.
- Ensuring data privacy, security, and accessibility.

# Managing the cultural change and a recommended Advocacy Programme for the LibOCS HEIs to support Citizen Science at their universities

Managing cultural changes in research at universities is critical for a number of reasons. Firstly, universities are home to a diverse population of individuals from various backgrounds, research cultures, and perspectives. Apart from the variety of research cultures, researchers come from different lifestyles and regional cultures. When cultural changes occur, these need to be managed effectively to ensure that all individuals feel respected and valued. The same is valid for the change Open Science proposes (Citizen Science is part of the Open Science cultural shift). Only this approach based on inclusiveness, respect and accepted values will create an inclusive research environment where everyone feels encouraged to contribute and collaborate, leading to more innovative and robust research outcomes.

Secondly, research is an ever-evolving field. As new methodologies, technologies, and ideas emerge, they often bring about cultural shifts. Universities must manage these shifts to ensure that their research practices stay relevant and competitive. This might mean adopting new technologies, revising research protocols, or updating ethical guidelines. If these changes aren't managed effectively, universities risk falling behind in their research capabilities, which could impact their reputation, funding opportunities, and the quality of education they provide. Citizen Science contributes to this ever-evolving field, and through participatory actions, it even amplifies the Open Science cultural change. This represents equal opportunities and challenges that need to be managed.

Lastly, cultural changes in research can also impact the wider university community. For example, shifts in the research culture might affect teaching methods, course content, or student engagement. By managing these changes, universities can ensure that their educational offerings remain current, engaging, and in line with industry best practices. Effective management of cultural changes in research is therefore important not just for the research itself but for the overall health and success of the university.

Managing cultural changes in research at universities is a multifaceted endeavour, with the growing emphasis on open science and external partnerships adding complexity to the task. With open science promoting transparency and accessibility in research, the culture is shifting towards sharing methodologies, data, and findings more freely. Universities must manage this shift to foster an environment that supports these practices. This includes providing the necessary infrastructure, developing data management policies, and cultivating a culture that values openness and collaboration.

Likewise, the rise of external research partnerships with industries, other academic institutions, or public bodies necessitates cultural changes within universities. These collaborations can bring about significant advancements in research, but they also introduce new dynamics in terms of communication, decision-making, and resource allocation. Managing these cultural changes is crucial to ensure successful collaboration, maximise the benefits of these partnerships, and mitigate potential conflicts or misunderstandings.

The combination of open science and external partnerships can profoundly shape the research culture at universities, influencing everything from the nature of research projects to the skills students are taught. Handling these cultural shifts effectively is key to maintaining the quality, relevance, and impact of university research and ensuring universities continue to be vibrant and dynamic centres of knowledge creation and dissemination.

Advocacy programmes play a vital role in supporting citizen science at universities. By raising awareness of citizen science, these programmes can engage a broader section of the university community and potentially the general public in scientific endeavors. They provide platforms for individuals to learn about the value of scientific methods and citizen science, how to contribute, and the potential impacts their participation can have.

In the context of the BESPOC model, an "Advocacy programme" could be defined as a strategic initiative aimed at promoting and supporting citizen science activities within the university and the broader community. This programme would likely focus on raising awareness about the benefits and importance of citizen science, encouraging broader participation and support from various stakeholders, including faculty, students, and external partners. Its goal would be to foster a supportive environment for citizen science, ensuring its integration into the university's core activities and its recognition as a valuable component of academic and community engagement.

As a special element that helps manage cultural changes, advocacy programmes can help overcome barriers to citizen science. For instance, they can address the scepticism or misunderstanding that often surrounds citizen science by showcasing successful projects and their outcomes or studies on citizen science practices. By making the achievements of citizen science more visible, these programmes can enhance their credibility and acceptance within the academic community.

Furthermore, advocacy programmes could focus on securing resources for citizen science. This means lobbying for funding or policy changes, but it can also involve efforts to ensure that the necessary infrastructure, such as IT systems or maker spaces, is in place. By advocating for these needs, such programmes can significantly enhance the capacity for citizen science at the LibOCS HEIs.

Lastly, advocacy programmes can be instrumental in fostering collaborations. They can bring together researchers, students, and volunteers from diverse backgrounds to work on citizen science advocacy activities. These collaboration opportunities can greatly enrich the citizen science projects (existing and future), but they also have broader benefits, such as building networks, enhancing skills, and promoting a sense of community. Thus, advocacy programmes are key in nurturing a vibrant and inclusive citizen science culture at universities.

## A Recommended Advocacy Programmes

The goal of this advocacy programmeme is to facilitate the integration of citizen science into more projects at each LibOCS HEI by leveraging the support and resources of the university library or partaking faculties. While each LibOCS HEI is to identify as the ideal office to lead the advocacy efforts, the library could play, at minimum, a supportive role in understanding the challenges and providing expertise on meeting design, facilitation, and outcome tracking during executive meetings between the library and university leaders.

By combining the expertise of different offices and departments in developing the advocacy effort, each LibOCS HEI can nurture the right environment for the successful implementation of a single point of contact in their university (BESPOC).

Here is a recommended advocacy programme based on our initial consultations.

