

**CITIZEN SCIENCE
IN CENTRAL AND EASTERN EUROPE**

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CITIZEN-ENHANCED OPEN SCIENCE IN SOUTHEASTERN EUROPE HIGHER EDUCATION KNOWLEDGE HUBS (CEOS_SE PROJECT)

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The Citizen-Enhanced Open Science in Southeastern Europe Higher Education Knowledge Hubs, CeOS_SE project, implemented from January 1, 2022, to January 1, 2025, sought to strengthen the capacity of Southeastern European (SEE) countries in Open Science (OS) and Citizen Science (CS). These regions have historically been less involved in major European scientific initiatives, including the European Open Science Cloud (EOSC). Led by LIBER¹ – the Association of European Research Libraries – the project united partners from Denmark, Croatia, Italy, Serbia, Greece, Bulgaria, and Cyprus. The initiative positioned libraries as central knowledge hubs tasked with mediating collaboration between researchers, students, community groups, and institutions. Throughout the project, libraries were recognized as critical actors capable of fostering citizen participation in scientific processes, thereby enhancing transparency, inclusiveness, and collective scientific literacy across the region.

A foundational contribution of CeOS_SE is the publication "Policy Recommendations for Sustainability and Connection to EOSC," (Vrčon et al., 2024)² which proposes a structured framework for integrating citizen-engaged practices into long-term institutional strategies. The recommendations highlight the strategic role of libraries in ensuring that citizen engagement becomes a sustainable and embedded component of scientific workflows rather than an isolated or experimental practice.

1 https://libereurope.eu/project/ceos_se-project-citizen-enhanced-open-science-in-southeastern-europe-higher-education-knowledge-hubs/

2 Vrčon et al., 2024. <https://zenodo.org/records/14923261>

Framework for Transfer of Knowledge and Innovation on citizen-enhanced open science (CeOS) (PR1)

The first objective established a shared foundation for knowledge transfer across the region. The resulting publication (Kaarsted, T. et al, 2023)³ underscored that there is no one-size-fits-all model for implementing CS in libraries. Kaarsted et al. (2022) argue that the diversity of library environments in SEE demands flexible approaches that respond to local needs, institutional maturity, and available expertise. The publication distinguishes between strategic recommendations, which focus on institutional vision and long-term planning, and operational recommendations, which guide everyday activities such as communication, training, and partnerships. This distinction is especially important in a region where libraries differ widely in capacities, infrastructure, and readiness to adopt CS-related responsibilities.

Report on implementation of citizen-enhanced open science in various open knowledge hubs in SE Europe (PR2)

The second objective focused on fostering collaboration among public, academic, and research libraries. Each project partner had to organize citizen science activity with their associated partner, public library of their choice. The study *Upscaling Collaboration Between Academic and Public Libraries for CeOS in SE Europe*⁴ emphasized three key elements: strategic integration of CS activities within library missions, advocacy for sufficient institutional support and resources, and mapping of partner skills to enable effective and sustainable collaboration. The findings demonstrate that libraries cannot operate in isolation when implementing CS activities. Instead, they must build networks that include NGOs, local authorities, community groups, and educational institutions. This collaborative approach ensures that CS initiatives are both relevant and impactful, reaching diverse community groups and fostering broader civic engagement with science.

3 Kaarsted, T. et al. (2023) How European Research Libraries Can Support Citizen-Enhanced Open Science. *Open Information Science*, 7(1), Article 20220146. <https://doi.org/10.1515/opis-2022-0146>

4 Mumelaš, D., Martek, A., Mučnjak, D. (2022) Upscaling collaboration between academic and public libraries for CeOS in SE Europe. Zenodo. Last modified December 8, 2022. <https://zenodo.org/records/7414551>

Report on implementation of CeOS activities and staff training for academic libraries (PR3)

The third objective sought to enhance competencies among academic and library staff by implementing CeOS activities across partner institutions. Each project partner had to organize two citizen science activities, learning by doing and train the trainers. The *Assessment Report on CeOS Activities at Partner Institutions*⁵ documented recurring challenges, such as limited citizen engagement and insufficient staffing. These challenges reflect broader structural issues faced by libraries in SEE, where financial constraints and limited workforce capacity often impede the adoption of innovative practices. Nonetheless, the assessment revealed a high level of motivation among librarians, who demonstrated curiosity, adaptability, and a strong commitment to advancing OS and CS. The report highlights the importance of well-designed training activities that incorporate relevant case studies, multi-stakeholder participation, and strong communication strategies. Effective communication emerged as a critical element for ensuring the success of both training events and CS activities.

