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ÚJ SOROZAT



CITIZEN SCIENCE IN CENTRAL AND EASTERN EUROPE

A MAGYAR TUDOMÁNYOS AKADÉMIA
KÖNYVTÁRÁNAK KÖZLEMÉNYEI



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IN CENTRAL AND EASTERN EUROPE**

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**CITIZEN SCIENCE
IN CENTRAL AND EASTERN EUROPE**

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CONTENT

ISTVÁN MONOK Citizen Science: an opportunity for libraries to thrive in the 21 st century: Introductory thoughts	7
TOMISLAV IVANJKO Citizen Science in the 21 st century	11
DÓRA KALYDY Why is it different in Central-Eastern Europe?	33
Case studies (Croatia, Serbia, Hungary, Slovenia)	
ALISA MARTEK Citizen-Enhanced Open Science in Southeastern Europe Higher Education Knowledge Hubs (CeOS_SE Project)	39
DOLORES MUMELAŠ, SANJA JURKOVIĆ Citizen Science in Croatia with the emphasis on Working Group for Citizen Science in Libraries	45
NATAŠA DAKIĆ, ALEKSANDRA TRTOVAC Citizen Science Integration in Serbia: The Role of Libraries	55
DÓRA KALYDY The role of Hungarian libraries in spreading citizen science	63
ÁGNES KOVÁCSNÉ KORENY Citizen Science in Public Libraries: The Ráday Mihály Memorial Project	67
MITJA V. ISKRIĆ Implementations and Examples of Citizen Science Projects and Network in Slovenia: The Central Role of Libraries	77
Interviews with participants in Citizen Science projects	
Mihály Ráday Memorial Project	87
Musical Intelligence in the Service of National Heritage	92
From the Library to the City 2.0: Changing Urban Spaces: Mlinska Street	94



**CITIZEN SCIENCE:
AN OPPORTUNITY FOR LIBRARIES TO THRIVE
IN THE 21ST CENTURY**

Introductory thoughts

The Library of the Hungarian Academy of Sciences celebrates its 200th anniversary in 2026. It is well-known that libraries have always remained libraries throughout history and will continue to do so, but it is important that each generation of librarians reflect on the priorities of their work. We have many allies in our work, and those who organize private enterprises for library tasks by default (*eo ipso*) may not necessarily be working against librarians, but perhaps with the intention of helping them. However, libraries should never be viewed solely from the perspective of economic market players and market interests. If we take this extreme view, there will be cases where a country does not have a national bibliographic database, or where specific library tasks are outsourced to external companies and players in the business world. Library work has its own internal (*immanent*) practices and consensus-based rules, and accordingly, cooperation between libraries also has its own power. It is a force that establishes its own set of tasks in a changing economic and social environment.

The bicentennial is also encouraging the staff of the Library and Information Centre of the Hungarian Academy of Sciences to reformulate their strategic plan and, if necessary (and it is necessary), to amend their organizational and operational regulations. It is a warning sign that since the political changes in Central Europe, libraries have begun to be called many different names. Not libraries. One such name is "knowledge centre", followed by "study centre", then "study and information centre", or even "library and information centre". We could call these name variations useless, but it is okay if we think about it: society and our legal authorities may expect something else from us in our daily work than just "storing books." Of course, we can emphasize that we investigate what needs to be acquired, process the acquired collection, then preserve it, and provide information about it in many ways.

Since 1990, the tools of the information society have been developing in ways that are difficult or impossible for librarians to keep up with, and it is thanks to this technological development that we are able to perform our traditional librarian tasks much more efficiently, and our collections have been expanded

with digital copies or digitally created documents. The business world, which owns the information and data, may believe that they can provide users with information without libraries, but true service is based on cooperation with libraries.

Library work, which is often monotonous and does not offer many intellectual challenges, pays off. Libraries also own data assets, and they need to know how to make the most of this property. Libraries are now involved not only in scientometric measurements based on bibliographic accuracy, but also in teaching artificial intelligence. At least serious developers know that artificial intelligence based solely on the free flow of information on the internet can be nothing more than artificial stupidity. There is a need for verified, authentic data, all kinds of scientific texts in all languages.

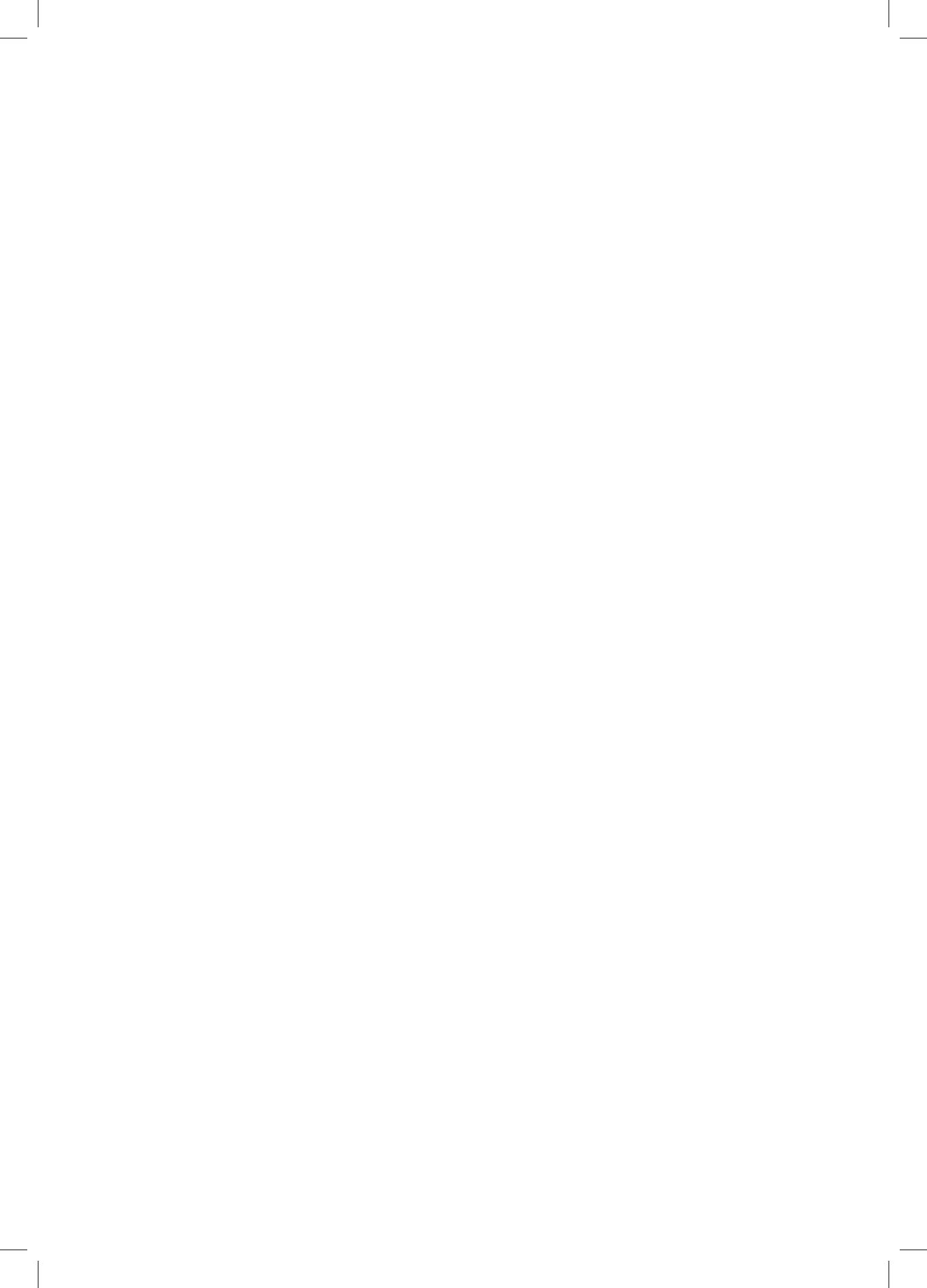
And this brings us to the importance of Open Science. To the importance of each aspect of this movement, namely Open Data, Open Access, and Citizen Science. It is no coincidence that these appear at the forefront of 21st-century library agendas, whatever colour they may be.

Citizen science leads us into a new world of collaboration with scientific workshops. Both librarians and citizens can learn a lot, get closer to the latest scientific findings, and participate in their creation. Scientists gain colleagues who can act as a bridge between the closed world of science and the way of thinking of everyday people, which is not limited by the internal regularities of scientific disciplines. Library work is becoming more valuable in this process, scientific work is entering society, and ideally, news of this collaboration and its results will even reach politicians who may understand its significance.

Libraries combine their traditional tasks with citizen science, facing new methods and new challenges. The preservation of cultural heritage elements undergoes a process of re-evaluation, introducing the preserved heritage elements to librarians, scholars, and the general public. We have almost reached the ideal world, Janopolis, the city that was dreamed up by early modern scholars as both the Earth and in the Heaven.

But we still have a lot of work to do—including in our citizen science activities.

István Monok
Director General





CITIZEN SCIENCE IN THE 21ST CENTURY

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Citizen science occupies an increasingly prominent position in contemporary research practice, yet its growth has been uneven, context-dependent, and shaped by diverse disciplinary needs rather than by a single coherent movement. The term encompasses a broad range of activities through which members of the public contribute to or collaborate in scientific research, overlapping with related concepts such as community science, participatory monitoring, and volunteer-based research (Shirk et al., 2012; Eitzel et al., 2017). Although these activities share certain principles, such as the involvement of non-professionals in knowledge production, they differ significantly in purpose, structure, and scope. Today, citizen science functions less as a unified paradigm and more as a family of related approaches responding to various scientific, social, and institutional developments (Haklay et al., 2021; Kullenberg and Kasperowski, 2016). Several factors explain why citizen science has gained traction in recent years. Advances in digital technology have enabled large-scale data collection and online collaboration, lowering barriers to participation and facilitating distributed observation, annotation, and analysis (Newman et al., 2012; Dickinson et al., 2012). Simultaneously, open science policies have increased attention to transparency, accessibility, and public engagement in research, creating institutional support for new forms of involvement (Fecher and Friesike, 2014; Ignat and Ayriss, 2020). In addition, many scientific domains face practical constraints that citizen participation can help address, particularly where extensive geographical coverage or long-term monitoring is required. The result is not a uniform shift in research practice but a gradual expansion of participatory approaches across a widening range of disciplines and policy arenas, including contributions to monitoring progress towards the Sustainable Development Goals (Fritz et al., 2019, Fraisl et al., 2020).