1. Collaboration and Partnership:
    a. The Library will collaborate with other stakeholders (HSS Faculty, Vice-Rectorate for Research, Research Administration Office) to identify key stakeholders and experts who can support the advocacy programme.
    b. The library will partner with such stakeholders to organize executive meetings with university leaders, researchers, and relevant faculty to discuss the challenges and opportunities of implementing citizen science projects at their university.
2. Needs Assessment:
    a. The library, alone or in consultation with another stakeholder, will conduct a needs assessment to understand the specific challenges researchers face when considering citizen science in their projects. Past LibOCS activities may even offer some answers to this assessment.
    b. Feedback from researchers will be collected to identify the support, resources, and training needed to incorporate citizen science effectively at a general level and to a BESPOC in particular.
3. Designing Effective Meetings:
    a. The library will provide expertise on meeting design and facilitation techniques to ensure productive discussions during the executive meetings.
    b. Focus group discussions and workshops can be organized to encourage open dialogue and gather diverse perspectives on citizen science implementation.
4. Outcome Tracking:
    a. The library will assist in tracking the outcomes of the executive meetings and documenting the identified challenges, potential solutions, and action plans.
    b. A comprehensive report will be prepared and shared with the relevant stakeholders for further strategizing and policy development.
5. Awareness and Training:
    a. The library works closely with other stakeholders in promoting citizen science awareness and training initiatives among researchers, faculty, and students.
    b. Hosting workshops, webinars, and training sessions on citizen science methodologies and best practices can enhance the understanding and uptake of citizen science at LibOCS HEIs.
6. Resources and Support:
    a. The library can curate and provide access to relevant literature, databases, and online resources related to citizen science for researchers to utilize in their projects.
    b. Collaboration with external citizen science networks and platforms can be facilitated by the library to expand the university's engagement opportunities.
7. Citizen Science Champions
    a. Create a network of Citizen Science Champions and work together to convince other colleagues of the applicability and effectiveness of citizen science approaches.

Such an Advocacy Programme should be considered in the context of a cultural change that is required to recognise the value of citizen science activities and to secure irreversible support. Managing the cultural change required by Open Science and Citizen Science should become stand-alone priorities at LibOCS HEIs.

To embrace and support the advocacy programme for citizen science effectively, key stakeholders from various departments and faculties, including the library staff, researchers, administrators, and students,

should be actively engaged in discussions and decision-making. Such cultural change management may include developing policies, recommendations and even regulations that promote Open Science and Citizen Science, addressing data sharing, intellectual property rights, and recognition of citizen science contributions.

Emphasizing the long-term nature of this transformation and setting realistic milestones will help measure progress and celebrate successes, inspiring others to join.

# What communities could be relevant for LibOCS HEIs, related to the development of more Citizen Science activities

Several relevant communities could be engaged by LibOCS HEIs to promote the development of more citizen science activities. Establishing such partnerships sits very often at the core of citizen science projects. These partnerships should be maintained beyond the projects' lifespans, and - ideally - the university contributes to these partnerships through multiple projects and programmes.

Through active engagement with these diverse communities, LibOCS HEIs can facilitate recruitment and volunteer retention in citizen science projects, but they could also enhance the impact and relevance of its citizen science projects, fostering a collaborative environment for research and innovation that benefits both the university and the broader society. Not least, as LibOCS HEIs can create a vibrant ecosystem of citizen science activities that encompass a wide range of topics and perspectives, they can empower such communities to participate actively in scientific discovery and problem-solving.

1. All LibOCS HEIs boast a vast network of alumni spanning the globe, who proudly embody the values and ethos of their cherished alma mater. As a collective, they carry both the privilege and the responsibility of contributing to the advancement of a society that champions science-based, sustainable education. Emphasizing the crucial role that alumni play in shaping the university's future and the quality of education it imparts, the institution should encourage all graduates to actively engage in its development. Whether through participation in mentoring programmes, supporting the university as donors, or providing internships and job opportunities to promising students, there are numerous avenues for alumni to steadfastly support their alma mater. Citizen Science is a strong reason to connect with your alumni network, make them aware of your research activities and invite them to join your efforts with some of their resources (time, knowledge, in-kinds and financial). In return, they will get engaging activities and new knowledge first-hand.
2. Secondary and High Schools: Engaging with schools allows LibOCS HEIs to inspire the younger generation and foster an interest in science and technology. Implementing citizen science projects in educational settings can provide valuable hands-on learning experiences for students.
3. Local Communities with specific topics: LibOCS HEIs can reach out to communities with specific interests or concerns, such as enthusiast astronomers, environmentalists, historians, health programmes enthusiasts, etc. Involving these communities in citizen science activities related to their interest can facilitate mutual understanding and potentially address their concerns. Communities of those opposing science should not be left outside, either. Through specific strategies, you can engage with vaccine deniers, wind-farm opponents, etc, to understand their concerns and to invite them to have a different look at science. Science should aim for broader

trust within society, and citizen science could be an important part of an effective solution to the complex milieu of misinformation, disinformation and manipulation.