Roadmap on CeOS in the Balkans (PR4)

The fourth objective resulted in the development of the *Roadmap on CeOS in the Balkans*⁶, which provides detailed guidance for organizing and evaluating OS/CS activities in the region. The roadmap identifies essential skills for librarians participating in CS initiatives, including communication competencies, analytical skills, pedagogical awareness, and proficiency with digital tools and social media. It also outlines strategic considerations such as forming long-term partnerships, integrating CS into institutional strategies, and prioritizing activities based on community needs. Operational recommendations include mapping researchers and ongoing projects, utilizing existing competences to avoid duplication, improving infrastructure and services, and incorporating CS components into educational programs. The roadmap's insights are applicable not only to libraries but also to independent organizations involved in OS/CS activities, making it a valuable resource for expanding citizen engagement across the Balkans.

5 Giglia, E., Cassella, M. (2023) Assessment report on CeOS activities at partner institutions. Zenodo. Last modified May 23, 2023. <https://zenodo.org/records/7962312>

6 Dakić, N., Trtovac, A. (2023) Roadmap on CeOS in the Balkans. Zenodo. Last modified August 31, 2023. <https://zenodo.org/records/8383149>

Uptake of citizen science in Higher education curricula and open science practice in SE Europe (PR5)

The fifth objective investigated the degree to which CS is incorporated into higher education curricula across SEE. The corresponding publication⁷ revealed that while awareness of OS is relatively balanced across institutions, CS remains underrepresented in formal teaching. Most students reported that they had not encountered CS concepts during their studies, despite expressing a strong interest in learning more about them. This disconnects points to a critical gap between emerging scientific practices and existing curricula. The findings underscore the need for higher education institutions to integrate CS more systematically into their programs. Furthermore, the authors developed a digital showcase featuring eight publicly accessible videos⁸ that demonstrate how CS can be incorporated into teaching practices. These resources serve as practical examples for educators seeking to introduce CS into their courses.

Policy change in CeOS for sustainability and impact – Connecting to the EOOSC (PR6)

The sixth objective focused on promoting policy change supported by evidence gathered throughout the CeOS_SE project. The publication Policy Recommendations for Sustainability and Connection to EOOSC⁹ outlines 12 recommendations that address education and training, societal impact, and the strategic use of CS as a tool for fostering scientific engagement. These recommendations highlight that sustainable adoption of OS and CS requires long-term planning, adequate resources, and alignment with broader European strategies such as EOOSC. They also emphasize the importance of framing CS as a means of strengthening societal trust in science, particularly in regions where scientific literacy and institutional transparency may be uneven.

7 Karaiskou, T., Tsakonas, G. (2024) Analysis of Current Practice in CeOS Uptake in Higher Education Curricula and Teaching Practice in Library Studies in SE Europe. Zenodo. Last modified April 11, 2024. <https://zenodo.org/records/10958592>

8 All videos are available on LIBER Europe youtube channel.

9 Vrčon, A. et al. (2024) Policy Recommendations for Sustainability and Connection to EOOSC. Zenodo. Last updated December 18, 2024. <https://zenodo.org/records/14923261>

Conclusion

The CeOS_SE project concluded with multiplier events across partner countries in 2024 and a final policy event in The Hague. These events played an essential role in disseminating project outcomes, engaging local communities, and encouraging institutions to adopt the project's recommendations. All project deliverables and related documentation are publicly accessible through the CeOS_SE Zenodo community¹⁰, ensuring ongoing availability and potential for further adoption. The project represents a significant step toward strengthening Open Science ecosystems in Southeastern Europe by empowering libraries, promoting citizen engagement, and connecting regional practices to European and global scientific developments.

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10 https://zenodo.org/communities/ceos_se/records?q=&l=list&p=1&s=10&sort=newest

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