Historical perspectives are important for understanding this development. Public involvement in science is not new; amateur naturalists contributed to taxonomy, botany and ornithology throughout the nineteenth century, sometimes producing work comparable to that of professional scientists (Cooper et al., 2007; Miller-Rushing et al., 2012). What distinguishes current practices are their scale, formalisation, and the presence of explicit discourse around participation and governance. In the 1990s, two influential conceptualisations helped shape the field. Bonney and colleagues framed citizen science as a structured research method in which volunteers assist scientists by collecting data according to predefined protocols (Bonney et al., 2009). This model emphasised methodological clarity, efficiency, and the value of volunteer labour for large-scale inquiry. In contrast, Irwin (1995) argued that citizen science concerns the relationship between science and society more broadly, complementing wider work on public engagement and co-production (Jasanoff, 2003; Callon et al., 2001). He stressed that scientific knowledge is embedded in social contexts and that public engagement is necessary to ensure responsiveness to local concerns and democratic accountability (Jasanoff, 2003). These two lineages, one rooted in practical data-gathering needs, the other in reflexive understandings of science–society relations, continue to shape the field. Many citizen science projects today clearly follow the contributory model described by Bonney et al., relying on large numbers of volunteers to record species observations, submit environmental readings, or classify images (Bonney et al., 2016). Other projects, particularly in health, environmental justice, cultural heritage, and the social sciences, draw more heavily on Irwin’s vision and on critical perspectives that foreground power and equity. These projects involve citizens in framing questions, interpreting results, or negotiating research priorities, sometimes explicitly linking participation to advocacy or regulatory debates (Ottinger, 2010; Dawson, 2018). Rather than representing competing understandings, these models illustrate how heterogeneous citizen science has become and how different disciplines mobilise public participation for different purposes (Shirk et al., 2012; Eitzel et al., 2017).

This heterogeneity complicates efforts to define the field. Narrow definitions that restrict citizen science to data collection do not adequately represent participatory research in the humanities, local environmental activism, or community-led investigations (Haklay, 2013; Kullenberg and Kasperowski, 2016). Conversely, definitions broad enough to encompass all public involvement risk losing analytical precision and obscuring important differences between consultation,

collaboration, and co-creation (Eitzel et al., 2017; Shirk et al., 2012). For this reason, organisations such as the European Citizen Science Association have moved from prescriptive definitions to flexible characteristics that describe common features while allowing for disciplinary variation (ECSA, 2015; ECSA, 2020; Haklay et al., 2020). This approach reflects the pragmatic reality that citizen science is shaped as much by institutional, cultural, and technological contexts as by epistemic ones (Hecker et al., 2018; Vohland et al., 2021). Libraries provide a clear example of this context dependence. Their participation in citizen science initiatives has grown steadily, but the forms this involvement takes differ across public, academic, national, and research libraries (Ayrís and Ignat, 2018, Mumelaš et al., 2025). Public libraries often facilitate participation through community programmes, lending equipment such as radon detection kits, or hosting events related to local environmental monitoring (Stanifer et al., 2024; Vandegrift and Varner, 2013). Academic and research libraries support citizen science by providing data management expertise, training, and open science infrastructure, aligning their services with institutional strategies for public engagement (Ayrís and Ignat, 2018; Mumelaš et al., 2025). In cultural heritage settings, libraries coordinate large-scale transcription, annotation, and digitisation efforts, relying on citizen contributions to improve access to historical materials (Holley, 2010; Ridge, 2014; Dunn and Hedges, 2012). These examples demonstrate that libraries are not merely peripheral supporters but increasingly function as intermediaries connecting research institutions with diverse publics.

Despite these opportunities, citizen science presents several challenges that require careful consideration. Designing studies that are both accessible and methodologically robust can be difficult. Data collected by volunteers may vary in quality due to differences in training, equipment, or interpretation, necessitating clear protocols, calibration procedures, and validation mechanisms (Wiggins et al., 2011; Kosmala et al., 2016; Stevenson et al., 2021). Ethical considerations are equally important. Projects must address privacy, informed consent, data protection, and the potential for unintended consequences, especially when dealing with sensitive information or vulnerable communities (Resnik et al., 2015; Bowser et al., 2017; Phillips et al., 2014). Without thoughtful design, participatory initiatives risk becoming extractive, benefiting institutions more than participants, or reinforcing existing inequalities (Senabre Hidalgo et al., 2021; Tauginienė et al., 2020; Dawson, 2018). Evaluating citizen science introduces additional complexity. Scientific impact can be measured through

publications, datasets, or contributions to monitoring systems, but other effects, such as learning, behavioural change, community cohesion, or cultural value, require qualitative or mixed-method approaches (Bonney et al., 2016; Phillips et al., 2018). Frameworks developed by Kieslinger et al. (2018) and Bornmann (2013) emphasise multidimensional evaluation, recognising that citizen science generates a range of outcomes that cannot be captured by single indicators. Evaluation is not only retrospective but also important for project planning, helping researchers articulate goals, anticipate limitations, allocate resources effectively, and increasingly link project design to policy agendas such as the Sustainable Development Goals (Fraisl et al., 2020; Fritz et al., 2019).

Given these considerations, citizen science is best understood not as a single methodology but as a set of practices shaped by disciplinary norms, institutional structures, available technologies, and participant motivations (Hecker et al., 2018; Vohland et al., 2021). Its contribution lies in the range of possibilities it offers for collaboration, knowledge production, and public engagement, rather than in any universal promise of transformation. The field continues to evolve as new tools, infrastructures, and policy environments develop, and as institutions such as libraries experiment with ways to integrate participatory research into their services.

Participation and Citizen Science

Citizen science projects vary widely in how they involve members of the public, and understanding this variation is essential for interpreting what these projects can achieve and how they should be designed (Shirk et al., 2012; Haklay, 2013; Hecker et al., 2018). Participation is not a single act, but a spectrum of roles shaped by disciplinary conventions, institutional constraints, and the expectations of both researchers and citizens (Shirk et al., 2012; Vohland et al., 2021). Early work in the field focused on identifying discrete categories along this spectrum, producing typologies that link forms of participation to different rationales and project designs (Bonney et al., 2009; Shirk et al., 2012; Eitzel et al., 2017). Although these frameworks differ in terminology and emphasis, they serve a similar purpose: to clarify how labour, knowledge, and decision-making are distributed within participatory research. They also provide a basis for evaluating whether participation is appropriate to a project's goals and whether participants have the opportunity to make meaningful contributions,

including in areas such as education and public health (Jordan et al., 2011; Den Broeder et al., 2018). One of the most established models is from Bonney and colleagues, who distinguished between contributory, collaborative, and co-created projects (Bonney et al., 2009; Bonney et al., 2016). In contributory projects, still the most common form, professional researchers design the study and define the data requirements, while citizens primarily gather observations or complete structured tasks (Bonney et al., 2009; Dickinson et al., 2012). This model has proved effective for large-scale environmental monitoring and observational science, where distributed data collection is essential and a high level of standardisation is required. The collaborative model describes projects in which volunteers participate in additional phases, such as refining research questions, analysing data, or contributing to interpretation (Shirk et al., 2012). Co-created projects go further, involving citizens and scientists jointly throughout the entire research process. While less common in large-scale studies, co-created approaches are well suited to local or community-driven inquiries where scientists and citizens have shared stakes in the outcomes and where redistribution of decision-making power is an explicit goal (Tauginienė et al., 2020; Ballard et al., 2017). Shirk et al. (2012) expanded this model to include contractual and collegial forms of participation. Contractual projects begin when communities identify a problem and seek scientific expertise to address it. In these cases, the public initiates the inquiry, and researchers act as facilitators or consultants, a pattern also observed in "popular epidemiology" and community-based environmental health work (Brown et al., 2012). Collegial projects, by contrast, recognise that non-professionals can conduct research independently, producing knowledge that may or may not be integrated into academic science (Haklay, 2013). These categories make explicit what is often implicit in participatory work: participation is not always invited from above but sometimes emerges from below, driven by local concerns, personal interests, or community priorities (Ottinger, 2010). The distinction is particularly relevant in contexts such as environmental justice, cultural history, or public health, where communities mobilise scientific tools to address issues of direct relevance to their lives (Corburn, 2005; Dawson, 2018). Although useful, these classifications should not be interpreted as strict boundaries. Many projects combine elements from different categories, and participation often shifts over time as volunteers acquire skills or as new opportunities for engagement arise (Kieslinger et al., 2018). The richness of citizen science lies partly in this flexibility. For example, a project may begin with a contributory model to collect baseline data but later incorporate collaborative elements as volunteers become

familiar with the subject. Moreover, participants bring varied motivations, ranging from a desire for learning and enjoyment to personal concern for environmental or social issues (Jordan et al., 2011). These motivations influence not only how people engage but also how participation can be supported and sustained, with implications for learning outcomes and self-efficacy (Phillips et al., 2018; Ballard et al., 2017).