4. In addition to the above-identified communities, LibOCS HEIs can connect with the following groups (examples only) to promote citizen science activities:
    a. Environmental NGOs and Activist Groups: Partnering with environmental non-governmental organizations (NGOs) and activist groups can be fruitful for citizen science projects related to biodiversity monitoring, air and water quality assessments, and climate change impacts. These collaborations can amplify the reach of LibOCS HEIs' research efforts and foster community-driven initiatives.
    b. Business and Professional Associations: Collaborating with industry associations can facilitate the implementation of citizen science projects in fields like sustainable manufacturing, circular economy, and smart cities. LibOCS HEIs can work with businesses to collect data, identify challenges, and develop innovative solutions to real-world problems. It is particularly important to recognise that citizen science encompasses not only the very distant society but also the experts and communities of practitioners that are very close to the scientific endeavour without being trained scientists. Engineers, clinicians, lawyers, multimedia experts, archivists, curators, technicians, and conservators could lend a helpful hand to researchers, complementing their perspectives and resources.
    c. Startups and Entrepreneurship ecosystems: Separate from the case of established businesses and professional associations, LibOCS HEIs can collaborate with startups and entrepreneurs to develop citizen science initiatives that explore emerging technologies, market trends, and innovative solutions. This collaboration can spur creativity and contribute to the growth of the entrepreneurial ecosystem in the Baltic countries. These ecosystems are already investing in knowledge transfer strands. Involving them in the early stages of discoveries could create a fabric of innovation much needed for any country or region.
    d. Local Government and Municipality Authorities: Engaging with local government and municipality authorities allows LibOCS HEIs to align citizen science projects with governmental and local strategies and priorities. Cooperation in urban planning, public health monitoring, and infrastructure development - just to name a few - can lead to more effective and inclusive policies and practices.
    e. Cultural and artistic communities: Connecting with cultural and artistic communities opens up opportunities for interdisciplinary citizen science projects that explore the intersection of technology, art, and society. LibOCS HEIs can engage artists, designers, and creatives in projects that address social issues through a creative lens. If researchers' main job is to create knowledge about nature and society, artists are good at illustrating them. These communities are rather closer than distant, and citizen science is offering the opportunity to create the (centuries old) missing bridges.
    f. Science communication and media Outlets: Partnering with independent journalists, science communication platforms and media outlets, but also with (carefully selected) trustful bloggers and social media contributors, can help disseminate the outcomes of citizen science projects to a broader audience, increasing trust, public awareness and engagement in scientific research.

Consider these steps forward:

- Existing connections with science enthusiast communities.
- Strategies to nurture and expand these communities.

- Best practices and lessons learned from other universities or organizations.

# Factors That Could Affect the Process of the BESPOC Implementation

Several factors can affect the process of obtaining support for the implementation of BESPOC. The following factors are among those identified by preliminary consultations.

1. The level of engagement and support from various departments, such as the University Libraries, The Vice-Rectorate for Research (of various names and roles), Research Management Offices (of various names and roles), Centers of Excellence in Research, Research groups of all kind, etc. Also, those involved in teaching and education can significantly impact the success of a BESPOC implementation. In particular, the Rector's team can drive a vision regarding the university's engagement with the public on the research front and the role of such engagement in attracting future students and public-private partnerships. The willingness of these stakeholders to collaborate, invest resources, and actively participate in the initiative will influence its effectiveness.
2. Adequate financial support is crucial for the successful implementation of BESPOC, although it doesn't require a large initial investment. The availability of funding from the university's budget backed by research grants, support from private organizations, or other sources will determine the timeline, the scale and the scope of the programme. A complete lack of funding may hinder the ability to carry out outreach activities, establish necessary infrastructure, and support research initiatives. Alternatively, financial support could be secured in the first years from national or international projects. As a last resort, financial support could be made in the first year via in-kind contributions (using free-of-charge the existing infrastructure or benefitting from existing services).
3. The support and commitment from the university or research institution to prioritize and integrate BESPOC into its research strategy is important. This includes creating an enabling environment for public engagement and encouraging researchers and faculty to actively participate in outreach activities. Without specific encouragement from research institutes and faculties, citizen science initiatives will grow much slower.
4. The level of public awareness and interest in science engagement initiatives that could be served by BESPOC can significantly impact the success of the programme. A lack of interest or understanding among the public may make it challenging to garner participation, hence the role of making BESPOC known to the university's public partners, once it is decided to be implemented. While BESPOC's advocacy actions will be driven during the initial set-up towards the inner part of your university, later on, a new set of advocacy actions should involve LibOCS HEIs external partners and, ultimately, the society. Effective communication and advocacy strategies are necessary to promote BESPOC and generate interest and support from the aforementioned stakeholders. Clear and compelling messaging can help attract support, collaborators, and funding opportunities.
5. Incentives, rewards and recognition are integral components in ensuring the active and sustained participation of both academic researchers and citizen scientists in any initiative. Their influence on the BESPOC implementation process can be understood in the context of motivation for

participation, retention of participants, quality of contributions, institutional rewards for researchers, fostering a culture of appreciation, and resource allocation.