The relationship between participation models and expected contributions can also be examined through the nature of the tasks involved. Many citizen science activities rely on relatively simple, rule-based interactions such as identifying species, classifying images, or transcribing text (Newman et al., 2012; Wiggins and Crowston, 2011). These tasks require consistency and scale rather than specialised expertise, although volunteers often develop expertise over time. In cultural heritage and library contexts, citizen science tasks commonly involve transcription, annotation, metadata creation, or the enhancement of digital collections (Holley, 2010; Ridge, 2014). Such tasks allow members of the public to engage deeply with historical material while simultaneously contributing to scholarly research and collection enhancement. They also demonstrate how citizen science intersects with digital humanities, where collaborative knowledge production is already well established (Terras, 2016; Causer and Terras, 2014). Other participatory models involve more interpretive or creative work. Community-led environmental monitoring may require volunteers to observe changes in local habitats, identify potential causes for these changes, or contribute to designing data collection strategies (Fraisl et al., 2020). In health-oriented projects, participants may help formulate questions about environmental exposures or public health risks, drawing on local knowledge or lived experience (Den Broeder et al., 2018). These forms of participation blur the line between scientific and experiential expertise and reflect broader debates about whose knowledge is valued in research (Irwin, 1995; Jasanoff, 2003). They also highlight the importance of context: a project focused on biodiversity monitoring in a national park may have very different participation dynamics from an urban air quality project led by community activists (Kimura and Kinchy, 2016). The distribution of tasks has methodological implications. Projects that rely on simple, repetitive tasks must ensure accessibility, clarity, and consistency. Design choices, such as the presentation of instructions, the structure of interfaces, and the provision of examples, affect data quality and participant experience (Wiggins et al., 2011; Kosmala et al., 2016). In these cases, researchers often standardise methods, provide training materials, and

implement validation mechanisms to minimise errors (Stevenson et al., 2021; Balázs et al., 2021). In contrast, co-created or interpretive projects require deliberative processes, iterative discussion, and negotiation of priorities. Here, participation becomes more relational, and the success of the project depends on trust, communication, and shared ownership rather than technical standardisation (Bonney et al., 2016; Senabre Hidalgo et al., 2021; Kieslinger et al., 2018).

Understanding participation also requires attention to the institutional and social environments in which projects take place. Libraries, for example, support a wide range of participatory activities, but do so within frameworks shaped by educational missions, public service goals, and resource constraints (Ayrís and Ignat, 2018). Public libraries may focus on activities that support community engagement, digital inclusion, or local history, while academic libraries may integrate citizen science into open science services or research support infrastructures (Pandey et al., 2020; Vandegrift and Varner, 2013). In both cases, the type of participation encouraged is influenced by institutional priorities and the resources that can be devoted to the work (Hecker et al., 2018; Ryan et al., 2018). This institutional perspective highlights an important, sometimes overlooked, aspect of citizen science: participation is not only a relationship between individuals and scientific projects, but also between institutions and communities (Hecker et al., 2018; Vohland et al., 2021). The roles and expectations of participants are shaped by how institutions frame the project, communicate its goals, and organise its activities (Fraisl et al., 2023; Skarlatidou and Haklay, 2020). For example, a library-led transcription initiative may emphasise learning, cultural heritage, and community identity, while a university-led environmental project may emphasise data accuracy, standardisation, and scientific outcomes. The framing affects who participates, how they engage, and what they consider meaningful contributions (Bonney et al., 2016; Dawson, 2018).

The temporal dimension of participation is equally important. Some citizen science initiatives require sustained engagement over long periods, such as repeated biodiversity surveys or multi-year environmental monitoring. Others involve episodic or short-term involvement, such as one-off digitisation events or seasonal data campaigns (Dickinson et al., 2012; Newman et al., 2012). The sustainability of participation depends on the alignment between project demands and volunteer capacity, the availability of support structures, and the presence of meaningful feedback (Phillips et al., 2018; Jennett et al., 2016).

Volunteers are more likely to remain engaged when they see the value of their contributions, receive timely updates on project progress, and feel connected to the broader purpose of the work (Robinson et al., 2018; Jennett et al., 2016). This creates a feedback loop: well-designed participation fosters motivation, which in turn supports data quality and project continuity.

While typologies are useful for mapping the field, they do not fully capture the informal or emergent forms of participation that arise spontaneously. Social media platforms, for example, enable ad hoc sharing of observations, images, or local knowledge, sometimes outside formal project structures (Newman et al., 2012). These contributions may be incorporated into research, raising questions about what counts as citizen science and how boundaries between formal and informal participation should be defined (Eitzel et al., 2017; Skarlatidou and Haklay, 2020). Similarly, some community-led initiatives do not use the term "citizen science" at all, yet their activities involve systematic observation, data collection, or interpretation (Kimura and Kinchy, 2016; Corburn, 2005). These examples further highlight that participation in science often extends beyond named projects and institutional frameworks.

Taken together, these perspectives show that participation in citizen science is multi-layered and context-dependent. Its forms are shaped by task structures, disciplinary norms, participant motivations, institutional environments, and the histories of the communities involved (Hecker et al., 2018; Vohland et al., 2021; Fraisl et al., 2023). Participation frameworks provide a vocabulary for describing this diversity, but they should not be used prescriptively. Instead, they serve as tools for reflection, helping researchers and institutions design activities that are appropriate, ethical, and aligned with project goals (Shirk et al., 2012; Den Broeder et al., 2018). They also help clarify expectations for participants, enabling them to understand their roles and the potential significance of their contributions. The next important area of citizen science research is addressing methodological considerations. While participation structures describe who is involved and in what capacities, methodological frameworks outline how citizen science projects are organised, how data are produced, and what types of infrastructures and governance arrangements are needed to support them (Hecker et al., 2018; Skarlatidou and Haklay, 2020). Methodology influences not only scientific outcomes but also participant experience, ethical robustness, and the long-term sustainability of citizen science (Kieslinger et al., 2018; Ryan et al., 2018).

Methodological Considerations: Designing and Sustaining Citizen-Science Practice

Methodology in citizen science is shaped by the need to coordinate contributions from individuals who differ widely in expertise, interests, time availability, and digital skills (Hecker et al., 2018; Vohland et al., 2021). Unlike laboratory research, where conditions are tightly controlled, citizen science projects occur across distributed environments such as homes, public spaces, online platforms, and community institutions, creating methodological challenges that require flexibility and adaptation (Haklay, 2013). These challenges must be addressed through careful planning, iterative design, and ongoing support, directly affecting both data quality and participants' sense of efficacy and engagement (Kosmala et al., 2016; Jennett et al., 2016). Because citizen science merges scientific goals with public engagement, methodological design must balance rigour, accessibility, and ethical responsibility (Hecker et al., 2018; Tauginienė et al., 2020).

A defining feature of citizen science methodology is its iterative nature. Many projects start with modest pilot phases in which researchers test protocols, digital tools, and instructions, using volunteer feedback to refine methods (Haklay, 2018; Jennett et al., 2016; Kosmala et al., 2016). An iterative approach and rapid prototyping are especially important for technology-enabled projects and for engaging under-represented or digitally less experienced participants (Haklay, 2018). As projects expand or reach new participant groups, further adaptations are often necessary, reflecting a pragmatic commitment to responsiveness and context (Vohland et al., 2021). Effective citizen science practice often depends on training to support both research-quality outcomes and participant confidence (Jennett et al., 2016; Tauginienė et al., 2020). This also includes the institutional support required for long-term project sustainability. Libraries are particularly well placed for digital upskilling, information literacy training, and providing the community infrastructure essential for sustained engagement (Ayrís and Ignat, 2018; Mumelaš and Martek, 2024). Research on citizen labs and similar initiatives shows that local contexts and partnerships are vital for scaling up and making capacity building more inclusive.

Data collection in citizen science must prioritise clarity, compatibility, and quality assurance. Researchers typically develop detailed protocols to standardise data gathering, clarify instructions, set boundaries for acceptable variation, and promote multimodal communication (Kosmala et al., 2016;

Stevenson et al., 2021; Haklay et al., 2021). Data-validation mechanisms such as expert review, algorithmic checks, and triangulation across contributors further enhance reliability; their design depends on whether the data are observational, sensor-based, or text-based (Kosmala et al., 2016; Stevenson et al., 2021). Crowdsourced annotation and transcription projects frequently use staged review or peer evaluation to ensure high quality (Holley, 2010). Digital infrastructure, especially user-friendly and accessible interfaces, is now central to participatory science (Hecker et al., 2018; Kosmala et al., 2016). Web-based, mobile, or dashboard platforms not only support participation but also provide communication, feedback, and community-building, making achievements visible and supporting retention (Jennett et al., 2016; Holley, 2010). Ethical and data-governance demands are increasing. Citizen science data should follow FAIR principles (findable, accessible, interoperable, and reusable), but this must be balanced with respect for contributors' privacy and autonomy, especially in projects dealing with health, environmental, or geolocated data (Tauginienė et al., 2020; Senabre Hidalgo et al., 2021). Securing informed consent, anonymisation, and clear licensing are essential practices, for which libraries and trusted community partners are often critical facilitators (Ignat and Ayrís, 2020; Mumelaš and Martek, 2024).

Participant management methods must align with the participation model and project goals. Recruitment, communication and support are essential throughout the project cycle, as are strategies tailored to either large, contributory projects (such as open public calls or partnerships) or small-scale, co-created studies (Haklay, 2013; Robinson et al., 2018). Retention, motivation and recognition depend on feedback, community building and visible impact (Jennett et al., 2016; Robinson et al., 2018). Ethics also require recognising and addressing power differentials. Extractive models that disregard volunteer input are increasingly critiqued, and best practice involves mechanisms for real agency, shared decision-making and recognition (Senabre Hidalgo et al., 2021; Tauginienė et al., 2020). Long-term sustainability is more likely when projects are embedded in institutions such as libraries, enabling continuity across funding cycles, and when protocols, documentation and governance are open and transparent (Ayrís and Ignat, 2018; Mumelaš and Martek, 2024). Rigorous, responsive methodology shapes both the scientific and social outcomes of citizen science. The long-term value— scientific, educational and communal — depends on adaptive experimentation, quality assurance and genuine partnership with participants (Hecker et al., 2018; Vohland et al., 2021; Tauginienė et al., 2020).

Evaluation, Evidence and the Question of Impact

Evaluating citizen science is essential for understanding what these projects achieve, how they compare to other research methods, and how they contribute to broader scientific and societal objectives (Kieslinger et al., 2018; Roche et al., 2020). Despite the importance of evaluation in contemporary research governance, citizen science projects vary widely in how they are assessed. This variation arises from the heterogeneity of the field: projects operate at different scales, pursue different goals, use different types of data, and engage participants in various ways. Consequently, evaluation cannot rely on a single set of metrics. Instead, it requires a pluralistic approach that recognises the diversity of outputs and outcomes that citizen science can produce, including scientific, educational, behavioural, cultural, and community effects (Kieslinger et al., 2018; Phillips et al., 2018; Auerbach et al., 2019; Tauginienė et al., 2020). Evaluation frameworks must therefore accommodate scientific, educational, cultural, and community dimensions, while acknowledging that not all projects aim to achieve all forms of impact (Wehn et al., 2021). The challenge is to design evaluation strategies that are both feasible and sensitive to project-specific characteristics, and to integrate them into planning from the outset rather than adding them retrospectively.

Scientific evaluation often focuses on data quality because concerns about reliability have traditionally shaped perceptions of citizen science. For many years, scepticism about public participation centred on the belief that non-professionals might produce inconsistent or inaccurate data. However, research increasingly shows that volunteers can generate high-quality contributions when supported by clear protocols, training materials, and validation mechanisms (Kosmala et al., 2016; Wiggins et al., 2011; Stevenson et al., 2021). The rigour of data produced in citizen science is influenced by several factors: the clarity of sampling instructions, the usability of data-collection tools, the presence of calibration procedures, and the extent to which projects incorporate verification steps (Kosmala et al., 2016). Some initiatives use multiple volunteers independently assessing the same phenomenon to identify discrepancies, while others rely on expert review or algorithmic tools to flag anomalous data (Danielsen et al., 2014). This combination of methodological design and quality-control practices allows citizen science data to be used reliably in ecological monitoring, biodiversity assessments, cultural heritage analysis, and other fields requiring structured inputs. Scientific impact is not limited to data quality. Many citizen-

science projects contribute to peer-reviewed publications, improve datasets used in long-term monitoring programmes, or generate tools and protocols that support future research (Cooper et al., 2014; Auerbach et al., 2019). In cultural-heritage contexts, large-scale manuscript transcription initiatives produce annotated corpora that enable new forms of historical, linguistic or archival analysis (Holley, 2010; Ridge, 2014). These contributions illustrate that citizen science can support both incremental and transformative research outcomes. However, the value of these outputs depends on how well they are documented, curated and integrated into institutional or disciplinary infrastructures. Without adequate documentation, even high-quality datasets may have limited long-term utility. This is why many institutions, including libraries, play an important role in ensuring that data adhere to FAIR principles (Shirk et al., 2012). FAIR-compatible data management increases the likelihood that citizen-science outputs will be preserved, shared and used beyond the lifespan of individual projects.

Another dimension of evaluation concerns participants' experiences. Citizen science is often justified partly by its educational benefits, but these benefits cannot be assumed. Projects vary considerably in how much they support learning, facilitate skill development, or deepen public understanding of scientific processes. Studies indicate that well-designed initiatives can enhance scientific literacy, foster critical thinking, and encourage sustained interest in scientific topics (Jordan et al., 2011; Bonney et al., 2016; Roche et al., 2020). Engagement with data collection or analysis provides opportunities for volunteers to learn about research methods, disciplinary concepts, or broader environmental and social issues. However, learning does not occur automatically; it is more likely when projects provide adequate explanations, contextual information, and opportunities for reflection, supported by embedded assessment and explicit learning goals (Phillips et al., 2014; Phillips et al., 2018; Falk et al., 2012). In this respect, libraries are often effective facilitators because they are already equipped to support structured learning environments and provide educational materials to participants (Ayris and Ignat, 2018; Mumelaš and Martek, 2024). Behavioural and psychological impacts are also relevant. Participation may foster a sense of agency, enabling individuals to feel they can contribute meaningfully to research or community decision-making, and may encourage more sustainable behaviours or conservation actions in environmental contexts (Bonney et al., 2016). In environmental and health-related projects, involvement can increase awareness of ecological or public health issues, influence attitudes,

and sometimes support changes in everyday practices (Den Broeder et al., 2018). This type of impact is difficult to measure, often requiring self-report surveys, interviews, or longitudinal studies (Phillips et al., 2018; Auerbach et al., 2019). Recent work has also highlighted links between participation, connection to nature, and mental wellbeing, suggesting that citizen science activities can have psychological benefits in addition to cognitive and behavioural ones (Beatty et al., 2025). Nonetheless, even where formal evidence is limited, many volunteers report a greater sense of connection to scientific processes and a heightened interest in the issues addressed by the project.

Social and community impacts are more diffuse but can be significant. Some citizen-science projects strengthen community networks, especially where participation is organised through local institutions such as libraries, schools or community centres (Corburn, 2005; Kimura and Kinchy, 2016). Group monitoring events, transcription meetups or community workshops create opportunities for social interaction and collective learning. In areas affected by environmental hazards, citizen science can empower communities to gather evidence, articulate concerns and engage with policymakers (Den Broeder et al., 2018; Haklay, 2018). For example, library-lending programmes involving radon detection kits not only provide equipment but facilitate community discussions about health risks and environmental awareness (Stanifer et al., 2024). In cultural-heritage settings, crowdsourced transcription or annotation can increase public engagement with local history, strengthen connections to cultural institutions and enhance the visibility of archival materials (Ridge, 2014; Dunn and Hedges, 2012; Ting and Jeng, 2023). These forms of impact are not always easy to quantify but are essential for understanding how citizen science contributes to social cohesion and cultural value. Kieslinger et al. (2018) propose a multidimensional framework that assesses scientific, participant, and socio-ecological or socio-economic impacts, emphasising both processes and outcomes. This model recognises that effective training, ethical communication, and transparent data governance are necessary preconditions for meaningful outcomes. Similarly, Bornmann (2013) distinguishes between scientific and societal impact, arguing that different kinds of evidence are needed for each, while Auerbach et al. (2019) introduce a practical tool for planning and assessing the range of outputs produced by citizen science projects. Scientific impact may be assessed through publications, data quality, or contributions to monitoring systems, while societal impact may require interviews, case studies, media analysis, or policy tracking (Bornmann, 2013; Wehn et al., 2021). These

frameworks encourage researchers to articulate evaluation strategies early in project planning, rather than treating evaluation as an afterthought, and to select indicators that align with their specific goals. Participatory evaluation offers an alternative approach, including participants, community organisations, and institutional partners in designing and interpreting evaluation processes. This approach recognises that participants may have different understandings of what constitutes success or value in a project. Engaging them in evaluation ensures their perspectives are represented and helps to avoid top-down assessments that overlook community priorities (Den Broeder et al., 2018; Wehn et al., 2021). Participatory evaluation is particularly relevant for co-created or community-led projects, where relational dynamics and shared ownership are central, and where evaluation can serve as a form of capacity building and empowerment (Senabre Hidalgo et al., 2021; Tauginienė et al., 2020).

Despite the availability of frameworks, evaluation remains challenging. One reason is that citizen science projects vary widely in scale and resources. Some are large, well-funded initiatives with dedicated evaluation teams and long-term support, while others are small, volunteer-driven efforts with limited capacity for systematic assessment (Auerbach et al., 2019; Wehn et al., 2021). Evaluation also requires expertise that not all research teams possess, especially when assessing learning outcomes, community impact, or behavioural change (Phillips et al., 2018; Roche et al., 2020). Furthermore, attributing observed outcomes to participation can be difficult. For example, changes in environmental awareness may result from participation, external events, or pre-existing interests; separating these influences requires careful study design, which may not always be feasible. Another challenge concerns the risk of relying on superficial metrics. Counting the number of participants or the volume of data collected provides some information but does not capture the depth or quality of engagement (Phillips et al., 2019; Wehn et al., 2021). Overemphasis on numerical indicators may create distorted incentives, leading projects to prioritise recruitment over meaningful involvement. Relying solely on quantitative metrics may also disadvantage projects that focus on interpretive or relational outcomes, such as cultural heritage engagement or community empowerment. A balanced approach requires combining quantitative evidence with qualitative insights that capture the nuances of participation, such as interviews, observations, or reflective exercises (Rowe et al., 2016; Roche et al., 2020). Ethical considerations also intersect with evaluation. Assessing participant experience or community impact may require collecting personal or sensitive information, which demands

careful attention to privacy, consent, and fair representation (Bowser et al., 2017; Phillips et al., 2014). Furthermore, evaluation processes must avoid reinforcing inequalities. If outcomes are measured solely from an institutional perspective, the experiences and priorities of participants may be overlooked (Boucher et al., 2021; Skarlatidou and Haklay, 2020). Ethical evaluation therefore requires reflexivity: acknowledging potential biases, ensuring transparency in methodology, and respecting the autonomy and perspectives of volunteers (Senabre Hidalgo et al., 2021; Tauginienė et al., 2020).

Despite these challenges, evaluation contributes significantly to the sustainability of citizen science. Projects that demonstrate clear scientific or social value are better positioned to secure ongoing support from institutions, funders, or community partners (Hecker et al., 2018). Evaluation articulates the relevance of citizen science within broader open science and public engagement strategies, reinforcing its place within institutional landscapes (Wehn et al., 2021; Vohland et al., 2021). Libraries, in particular, benefit from evaluation because it provides evidence that citizen science services align with their missions in digital literacy, cultural preservation, and community engagement (Ayrís and Ignat, 2018; Mumelaš and Martek, 2024). As a result, evaluation not only measures impact but also helps embed citizen science into long-term organisational planning. Ultimately, the role of evaluation is not merely to justify citizen science but to improve it. By identifying strengths and weaknesses in design, communication, governance, and support, evaluation provides feedback that strengthens future initiatives (Auerbach et al., 2019). Because citizen science is an evolving field, it benefits from reflective and adaptive approaches that respond to changing contexts, technologies, and community needs (Hecker et al., 2018; Roche et al., 2020). Evaluation thus functions as both a mirror and a map: it reflects what has been achieved and helps chart pathways for future development.