6. Collaboration with existing communities related to the university (e.g. alumni) and other organizations is essential for the success of BESPOC. We dedicated an entire section of this report to this matter.
7. On-the-go evaluation and impact assessment are essential for successful BESPOC implementations. Implementations are very specific to each institution, hence the need to evaluate, understand and adapt the implementation. Demonstrating tangible benefits and outcomes can help secure ongoing support and investment.
8. A lower level of competencies and staff for issues related to the legal aspects of citizen science projects. Researchers may want to do the projects but there is just not enough support for them on legal and safety matters that could occur in citizen science projects. This situation could lead to a difficult implementation of the BESPOC's "Legal and Safety Office Connector".
9. Not least, there is an important need to have continuity during personnel changes (either at the top of the university's management or at the level of different departments). Implementing BESPOC and adjusting it for a higher impact is a matter of many years that will probably span through a number of management teams. It is, therefore, important to have continuity in strategy and to ensure proper hand-over processes when teams are changed.

# Summary and Preliminary Recommendations

To foster a thriving citizen science environment, the five Baltic HEIs should prioritize the establishment of a dedicated Citizen Science hub within their institutions. This hub would serve as both a physical and virtual space, bringing together researchers, students, and the community at large. The hub would house the BESPOC, serving as the primary contact for citizen science inquiries and support. Integrating the hub within the existing library system could capitalize on its existing strengths and resources. As citizen science relies heavily on participation, ensuring that this space (even when only digital) is accessible, collaborative, and well-equipped with processes, platforms, skills and - when available, hardware - is highly important. Furthermore, by repurposing some of their advanced services, these universities could establish a foundation for citizen science activities. A phased approach, starting with essential infrastructure adjustments, such as a catalogue of projects, a platform for recruiting volunteers or dedicated spaces for workshops and meetings, and progressively integrating more specialized resources, can lead to a sustainable and scalable model. The end goal should be an infrastructure that not only supports but actively drives citizen science projects, making them an integral part of the LibOCS HEIs research ecosystem.

For the seamless integration and success of BESPOC at the Baltic HEIs, it's essential that the universities envision and strategize their citizen science trajectories for the next decade. By conducting a comprehensive needs assessment, the universities can identify existing infrastructures that can be repurposed for citizen science endeavours. Aligning BESPOC's integration with the universities' long-term vision will ensure its sustainability and growth. Continuous stakeholder engagement, through workshops and consultations, can guide the iterative development of the infrastructure, ensuring it remains relevant and responsive to the evolving demands of citizen science projects. Collaborative platforms, data management systems, and training programmes should be foundational components. Additionally, emphasis should be placed on ethical considerations, data privacy, and participant consent, ensuring that the universities maintain the trust and enthusiasm of their community participants. Establishing clear metrics and KPIs for the return on such investment (ROI) and continuously seeking feedback will ensure that the infrastructure remains efficient, effective, and value-driven.

To ensure the long-term success of the BESPOC model and the broader citizen science initiatives at the LibOCS HEIs, a multi-faceted and phased funding approach should be adopted. Initially, the institutions should harness internal resources by reallocating existing budgets or tapping into left-over or discretionary funds. As the BESPOC implementation demonstrates its value, it can serve as a compelling proof of concept, justifying increased internal financial commitment. During this phase, it's crucial to foster partnerships with different departments, showcasing the benefits of citizen science and the BESPOC's instrumental role in facilitating such initiatives. With each successful project, the universities should collate and document outcomes, benefits, and societal impacts, crafting a compelling narrative that can be presented to potential external funders. Simultaneously, the LibOCS HEIs should invest in capacity building, specifically in grant writing and partnership development, targeting external funding opportunities. Over time, as the institutions gain a reputation and expertise in citizen science, they can more intensively seek external grants, partnerships, and collaborations. This combined approach of internal reallocation, interdisciplinary collaboration, and external partnership development will ensure the sustained growth of citizen science activities and the continued evolution of the BESPOC as an essential resource within the university ecosystem.

The foundation of a successful BESPOC lies in the strength and adaptability of its team. As LibOCS HEIs venture deeper into citizen science support, there's a need for intentional staff development. The preliminary consultancy underscores the potential of repurposing existing roles to emphasize citizen

science, necessitating the transition of responsibilities. A pragmatic approach involves targeted part-time recruitments tailored for citizen science roles, fostering growth without overstretching initial resources. Beyond staffing, the institution should actively pursue external funding and partnerships, enhancing its capability to further citizen science endeavours. Professional development is also important; workshops, internal collaborations, and recognition programmes will not only uplift skills but also instil a culture of participatory science. Strengthening ties with external experts can further enrich the team's expertise while supporting research and hosting networking events will cultivate a community of practice and innovation.

The intricate connection between academic research and public engagement in science demands a specialized skill set. LibOCS HEIs should emphasize core competencies like information management tailored for citizen science, research assistance for both professionals and volunteers and effective information literacy training. The growing importance of data in research brings to the forefront the need for advanced data curation, management, and training skills. As collaborations form the bedrock of citizen science, skills in networking, technological proficiency, and outreach are indispensable. Keeping abreast of evolving technological tools and platforms amplifies project impact, while a nuanced understanding of communication strategies ensures the broader community remains engaged and informed.