Conclusion

Citizen science today includes a wide range of activities involving non-professionals in scientific inquiry, shaped by local contexts, disciplinary norms, and institutional arrangements. Rather than constituting a unified paradigm, citizen science serves as an adaptable framework supporting various research goals and forms of public engagement, as reflected in evolving descriptions such as the ECSA Characteristics of Citizen Science. The preceding sections have shown how this diversity is structured: participation models describe how

labour and decision-making are distributed; methodological considerations explain how projects are organised, supported, and governed; and evaluation frameworks account for the many different forms of impact that citizen science may generate. Together, these dimensions show that citizen science is as much a methodological orientation as a set of practices, linking epistemic, social, and institutional concerns.

A central theme throughout the chapter is that citizen science depends on careful design. Projects involving volunteers must balance accessibility and rigour, making scientific tasks understandable without compromising data quality – an issue highlighted in discussions of "citizen science frontiers" and human–machine systems. Achieving this balance is not straightforward; it requires iteration, testing, and the ability to adjust protocols as projects develop in response to participant feedback and contextual changes. Capacity building is equally important. Volunteers bring diverse motivations and experiences, and sustained engagement depends on clear communication, adequate training, and meaningful feedback, including embedded assessment of learning and engagement. Institutions such as libraries often play a critical role, providing infrastructure, digital literacy support, and community spaces where citizen science can take root and be sustained over time. Ethical considerations are also a key component of sustainable practice. Citizen science often relies on data collected outside controlled research environments and sometimes involves sensitive personal or environmental information, particularly in health and environmental justice contexts. Ensuring privacy, securing informed consent, managing data responsibly, and fostering equitable participation are therefore essential, especially where power relations between institutions and communities are unequal. These ethical requirements are not obstacles to participation but integral elements of responsible research design. Projects that invest in ethical communication, shared expectation-setting, and collaborative decision-making tend to build stronger relationships with participants and more durable forms of engagement.

Evaluation enables understanding of what citizen science projects achieve and how they contribute to broader scientific and societal goals. As the field is heterogeneous, evaluation must accommodate various types of evidence, from quantitative measures of data quality and scientific outputs to qualitative accounts of learning, cultural value, or community empowerment. Evaluation serves both accountability and improvement: it demonstrates impact to funders

and institutions while providing insights to refine future projects, especially when integrated as embedded assessment rather than added retrospectively. For libraries and other public institutions, evaluation also strengthens the case for incorporating citizen science into long-term strategies for open science, public engagement, and community development, showing how projects align with missions related to equity, inclusion, and civic participation.

Taken together, the arguments presented in this chapter emphasise that citizen science should be understood not only as a mode of data collection, but as a collaborative process grounded in methodological design, ethical responsibility, and reflective assessment. Its value lies in the opportunities it creates for scientists, institutions, and communities to work together on issues of shared concern, producing knowledge that is both scientifically robust and socially meaningful. As the field continues to evolve, the challenge will be to sustain the balance between maintaining scientific standards and fostering accessible, inclusive participation that reflects the diversity of the public involved and addresses emerging questions about who participates, whose knowledge is valued, and how benefits are distributed.

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WHY IS IT DIFFERENT IN CENTRAL AND EASTERN EUROPE?

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The aim of this volume is to present citizen-science projects from parts of the Central–Eastern European region. Tomislav Ivanjko’s study clearly shows that there is no universal or precise methodological description for a citizen-science project, as each project depends on many factors. However, we all agree that the role of libraries in citizen-science initiatives is indisputable. We have recognized the opportunities, but we also face many challenges when participating in individual projects. The role of libraries varies greatly, yet our most vital task remains reaching, recruiting, and motivating volunteers. Our existing networks of readers, visitors, and researchers provide a unique platform to introduce ongoing projects, and we are generally convinced that few would resist our call. Although regional statistical data is still being collected, personal experience confirms that our primary challenge is the low level of interest among citizens.

The question, then, is why it is difficult to engage volunteers, or why it is more difficult here than in the “more fortunate” parts of Europe beyond the former Iron Curtain. The answer is clear to us, but we wish to emphasize it to our colleagues as well, to raise awareness of our historical background—something we will certainly carry with us for some time.

Before we get into why it is difficult to recruit volunteers in our region, it is important to point out that in Central and Eastern Europe, volunteers motivated by scientific curiosity began participating in scientific observations at around the same time, if not earlier. Many fields of science that are now considered official owe their existence to the participation of volunteers in the 19th century. One typical example is meteorology. In Hungary, Ágost Heller published his call for thunderstorm observations in 1881 in the *Természettudományi Közlöny* (Natural Science Gazette), in the *Levélszekrény* (Letter Box) section (volume 13, issue 142)¹. He outlined the observation methods in 13 points.

1 Zivatarok statisztikája érdekében, *Természettudományi Közlöny*, 142(1881), 13. évf., 277.

In accordance with the "rules" of citizen science accepted today, two years later he repeated the call in the columns of *Természettudományi Közlöny*², thanking the volunteers who sent in data and highlighting those who sent the most complete descriptions by name, occupation, and location. Among those who documented thunderstorms and lightning strikes were school teachers, clergymen, high school teachers, and pharmacists. We could list many other examples of scientific research involving volunteers in the 19th century, but one example is enough to illustrate the common roots of the people living in the Austro-Hungarian Monarchy at that time than other citizens of Europe.

In order to engage colleagues, volunteers, and researchers with appropriate sensitivity, we must understand the closed nature of society and the scepticism of researchers. A few articles examine volunteering behaviour after the political transitions of the 1990s. Sociological studies clearly confirm that the number of volunteers is significantly lower in post-communist countries (Voicu, Bogdan – Voicu, Malina 2009). It should be acknowledged that in the 21st century the societies are not at the same position as the Western communities; therefore, it is understandable that libraries in Central–Eastern Europe cannot easily "compete" with their Western counterparts.

We do not need to look far into the past. There is still a generation alive today that experienced firsthand the less pleasant aspects of the 20th century. In terms of voluntary assistance and work, the most memorable examples were those forced upon the population and labelled as social or voluntary activities. These include forced collectivization, the elimination of charitable organisations, the destruction of church communities, and compulsory community service such as the so-called "subbotniks" (Red Saturdays). Even in the 1980s, every other Saturday was officially a working day, and on free Saturdays people were required to participate in community work-activities unrelated to their actual profession and usually organised by the Communist Party branch at their workplace. In schools, these activities were organised by the Pioneer Movement. Because volunteering was associated with coercion and ideological manipulation, public trust in volunteer organisations collapsed after the fall of communism.

In the 1980s, a silent change could be seen, mainly secretly, but there were groups who volunteered in Hungary to be part of a "research" project, although at that time they probably did not know about the future value of their dedication.

2 Heller Ágost, Zivatarok statisztikája érdekében, *Természettudományi Közlöny* 166. (1883), 15. évf., p. 285. https://real-j.mtak.hu/6578/1/TermtudKozl_1883.pdf

The Social Theory Collection (Társadalomelméleti Gyűjtemény) of the Klebelsberg Library at the University of Szeged³ was established in 1985 by a few young lecturers and students of the Faculty of Humanities at the former University of Szeged with the aim of collecting social theory, ideological and political history, "emigrant" and "samizdat" publications, manuscripts, handwritten translations, memoirs, and research background materials concerning the history of Hungary and Central and Southeastern Europe in the 20th century. Volunteers, usually university students, collected and in many cases copied manuscript materials in the former Yugoslavia and Romania, and gathered political leaflets, which are now indispensable documents and an integral part of university research and education.

In the early transition period, many NGOs were created mainly due to external donors (e.g., the World Bank) or international charitable organisations (Rotary, Lions' Club, Zonta, Order of Malta, Red Cross). When these external actors later withdrew, many organisations became inactive and existed only on paper. For at least two generations, the concepts of voluntarism and charity were either eradicated or carried pejorative connotations. The parents of Generation Z did not have the opportunity to grow up with established traditions of volunteering and charity in the same way as their Western European peers (Silló 2016). In Central and Eastern Europe, volunteering has little value – or at least far less value – than in the West. This situation can only be changed gradually, and it is not certain that the "compulsory" community service required in Hungarian high schools (Act CXC of 2011 on National Public Education) is the most effective way to motivate young people, since it also represents an obligation. Students over the age of 16 must choose and complete 50 hours of community service. Nevertheless, volunteering is slowly becoming more popular among young people, and both researchers and practitioners observe growing interest—especially in sustainability and environmental issues.

Studies also highlight that in countries where average incomes are low—lower than in Western Europe—people are far less likely to volunteer, even when the citizen-science project matches their interests. Volunteers are generally better educated in both Western and Central–Eastern Europe, but incomes in our region still lag significantly behind Western salaries, particularly in the humanities, where many individuals need to take on additional work to

3 <https://www.ek.szte.hu/kezdooldal/mit-keres/kulongyujtemenyek/tarsadalomelméleti-gyujtemeny/a-tarsadalomelméleti-gyujtemenyrol/>

maintain their standard of living. This means that even if someone considers a citizen science research project important, they will not sacrifice their free time for "unpaid work" because they need to earn money.