Universities, as diverse and ever-evolving ecosystems, are witnessing significant shifts, especially in the area of research. The embrace of Open Science, of which Citizen Science is a pillar, embodies the transition towards more inclusive and transparent research methodologies. This change is vital, not just because of its alignment with global trends but because it ensures all stakeholders - from diverse research cultures to different regional backgrounds - feel valued and incorporated. Such inclusiveness enhances the calibre of research outcomes. Furthermore, the fluidity of research mandates that universities continuously adapt, ensuring methodologies, protocols, and ethical guidelines remain contemporary. With Citizen Science amplifying the participatory approach of Open Science, the challenge lies in effectively managing this transition to maximize the benefits of communal participation in research. Moreover, these changes aren't just restricted to research; they influence pedagogical approaches, curricular structures, and overall student engagement. Hence, proactive management is essential to ensure a harmonious and productive environment.

The recommended advocacy programme for LibOCS HEIs is centred around promoting citizen science integration, with the university library (or, where the case is, with another department/faculty) serving as a support hub. This programme underscores collaboration and partnership, where the library teams up with stakeholders like the HSS Faculty, Vice-Rectorate for Research, and Research Administration Office to spearhead strategic meetings and discussions. Central to this initiative is a rigorous needs assessment to pinpoint challenges and requisites for citizen science incorporation. The library's role expands to orchestrating strategic meetings, tracking outcomes, and, subsequently, generating comprehensive reports for future strategy. Concurrently, it spearheads awareness campaigns, furnishes essential citizen science resources, and cultivates an influential network of Citizen Science Champions. This advocacy is not just about project integration; it's a clarion call for a profound cultural shift in recognizing citizen science's value, demanding holistic participation from all university echelons. This long-haul transformation, with its roots in promoting Open Science and Citizen Science, necessitates consistent engagement, policy development, and a commitment to achieving defined milestones.

LibOCS HEIs stand to benefit immensely from promoting and expanding citizen science activities through partnerships with a diverse range of communities. Central to the success of citizen science projects is the formation and maintenance of enduring partnerships, where the university consistently contributes across various projects and programmes. By actively reaching out, the HEIs can not only

simplify recruitment and retain volunteers but also augment the impact of their citizen science endeavours, thus establishing a collaborative research milieu that serves both academic and societal interests. The global alumni network, ingrained with the university's values, provides a potent avenue for engagement, offering them a platform to contribute to their alma mater while partaking in enriching activities. Schools present an opportunity to instil a scientific temper among students, while specific local communities, including those sceptical of science, offer a chance for mutual understanding and countering misinformation. Moreover, HEIs should also leverage collaborations with environmental NGOs, professional associations, startups, local governmental bodies, artistic communities, and media outlets. Such comprehensive engagement can result in a holistic and inclusive approach to science, fostering innovation, trust, and awareness. To maximize the potential of these partnerships, it's recommended that HEIs adopt a proactive approach in community outreach, continually reassess and adapt strategies based on feedback, and ensure transparency and inclusivity in all citizen science endeavours.

In today's digital age, data management has emerged as a linchpin for establishing the credibility, accessibility, and reliability of research. Open Science emphasizes open or FAIR (Findable, Accessible, Interoperable, and Reusable) data, which, although not always open, prioritizes data scrutiny and research reproducibility. Citizen science, with its inclusion of diverse non-traditional research contributors, introduces an additional layer of intricacy to data management. Preliminary consultations with the five LibOCS Baltic universities revealed a robust foundation in research data management (RDM). Each institution demonstrates commendable adherence to Data Management Plans (DMP), signifying well-established research data practices. Their proactive alignment with FAIR data principles signals a paradigm shift towards transparency and open access. Despite their foundational strengths in RDM, the distinctiveness of citizen science calls for a specialized approach to data management. Recommendations include devising tailored DMPs for citizen science, organizing data management training workshops, recognizing and collaborating with Citizen Data Champions, actively liaising on data matters with volunteers, and leveraging collaborative platforms for data collection and sharing.

Furthermore, it's imperative to prioritize informed consent in data collection, ensuring transparency, clarity, and participant rights. Consent forms, written in layman's terms, should elucidate project objectives, data utilization, and potential risks. The distinction between opt-in and opt-out systems should be emphasized, guaranteeing participant autonomy in data contribution. In terms of licensing for volunteer-collected data, open licenses like the Creative Commons are recommended. Licensing should outline provisions for attribution, derivative works, commercial use, data retention and deletion, and third-party sharing. By diligently implementing these recommendations, institutions can nurture a conducive ecosystem for data management in citizen science underpinned by trust, collaboration, and inclusivity.

The successful implementation of BESPOC hinges on a myriad of interrelated factors. Foremost is the level of commitment and engagement from university departments, from the University Libraries and Research Management Offices to teaching and educational personnel. Specifically, the Rector’s team's vision can significantly shape the university's public engagement direction, affecting potential partnerships. Additionally, adequate financial backing is paramount; while BESPOC doesn't demand a vast initial outlay, sustained funding, be it from institutional budgets, grants, private support, or in-kind contributions, impacts the programme's reach and feasibility. Equally crucial is the university's dedication to integrating BESPOC into its research strategies, fostering an atmosphere conducive to public participation. The public's existing awareness and enthusiasm for science engagement can either bolster or impede BESPOC's traction. Effective communication strategies are vital to entice diverse stakeholders. Motivational strategies, like incentives and recognition, play pivotal roles in participant

engagement and retention. Collaborations with established university-affiliated communities and continuous evaluations enhance BESPOC's potential success. Lastly, ensuring uninterrupted progress during personnel transitions is essential, highlighting the importance of strategic continuity and seamless handovers amidst evolving management teams.