Volunteer centres scarcely exist in Central–Eastern Europe, as local governments have not assumed this role. This gap presents an opportunity for libraries, which can fill an important function in community life. Experience also suggests that citizen engagement is most effective when connected to local, place-based initiatives—an opportunity that organisers of citizen-science projects should exploit. There is one excellent example of a Citizen Science Hub in the region, it is in Slovenia: the Central Technical Library at the University of Ljubljana operates the national Citizen Science Hub. <https://citizenscience.si/en/> The website provides comprehensive information and presents Slovenian citizen-science projects. Three full-time colleagues are responsible for operating the Hub, organising training sessions and workshops, and coordinating project participants.

Volunteering has not always carried negative connotations in Central–Eastern Europe. In the 19th century, many civic and aristocratic initiatives produced benefits that remain visible today. This volume is being published as part of the bicentennial celebrations of the Library and Information Centre of the Hungarian Academy of Sciences, and we cannot overlook the fact that the Academy itself – and its Library – were founded through voluntary donations. This fact also confirms our belief that, libraries are institutions that serve as trusted and engaged hubs, providing support and security even for uncertain but interested volunteers of citizen science projects.

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CASE STUDIES
(CROATIA, SERBIA, HUNGARY, SLOVENIA)



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 EOSC (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 EOSC*⁹ 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 EOSC. 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., Tsakonias, 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 EOSC. 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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- Thomas Kaarsted 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>
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10 https://zenodo.org/communities/ceos_se/records?q=&cl=list&p=1&s=10&sort=newest

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

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CITIZEN SCIENCE IN CROATIA WITH THE EMPHASIS ON WORKING GROUP FOR CITIZEN SCIENCE IN LIBRARIES

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Citizen science entered the Croatian context primarily through non-governmental organization (NGOs), led by IRIM's Croatian Makers movement launched in 2014. After *STEM Revolution* projects equipped schools and libraries with micro:bit sets and training, IRIM expanded on this with *Digital Libraries for Local Development – DL4LD* in 2019, emphasizing the citizen science concept. This resulted in an atmospheric station across 100 Croatian and 5 Swiss libraries, forming a nationwide ecological monitoring network. In 2021, *Citizen Science: Measuring and Observing Seas* project engaged nearly 200 institutions with underwater drones for continuous monitoring and documenting of the Adriatic temperature and marine environment.¹ All of the activities were complemented by their free educational web portal *Izradi!*, and the recently published *Citizen Science Handbook* (2020).²

At first, environmental protection dominated CS projects. Under the LIFE Euroturtles project, the Croatian Natural History Museum launched the *eTurtle* app in 2018 to improve the conservation status of turtles nesting in the Mediterranean, allowing citizens to submit and browse sighting photos.³

1 Institut za razvoj i inovativnost mladih, Građanska znanost: mjerenja i promatranja mora, accessed 20 January 2026. <https://seas.croatianmakers.hr/>

2 Nicola Schoenenberger, Paolo Zenzerović and Ana Tolić, „Priručnik za građansku znanost“, Zagreb: Institut za razvoj i inovativnost mladih, (2020), accessed 20 January 2026. <https://izradi.croatianmakers.hr/wp-content/uploads/2020/09/Prirucnik-za-gradjansku-znanost-cijela-knjiga-i-korice.pdf>

3 Aleksandra Pikić, „Građanska znanost (Citizen Science): kako se narodne knjižnice mogu uključiti?“, *Mreža narodnih knjižnica - suradnja u razvoju digitalnih usluga i predstavljanju javnosti : zbornik radova* (2022): 477–491.

Similarly, the Blue World Institute, as part of the LIFE DELFI project, developed the application *Marine Ranger* in 2021, enabling citizens to report sightings of dolphins, sharks, sea turtles, marine mammals, and environmental threats. It started with a public call in 2020 to help locate a large whale in the Velebit Channel, and in 2022 they organized Croatia's first Adriatic BioBlitz, mobilizing volunteers to rapidly document marine biodiversity.⁴

The BIOM Association dedicated to nature conservation with a focus on wild birds and habitats, has long relied on volunteer engagement, including early citizen science efforts like launching the portal *Fauna.hr* in 2017, mobilizing volunteers for nature protection through their phones.⁵

The Andrija Štampar Teaching Institute of Public Health, participating in the Aedes Invasive Mosquito COST Action project, launched a citizen science activity in 2019 focused on source reduction of the invasive tiger mosquitos. This expanded into the *Pour out the water so they don't bite us* project, with school and community educations and workshops in 2023, achieving exceptional results in trap deployment and egg mass detection.⁶

Before long, citizen science began to infiltrate the Croatian GLAM sector in the 2020s. The *Written Heritage* project (2021–2022) digitized, cataloged, and presented Glagolitic manuscripts via *GlagoLab* portal of the University of Zadar's Centre for Glagolitic Studies, facilitating collaborative research and promotion of Zadar Archdiocese texts from the 17–18th centuries.⁷ Evolving into *Civil Science in the Field of Glagolitics: From Crowdsourcing to Knowledge*, it engaged citizens through campaigns like *Let's Explore Heritage Together*, *Reading History Written in Glagolitic!* and *Let's Read Glagolitic Texts Together!*, using Transkribus for transcription of parish registers and land

4 Institut Plavi svijet, accessed 20 January 2026. <https://www.plavi-svijet.org/>

5 Udruga BIOM, „Svaka ptica se broji - i broji ih se više nego ikad!“, (2025), accessed 20 January 2026. <https://www.biom.hr/2025/08/05/svaka-ptica-se-broji-i-broji-ih-se-vise-nego-ikad/>

6 Ivana Vručina, Enrih Merdić and Nataša Bušić, „Građanska znanost (Citizen science) - aktivnost zajednice u svrhu praćenja i kontrole invazivnih vrsta komaraca u Hrvatskoj“, Znanstveno-stručno-edukativni seminar s međunarodnim sudjelovanjem DDD I ZUPP 2024 - uključenost zajednice - zbornik radova : novine u u djelatnosti dezinfekcije, dezinsekcije, deratizacije i zaštite uskladištenih poljoprivrednih proizvoda, (2024): 35–41.

7 Marijana Tomić, Laura Grzunov and Martina Dragija Ivanović, „Crowdsourcing transcription of historical manuscripts: Citizen science as a force of revealing historical evidence from Croatian Glagolitic manuscripts“, *Education for Information* 37, 4 (2021): 443–464, accessed 23 January 2026. <https://doi.org/10.3233/EFI-211555>

records.⁸ *DigiSport* is a project carried out by the Faculty of Humanities and Social Sciences, University of Zagreb (FFZG) and Croatian Sports Museum in 2022 and 2023. The project engaged active and retired sports journalists from the Croatian Association of Sports Journalists, contributing detailed metadata to the digitized segment of the Croatian Sports Museum's Photo Collection from 1970–1994, through a custom digital tool.⁹ The State Archives in Zagreb organized a Transcribathon Zagreb in 2022, a week-long citizen science event held at FFZG, as part of the EU Enrich Europeana+ project. The project combined AI with students transcribing and adding valuable metadata to selected parts of funds and collections from 19th century, enhancing its public access.¹⁰

The Križevci University of Applied Sciences, aiming to promote the Historical collection of the agricultural education and its significance, invited former students to participate in the research and documentation of this rich collection. Linking open access and citizen science with cultural heritage, the *Revitalization of the Cultural Heritage of the College of Agriculture in Križevci* project in 2021 resulted in a new approach to interpretation and preservation of the school's cultural tradition, spanning more than 160 years.¹¹ ICARUS's Topotheque platform is a virtual archive enabling citizens to participate in preserving and promoting historical heritage by sharing photographs, documents, and stories. In cooperation with local institutions, such as the Prelog Public Library, more than 420 Topotheques have been established as part of the European network.¹²

8 Glagolab – portal i digitalni laboratorij za suradnička istraživanja i promoviranje hrvatskoga glagoljaštva, accessed 23 January 2026. <https://glagolab.unizd.hr/>

9 Goran Zlodi, Tomislav Ivanjko, Danira Biliš and Petra Husain Pustaj, „Mogućnosti primjene građanske znanosti u društvenim i humanističkim istraživanjima na primjeru istraživanja i opisa segmenta Zbirke fotografija Hrvatskog športskog muzeja”, Dvanaesti festival hrvatskih digitalizacijskih projekata : programska knjižica, (2023): 48–49, accessed 23 January 2026. https://dfest.nsk.hr/wp-content/uploads/2023/04/D-fest2023_programska.pdf

10 Sonja Galina, „Transcribathon Zagreb 2022.”, Dvanaesti festival hrvatskih digitalizacijskih projekata : programska knjižica, (2023): 50, accessed 23 January 2026. https://dfest.nsk.hr/wp-content/uploads/2023/04/D-fest2023_programska.pdf

11 Marina Vidović Krušić, „Povijesna zbirka poljoprivrednog školstva Knjižnice Veleučilišta u Križevcima u službi promocije kulturne baštine”, Kalibar 11, 2 (2024): 38–43, accessed 23 January 2026. <https://www.dkkz.hr/wp-content/uploads/2024/12/10.-Marina-Vidovic-Krusic.pdf>

12 Maja Lesinger, „Platforma Topoteka u kontekstu građanske znanosti - primjer Topoteke Prelog”, @rhivi 16 (2024): 12–13, accessed 23 January 2026. <https://hrcak.srce.hr/329532>

Croatian libraries actively support citizen science projects. Research shows librarians' willingness to participate, use libraries as platforms, and emphasize cooperation and education for scientific literacy and inclusion.¹³ Key promoters include the Working Group for Citizen Science in Libraries of the Zagreb Library Association (GZUK) and National and University Library in Zagreb (NSK).

The National and University Library in Zagreb began its systematic engagement in citizen science through the CeOS_SE project and subsequently continued to develop this field by initiating and implementing its own CS projects.¹⁴

The *Bees, Life, People* project was implemented in 2022 within the CeOS_SE project and the Science Festival, in cooperation with the Ivanić-Grad Public Library, and the Croatian Web Archive. The project focused on collecting and selecting web-based resources on bees as key organisms for biodiversity conservation.¹⁵ Following introductory lectures and a workshop on criteria for web content archiving, students of the Ivan Švar Secondary School independently identified and proposed relevant online sources, which NSK librarians then evaluated, archived, and published in the Croatian Web Archive. The result was a thematic digital collection¹⁶ comprising 145 archived URLs, contributing to the long-term accessibility of digital content related to biodiversity.