# Appendinx 1: A Short Overview of the BESPOC Model

This is a short overview of the *BESPOC* (acronym for “Broad Engagement in Science, Point of Contact”), which is a model for a central service for citizen science at universities and other research organisations.

## Executive summary

BESPOC (Broad Engagement in Science - Point of Contact) is a model designed for universities and research organizations to centralize and enhance their citizen science initiatives. Developed by Immer Besser (Germany) and SKS Knowledge Services (Germany), it aligns with the League of European Research Universities' (LERU) recommendations for supporting citizen science.

**Modules of BESPOC**

1. Policy & Development Plans (P&D-CS)
    a. Focuses on developing and updating policies for citizen science.
    b. Aims to institutionalize citizen science in academic settings.
    c. Ensures effective communication and engagement of policies.
2. Activities Portal (AP)
    a. Serves as a central hub for citizen science projects.
    b. Transforms policies into actionable projects and campaigns.
    c. Supports project engagement, dissemination, and collaboration.
3. Partnership Frameworks (PFs)
    a. Establishes collaborative relationships with various stakeholders.
    b. Outlines structure, roles, responsibilities, and objectives of partnerships.
    c. Enhances the impact of citizen science in academia and society.
4. Templates for Citizen Science Projects (TCSP)
    a. Provides resources for initiating and executing citizen science projects.
    b. Includes consent forms, data collection sheets, and safety protocols.
    c. Aids in ethical compliance and effective communication.
5. Specific Citizen Science Communication (SCSC)
    a. Addresses unique challenges in communicating research to non-professionals.
    b. Promotes accessibility, engagement, and two-way communication.
    c. Fosters transparency and open science principles.
6. Research Management & Administration Connector (RMA-C)
    a. Integrates citizen science with existing research management systems.
    b. Facilitates efficient workflows and policy integration.
    c. Enhances support for citizen science projects within the university.
7. Gateway to Society (GtS)
    a. Empowers citizens to participate in shaping research priorities.
    b. Ensures research findings are used in policymaking.
    c. Strengthens connections between research and decision-making processes.
8. Legal & Safety Office Connector (LS-C)
    a. Ensures legal and safety compliance in citizen science projects.
    b. Facilitates understanding and responses to legal and safety matters.
    c. Safeguards participants, researchers, and institutional interests.
9. Communities Builder (CB)

a. Cultivates sustainable communities around citizen science projects.
b. Supports Community of Interest, Knowledge, and Practice.
c. Encourages personal and collective growth within these communities.

**Implementation & Objectives**

While the *BESPOC Prototype*[3] has been published open access and it's fee to use, the *BESPOC Model* is offered as a consultancy service, providing guidance and support for establishing a citizen science point of contact.

It aims to promote citizen science, facilitate collaboration, and ensure transparency and effective communication in research projects. The

The *BESPOC Model* is a building block for universities and research organisations that 1) aim to create a central services for citizen science for their researchers and 2) wish to adopt a strategy for broader public engagement. It underscores the importance of cross-departmental collaboration, staff and infrastructure support, and community engagement in research.

**In summary,**

BESPOC is a dynamic, multifaceted approach to embedding citizen science in academic and research institutions. It emphasizes the importance of policy development, community engagement, legal compliance, and effective management of citizen science projects. This model serves as a guideline for research organisations to foster a more inclusive, collaborative, and impactful research environment.

[3] Ignat, T. and Ayris, P., 2020. Built to last! Embedding open science principles and practice into European universities. Insights: the UKSG journal, 33(1), p.9.DOI: https://doi.org/10.1629/uksg.501

# Appendix 2: Past and current involvement in citizen science projects

*Overview of ongoing or completed citizen science projects at each institution.*

*Existing collaborations, partnerships, and major achievements. These lists offer only a selection of project and activities where the LibOCS HEI's engaged their best effort to collect this information.*