The citizen science activity *Self-Help and Well-Being in the Academic Online Environment* was conducted in 2022 as part of the CeOS_SE project, in collaboration with researcher Iva Žurić Jakovina and the FFZG. Students enrolled in the course Digital Library 2 acted as citizen scientists, collecting data on open-access scholarly and professional journals addressing bibliotherapy, self-help, and subjective well-being. The activity included an introductory

13 Dolores Mumelaš and Antonija Filipeti, „Exploring the Perspectives of Croatian Libraries on Citizen Science”, *LIBER Quarterly: The Journal of the Association of European Research Libraries* 35, 1 (2025): 1–32, accessed 25 August 2025. <https://liberquarterly.eu/article/view/19014>

14 Dolores Mumelaš and Sanja Jurković, „Citizen Science in Croatia and the Contribution of the National and University Library in Zagreb”, *Čitalište: naučni časopis za teoriju i praksu bibliotekarstva* 47 (2025): 7–21, accessed 20 January 2026. <https://doi.org/10.5937/cit2547007m>

15 Dolores Mumelaš, „Mladi u ulozi građana znanstvenika i kvizaša”, *Kalibar* 10, 1/2 (2023): 30–36, accessed 5 January 2026. <https://www.dkkz.hr/wp-content/uploads/2023/09/Kalibar-2023-1-30-36.pdf>

16 Croatian Web Archive, „Pčele, život, ljudi”, accessed 20 December 2025. <https://haw.nsk.hr/tematske-zbirke/42/p%C4%8Dele,-%C5%BEivot,-ljudi/>

lecture and practical training in searching the Hrčak portal. The collected data were processed and analyzed, and subsequently presented as a scientific poster¹⁷, and the results were further developed into a scientific article published in a peer-reviewed journal¹⁸.

The *Dendroteka* project was implemented in 2023 as part of the Science Festival, in cooperation with NSK, dendrology experts, and students from Zagreb secondary schools. The activity focused on identifying tree species depicted on historical postcards of Zagreb preserved in the NSK Graphic Collection. Participants collected data through fieldwork, the use of mobile applications, and by comparing historical and contemporary photographs. In collaboration with experts, changes in urban greenery over time were analyzed, and the final outcome was a publicly accessible portal¹⁹ with an interactive map of Zagreb, enabling the comparison of historical and contemporary views and identification of tree species. The project connected heritage collections, scientific expertise, and youth participation in research on the urban environment.

The *HAWathon* project began in 2023 as a pilot activity organized in cooperation between the National and University Library in Zagreb and the City Library “Ivan Goran Kovačić” in Karlovac²⁰. In 2024 it developed into a national crowdsourcing project, carried out in partnership with public schools and libraries across Croatia, focusing on collecting web-based resources for the Croatian Web Archive. A total of eleven HAWathons were held, involving 186 secondary school students. Participant evaluations indicated a high level of satisfaction and the development of digital, information, and critical thinking skills.²¹ Simultaneously, this significantly reduced the workload of librarians involved in web content collection, confirming the effectiveness of crowdsourcing approaches. New HAWathons are still taking place.

17 OAI14, „OAI13 Posters“, accessed 5 January 2026. <https://oai.events/oai13/posters/>

18 Iva Žurić Jakovina and Dolores Mumelaš, „Bibliotherapy, Self-Help and Subjective Well-Being in Open Access in Croatia“, *Socijalna psihijatrija* 52 (2024): 47–82, accessed 5 January 2026. <https://hrcak.srce.hr/file/462831>

19 Dendroteka, accessed 15 January 2026, <https://virtualna.nsk.hr/dendroteka/>

20 City library „Ivan Goran Kovačić“ Karlovac, „The first HAWaton competition was held in Croatia“, accessed 20 January 2026. <https://gkka.hr/hawaton-natjecanje-gimnazijalaca-u-prikupljanju-mreznog-sadrzaja/>

21 Dolores Mumelaš, Ingeborg Rudomino and Anamarija Ljubek, „Evaluacija sudionika projekata rada mnoštva i istraživanje sudionika projekta Hawaton“, *Vjesnik Bibliotekara Hrvatske* 68, 1 (2025): 189–210, accessed 21 January 2026. <https://hrcak.srce.hr/330392>

The *Musical Intelligence in the Service of National Heritage* project was conducted in 2024 as part of the Science Festival and was organized by NSK. Students from primary and secondary music schools analyzed sound recordings from the legacy of Croatian composer Silvio Foretić, identifying musical genres, performing ensembles, and other characteristics of the recordings. The collected data were analyzed and published in a scientific article, with 90% of the analyzed recordings successfully identified.²² This project represents the first example of citizen science in Croatia focused on musical heritage.

The Working Group for Citizen Science in Libraries (GZUK)

GZUK was formed in March 2024 to strengthen collaboration among libraries, researchers, and the public through citizen science. By providing training, thematic workshops, and expert lectures, GZUK supports libraries in building their competencies and encourages broader community participation in scientific research. In doing so, it highlights the role libraries can play as key connectors between science and society. Through this collaboration, the Working Group publishes two regular alternating monthly columns: GZUK nauk (translated: GZUK science) and GZUK u praksi (translated: GZUK in Practice).²³ GZUK offers free workshops and organizes lectures for researchers. In 2024 and 2025, GZUK organized a few citizen science projects.

The project *Through the Streets of Medieval Rulers*, organized in 2024, is carried out in cooperation with public and school libraries across Croatia. It aims to document and map streets, squares, and parks throughout the country named after medieval Croatian rulers, focusing on five Croatian kings and five Croatian dukes. Professor Ivan Majnarić from the Catholic University of Croatia serves as the scientific partner, using the data for historical research on the presence and representation of medieval rulers in contemporary Croatian urban spaces. The initiative combines elements of both bottom-up and top-down models; GZUK designed the concept and scientific structure, while participating libraries, acting as community coordinators and research facilitators, and their

22 Tanja Mihalić and Dolores Mumelaš, „Baštinska glazbena građa u kontekstu građanske znanosti i kao izvor za znanstvena istraživanja“, *Vjesnik bibliotekara Hrvatske* 68, 1 (2025): 25–50, accessed 30 January 2026. <https://hrcak.srce.hr/330385>

23 Sanja Jurković, “Zagreb Library Association’s Working Group for Citizen Science in Libraries”, *Libraries in the Digital Age 2025: Libraries and Information Institutions in the digital age*, (poster) 2025.

users shape the project through active local engagement and data collection via Google Maps. The goal is creating the first comprehensive database of spatial references to medieval Croatian rulers in modern Croatian settlements.²⁴

In the Footsteps of Croatian Writers was a citizen science activity organized by the August Cesarec City Library in Zagreb, with the support of GZUK. Developed in collaboration with Silvije Strahimir Kranjčević Primary School and its school library, the activity took place on 28 March 2025 in the Study Reading Room of the August Cesarec City Library.²⁵ Pupils located 138 streets named after Croatian writers, covering authors from nine literary periods, from medieval Glagolitic and Latin writers to contemporary Croatian writers. The immediate outcome was a digital interactive map of Zagreb that displays all geolocated streets identified during the activity, created by librarians Ana Brekalo and Alenka Melkić²⁶. The project exemplifies how libraries can blend literature, digital skills, and scientific thinking through collaboration between public and school libraries, while demonstrating how citizen science can enrich their programs.²⁷

The *Spiders under the Magnifying Glass* project, organized by GZUK in cooperation with the Commission for Green Libraries of the Croatian Library Association, was initiated by biologist Iva Čupić and inspired by the 2025 Science Festival theme of nets and networks. Using the international platform iNaturalist, citizens were invited to photograph and document spiders found in their surroundings, primarily in Zagreb, but observations from all parts of Croatia are welcome.²⁸ This resulted in a large collection of verified spider observations documenting their presence in Zagreb and beyond, promoting

24 Radna grupa za građansku znanost u knjižnicama, "Projekt Ulice srednjovjekovnih vladara", accessed 1 December 2025. <https://gzukzkd.wordpress.com/2025/02/13/projekt-ulice-srednjovjekovnih-vladara/>

25 Radna grupa za građansku znanost u knjižnicama, "Aktivnost Tragovima hrvatskih pisaca", accessed 3 Decemeber 2025. <https://gzukzkd.wordpress.com/2025/03/12/aktivnost-tragovima-hrvatskih-pisaca/>

26 Padlet, "Tragovima hrvatskih pisaca", accessed 3 Decemeber 2025. <https://padlet.com/alenkana25/tragovima-hrvatskih-pisaca-zjnvtao97piexyl>

27 Radna grupa za građansku znanost u knjižnicama, "Održana aktivnost građanske znanosti Tragovima hrvatskih pisaca u Knjižnici Augusta Cesarca!", accessed 3 Decemeber 2025. <https://gzukzkd.wordpress.com/2025/04/15/odrzana-aktivnost-gradanske-znanosti-tragovima-hrvatskih-pisaca-u-knjiznici-augusta-cesarca/>

28 Radna grupa za građansku znanost u knjižnicama, "Pauci pod povećalom – pridružite se projektu građanske znanosti!", accessed 7 Decemeber 2025. <https://gzukzkd.wordpress.com/2025/04/24/pauci-pod-povecalom-pridruzite-se-projektu-gradanske-znanosti/>

ecological literacy and encouraging participants to observe nature more closely. The project concluded with a public showcase of the best photographs and awarding the winning spider photo at the Zagreb Library Association Christmas gathering.²⁹

Citizen science in Croatia began to develop more intensively in the 2020s, with non-profit organizations and libraries playing a particularly prominent role in its advancement. With systematic education and capacity-building activities carried out by the National and University Library in Zagreb, as well as training workshops organized by the GZUK, the number and scope of citizen science initiatives can be expected to grow. These efforts contribute to the gradual institutionalization of citizen science and create a foundation for its more sustainable integration into research, educational, and community-oriented practices in Croatia.