## University of Tartu (UT)

- EU BON - Building the European Biodiversity Observation Network (http://www.eubon.eu/). The main objective of EU BON is to build a substantial part of the Group on Earth Observation's Biodiversity Observation Network (GEO BON). A key feature of EU BON will be the delivery of near-real-time relevant data – both from on-ground observation and remote sensing – to the various stakeholders and end users ranging from local to global levels.
- Looking For Cowslips (https://nurmenukk.ee/). A citizen science project on cowslips. By studying the cowslip as a characteristic grassland plant, we hope to obtain knowledge not only about this species, but also to enhance understanding about the status of other similar species. Many of you have heard of lab rats, fruit flies and baker's yeast as commonly studied model organisms. Cowslip serves almost as a model species in our studies.
- Observing and Mapping Marine Ecosystems – Next Generation Tools (https://obama-next.eu/) . OBAMA-NEXT will develop innovative tools to monitor and describe marine organisms, from microbes to mammals, and ecosystem services across different habitat types in European coastal and marine waters. This will require an overarching approach to identify relevant and needed information products, as well as their validation and applicability, to ensure spatial coherence across organism groups. This also requires a broad project team, including specialists of specific organisms and habitats, ecosystem dynamics, and functioning scientists capable of developing algorithms and models. Therefore, close collaboration between every partner will be essential to the successful completion of OBAMA-NEXT.
- DOORS - 3D Scanning Infrastructure for Nature Education and Remote Research (https://natmuseum.ut.ee/et/DOORS-inkubatsiooni-programm) - The University of Tartu Natural History Museum and Botanical Garden is developing a web application to explore digital 3D models of natural objects in its collection. The workshop on Tuesday 9 May will demonstrate technical solutions for 3D scanning, presentation and printing of objects.Making spatial digital copies of objects has become commonplace and taken for granted in some cases. 3D printers are increasingly available and affordable. But how do museums relate to 3D technology?The University of Tartu Natural History Museum and Botanical Garden is piloting a web application for exploring digital 3D models of natural objects in its collection. The 3D models will be linked to the collection management software PlutoF. The insect models will be scanned in collaboration with Toivo Ylinampa, a PhD student at the University of Tartu, who is developing a scanner that will allow the spatial storage of every hair on an insect.
- Improving the Functional Connectivity of Grassland Networks for Plant-Pollinator Interactions (FuncNet) (https://landscape.ut.ee/what-we-do/projects/improving-the-functional-connectivity-of-grassland-networks-for-plant-pollinator-interactions-funcnet/?lang=en). Landscape biodiversity workgroup studies ecosystem functioning and restoration of degraded ecosystems. Our research focuses on different ecosystems from semi-natural grasslands to forests and cities, different species groups

from vascular plants to mycorrhiza and spiders, and different biodiversity components from species diversity to genetic diversity. We think it is important to consider historical land-use and time-lags (e.g. extinction debt, colonisation credit) in ecology and nature conservation.

- Waterlands- WaterLANDS will contribute to the restoration of wetland sites across Europe which have been damaged by human activity and is laying the foundations for protection across larger areas. https://waterlands.eu/local-languages/eesti/. At the end of 2021, the spectacular WaterLANDS project started in Estonia and 13 other European countries, within the framework of which it is planned to restore a total of 10,500 hectares of damaged wetlands in many parts of Europe . We want to create good restoration practices that can be used to restore other wetlands in the future. We work closely with local people, companies, municipal governments and other interest groups so that the restoration of wetlands not only improves the natural environment but also creates social and economic support for communities.
- Robotont - an open-source platform for robotics education and research http://robotont.ut.ee/main?lang=en. Robotont is open-source platform for robotics education and research. It is an omnidirectional mobile robot with ROS (Robot Operating System) support. Development of robotont is coordinated by the Institute of Technology, University of Tartu.

## Tallinn University of Technology (TalTech)

NOTE: Although there are other projects that aim to include citizens, the level of citizen involvement in those does not seem enough or cannot be determined.

- Bicification - a project to promote and map cycling in the city. Includes three cities - Tallinn, Istanbul and Braga.TalTech is the partner institution in Tallinn.
  Website: Bicification – increasing bicycle use in urban traffic | Tallinn, BICIFICATION - Bicification (bicification-project.eu)

- Ühtsed ruumid hariduses. Suletud ruumide läbimine ja ebavõrdsuste ümberpööramine (Educational Common Spaces. Passing through enclosures and reversing inequalities) - SMOOTH intends to introduce the emergent paradigm of the ‘commons’ as an alternative value and action system in the field of education for children and young people. The project critically draws out the implications of the commons for refiguring education and for social change in general, on a footing of equality, sharing, participation, togetherness, caring and freedom. The project will address social inclusion according to the ‘educational commons’, which we want to study, if they can operate as a catalyst for reversing inequalities, through a variety of methods such as pedagogical documentation, pedagogy of active listening, ethnography, discourse analysis. ETIS

- Vanad industriaalsed piirkonnad kui innovatsiooni ja linna transformatsiooni uued keskused (New Centralities in Industrial Areas as Engines for Innovation and Urban Transformation) - The EU-funded CENTRINNO project aims to develop and demonstrate strategies, approaches and solutions for the regeneration of industrial historic sites and areas as creative production and manufacturing hubs that stay true to the ecological challenges of our time. ETIS

## Kaunas University of Technology (KTU)

- *COST ACTION 15212 Citizen Science to Promote Creativity, Scientific Literacy, and Innovation throughout Europe* (CS-EU). (2016-2019). The main objective of this action was to gather capacities across Europe to explore and extend the scientific, educational, policy and citizen impact of citizen science, involving stakeholders from all relevant sectors to assess the potential of citizen science as a tool for social innovation and social and environmental transition. KTU was the partner in this project.
- *Citizen Science as an Innovative Form of Citizen Participation for Welfare Society Development (*CS4Welfare*)* (2020-2021). Project was funded by Research Council of Lithuania (RCL), under National Research Programme "Welfare Society". This project aimed to explore the potential of citizen science as an innovative form of engaging citizens in solving social problems of local communities and to develop recommendations for governmental institutions and other stakeholder groups. The results of the research have been presented not only to the academic community (through scientific publications and presentations at scientific conferences), but also to the general public by organising and participating in publicity events and by disseminating the results of the research in the Lithuanian media. KTU was coordinator of the project.
- *Supporting Sustainable Institutional Changes to Promote Citizen Science in Science and Technology* (TIME4CS). Project is funded under EU Framework Programme for Research and Innovation "Horizon 2020". TIME4CS aims to help the science ecosystem to be more responsive to society by supporting research organisations, i.e. research entities such as universities and research centres, in identifying and implementing institutional changes that can lead to a better and more effective involvement of citizens in research and innovation. KTU is taking part in the project as implementer.
- *Empowering Youth and Co-creating Social Innovations and Policy-Making Through Youth Citizen Social Science* (YOUCOUNT) (2021-2024). Funded by the EU Framework Programme for Research and Innovation "Horizon 2020". The project focuses on social inclusion for young people to participate in society, and explores issues of social participation, connectedness and social belonging. KTU is participating as project partner.
- *Promoting ocean and water literacy in school communities* (ProBleu) (2023-2026). ProBleu seeks to strengthen the connection between individuals and their local marine or freshwater environments to achieve this. To achieve goals project will apply citizen science methods, involving collaboration between educators and scientists. Project is funded under EU Research and Innovation Funding Programme "Horizon Europe" and KTU is acting as a project partner.

## Vytautas Magnus University (VMU)

- *Citizen Science for Urban Environment and Health* (CitieS-Health) (2019–2022). The aim of the project was to develop an effective citizen science model at the maximum collaboration level. The project developed citizen science projects in five diverse European cities (Barcelona, Kaunas, Ljubljana, Amsterdam, Lucca), assessing urban air and noise pollution, wood burning, urban design and mobility at local levels.
- *Increasing understanding of alien species through citizen science* (ALIEN-CSI) (2018–2023). The aim of the project is to increase understanding of alien species.

- *Baltic Engagement Centre for Combating Information Disorders* (BECID) (2022–2025). The primary objective of the project is to support the EU in its efforts to tackle disinformation in the three Baltic countries.
- *Encouraging citizens' involvement in Vytautas Magnus University's science campaigns by creating a favourable ecosystem for the use of citizen-generated data in research* (Vis.DuomUo) (2023–2025). The project aims to create an ecosystem at Vytautas Magnus University that is supportive of the use of citizen-generated data in research, its opening and management, thus involving citizens as much as possible in the research campaigns of Vytautas Magnus University.

## University of Latvia (LU)

- Activity "One day in Latvia" – main organizer the Faculty of Geography and Earth Sciences of the University of Latvia invited the citizens of Latvia to participate in the nature observation activity by sending the scientists pictures of seasonal natural processes – photos of trees: Mayday tree, birch, apple tree. The results were very good, as a total of 1435 photos from 365 places in Latvia were submitted.
- "Vietvārdu talka" and "Apvidvārdu talka" are dedicated for collecting toponyms. Latvia is one of the countries that, thanks to the tradition of independent farming, has been able to boast of a very magnificent and large set of place names. Latvian Language Institute of the University of Latvia (UL LLI) as main organizer takes care of developing the database and website, where every citizen can enter data on place names.
- HUMMA is a digital platform for humanities and arts that developed and maintained by the Institute of Literature, Folklore, and Art of the University of Latvia (LU LFMI). Certain modules of HUMMA are being developed in collaboration with other institutions. Such resources and results of citizen science projects are available through the platform, such as: garamantas.lv, literatura.lv, iesaisties.lv, womage.lv and others.
- The Institute of Mathematics and Computer Science of the University of Latvia (IMCS UL), the Institute of Literature, Folklore and Art of the University of Latvia (ILFA UL) patrticipates in the project balsutalka.lv – for collecting of Latvian voice samples for the development of speech technology.
- Series of activities from 2012 to 2018 "Moments until the 100th anniversary of the University of Latvia" during which identified, collected, selected, digitised and displayed at exhibitions materials about the history and traditions of the University of Latvia, including the study process, amateur artistic groups, sports achievements, library treasures, University personalities, while waiting for the University's 100-year anniversary. Initiator and main organizator was the Library of the University of Latvia and participants were current and former University of Latvia staff, graduates.
- The University of Latvia, Institute of Clinical and Preventive Medicine and Faculty of Medicine participates in the international project ROSiE – three-year project with mission to co-create with all related stakeholders novel practical tools to foster a responsible open science and citizen science.
- The Institute of Literature, Folklore and Art of the University of Latvia (ILFA UL) participated in a study on clarifying the situation of open science in Latvia in order to develop a policy roadmap initiated by the Ministry of Education and Science of the Republic of Latvia. As a result, a valuable report on citizen science was prepared.

The university also participates in and organises activities that help educate stakeholders and citizens about citizen science, such as

- distributing the information and inviting to use the BRITEC MOOC “A roadmap to citizen science Education” (by the University of Latvia, Interdisciplinary Centre for Educational Innovation),
- initiating informal discussion of scientific issues of interest to society by organising University of Latvia "Science Cafe" (by UL Academic Department in cooperation with the Department of Communication and Innovation,
- distributing the information on citizen science by organising activities during HELSUS knowledge festival, the European Researchers' Nights, the Library weeks, the Open Access weeks (by Library of the University of Latvia).

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