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29 ZLA Facebook. “Božićni domjenak ZKD-a 2025”, accessed 15.12.2025. <https://www.facebook.com/share/p/1G31cDoGKF/>

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CITIZEN SCIENCE INTEGRATION IN SERBIA: THE ROLE OF LIBRARIES

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Serbia has made substantial progress in aligning its research ecosystem with European Open Science (OS) principles and increasingly recognises Citizen Science (CS) as a valuable instrument for transparent, participatory, and socially responsible research. CS is seen as central to building inclusive and socially embedded research practices. This study examines Serbia's policy landscape, highlights institutional actors driving CS development, and presents illustrative CS projects from the natural sciences. Special attention is given to the University Library "Svetozar Marković" (UNILIB), which has emerged as a national leader in integrating CS within library services (Dakić, Trtovac, and Janković 2023). The analysis draws on insights from the *Citizen-Enhanced Open Science in South-East Europe (CeOS_SE)* project coordinated by LIBER.

National Policy Framework and Institutional Actors

Serbia's OS strategy is anchored in key policy and legislative instruments. The *Open Science Platform* (Ministry of Education, Science and Technological Development 2018) and *Open Science Platform 2.0* (Ministry of Education, Science and Technological Development 2024) established procedures for depositing research outputs, clarified institutional responsibilities for training and implementation, and emphasised open data, transparency, and public participation. The *Law on Science and Research* (Službeni Glasnik Republike Srbije 2020) reinforces these commitments, advocating for OS infrastructure to strengthen public trust in science. In 2023, the Ministry of Science,

Technological Development, and Innovation introduced dedicated funding lines for OS and CS, promoting sustainable research policy. A major milestone was the launch of *eNauka*¹, a unified national registry of researchers, institutions, and outputs, which facilitates integration of citizen-generated data into national workflows.

Several institutions are central to Serbia's CS ecosystem. The Center for the Promotion of Science (CPN) under the Ministry of Science, Technological Development, and Innovation, serves as Serbia's principal coordinator of CS activities, developing educational programmes, organising events, and offering competitive funding schemes for CS projects. In the past two years, CPN has successfully conducted two public calls for funding citizen science projects. These calls, funded by the Ministry and aligned with national OS priorities, have provided structured financial support for pilot citizen science initiatives across Serbia, enabling libraries, universities, and community organisations to engage citizens directly in scientific research. This has further strengthened Serbia's position as a regional leader in integrating CS within OS frameworks while demonstrating practical pathways for citizen participation in addressing local challenges².

On the other hand, UNILIB plays a unique role as a knowledge mediator and training provider, actively fostering citizen engagement in research and educational initiatives (Dakić and Trtovac 2024). Over the past decade, the library has coordinated and supported several projects based on the principles and concept of citizen science, including Wiki-Librarian³, the Democratization of Digitization project⁴, the use of the Transkribus tool for processing archival materials⁵, and the Language Laboratory⁶. Through conferences, professional workshops, cross-sectoral collaborations, and the development of training materials, UNILIB has advanced CS awareness and practice. These activities demonstrate how libraries can serve as community-driven hubs, connecting citizens with researchers, providing tools and skills for participation, and embedding participatory approaches into scientific and cultural processes.

1 More at: <https://enauka.gov.rs/?locale=en>

2 More at: https://www.cpn.edu.rs/javnipoziv_gni_2024/

3 More at: <https://commons.wikimedia.org/w/index.php?search=viki+maraton&title=Special:MediaSearch&go=Go&type=page>

4 More at: <https://novisad2022.rs/demokratizacija-digitalizacije-centralna-radionica/>

5 More at: <http://unilib.rs/transkribus/tehnologija.html>

6 More at: <http://lab.unilib.rs/about>

The CeOS_SE Project and Roadmap for CS in the Balkans

The *CeOS_SE* project (2022–2024), coordinated by LIBER, aimed to integrate CS into OS practices across South-East Europe. Partners from Serbia, Croatia, Bulgaria, Greece, and Cyprus collaboratively conducted policy mapping and gap analysis, developed CS training modules for librarians and researchers, organised pilot projects, produced multilingual educational resources, and strengthened regional collaboration. Serbia contributed case studies, pilot actions, and played a leading role in producing regional guidelines.

UNILIB coordinated a dedicated work package that produced the *Roadmap on Citizen-Enhanced Open Science in the Balkans* (Dakić and Trtovac 2023). A regional survey of 99 academic libraries mapped current CS activities, infrastructure readiness, and training needs. Respondents from Serbia, Croatia, Greece, Bulgaria, Bosnia and Herzegovina, North Macedonia, Montenegro, and Cyprus provided insights that informed actionable recommendations for CS implementation. Key competencies identified for librarians included communication and public engagement, analytical and data stewardship skills, educational skills for workshops and training, and outreach via local networks and social media. Strategic and operational recommendations emphasised partnership building, institutionalisation of CS, integration of CS methodologies into curricula, OS-supporting infrastructure, and training researchers on participatory approaches.

Citizen Science Training

In 2023, Serbia launched the region's first accredited Citizen Science (CS) seminar for librarians, titled *Citizen Science: Libraries as a Link Between Civil Society and Science* (Dakić and Trtovac 2025, in press). The first of many training sessions was held in Novi Sad on 8 March 2023, attracting over 200 librarians from academic, public, and school libraries across Serbia. The curriculum included:

- Principles and types of CS
- Designing and managing CS projects
- Data collection and ethical considerations
- Tools for engaging diverse community groups

- Alignment with EOSC and Horizon Europe standards
- Workshop on potential CS project ideas

This training has been integrated into Serbia's professional development portfolio for librarians, enabling them to take proactive roles as CS facilitators and community science educators. To date (by the end of 2025), about 550 librarians have gained knowledge and skills in CS through this seminar.

Participant feedback highlighted the seminar's practical relevance:

- "I now feel confident to lead small CS projects in our community library."
- "We plan to collaborate with local schools on water quality monitoring."
- "The workshop was very useful and creative. The information provided offers unlimited opportunities for collaboration and for connecting citizens with scientific work through the library, as well as with other forms of human creativity."
- "There is a clear need to popularise the concept of Citizen Science among the heads of research organisations and cultural institutions, as key figures for promoting its broader implementation and effective operationalisation."

By equipping librarians with accredited CS knowledge and practical skills, Serbia is building a sustainable foundation for libraries to become active hubs of citizen participation in science across the region.

Project Case Studies

In recent years, several successful citizen science (CS) projects have been organised in Serbia, demonstrating the practical value and impact of citizen participation in research. These initiatives highlight how localised engagement can directly contribute to achieving national research objectives while fostering community ownership of environmental monitoring and scientific data collection. By actively involving citizens, these projects not only generate valuable datasets but also strengthen public awareness and stewardship of local environmental and societal challenges.

The following projects illustrate the practical benefits of citizen science in Serbia:

Obtectus Finders⁷ engages citizens in collecting seed beetles (*Acanthoscelides obtectus*) to study genetic diversity. Led by the Institute for Biological Research "Siniša Stanković" and the Faculty of Biology, University of Belgrade, and supported by CPN and the Start Up for Science programme, the project expands sampling coverage and contributes to future biocontrol strategies (Serbian Evolutionary Society 2025). Volunteers send collected beetles by post, creating a crowdsourced dataset visualised on an interactive map. Media coverage has boosted public participation, making the project one of the most visible biodiversity initiatives in Serbia. This project could be found at the European Citizen Science platform⁸.

Monitoring the Spread of *Megachile sculpturalis*⁹ addresses the invasive sculptured resin bee, first detected in Belgrade in 2017 and established by 2019. The Centre for Bee Research at the Faculty of Biology coordinates citizen reporting of observations from urban, suburban, rural, and semi-natural areas. The project documents the species' spread, interactions with native and exotic plants, population dynamics, ecological impacts, and genetics. Citizen contributions have been vital for early-warning monitoring and regional biodiversity research. More information:

In addition, 11 ongoing projects funded by the Ministry of Science of the Republic of Serbia – supported through the Ministry's calls for proposals and public announcements – further demonstrate the growing role of citizen science in the national research landscape.

Together, these initiatives show how citizen science can serve as a practical tool for addressing local challenges while contributing to Serbia's broader research and environmental objectives, offering a replicable model for regional and national strategies.

Globally, stakeholders typically operate within hybrid models that combine top-down policy support with bottom-up civic engagement. Libraries act as facilitators, trainers, and community connectors; researchers ensure methodological integrity and analyse collected data; and citizens participate through workshops, school collaborations, and voluntary monitoring. This collaborative model strengthens public trust and enhances research outcomes.

7 More at: <https://www.opasuljise.rs/en/>

8 More at: <https://citizenscience.eu/project/290>

9 More at: <https://srbee.bio.bg.ac.rs/english>

Achievements, Challenges, and Recommendations

Serbia's CS ecosystem has achieved significant outcomes: increased national visibility of CS, strengthened collaboration between researchers, libraries, and civic groups, accredited training integrated into professional development, new biodiversity and agricultural datasets, and enhanced scientific literacy among the public. Persistent challenges include limited public awareness of CS, uneven digital access, cultural scepticism toward volunteering, and the need for systematic data-quality procedures. Addressing these requires sustained investment in training, outreach, and digital infrastructure.

Libraries are ideally positioned to support CS due to their accessibility, trustworthiness, and information management expertise. Through CS, they diversify services, support lifelong learning, and reinforce societal roles. Key recommendations for sustainable development of CS include integrating it into national library and higher education strategies, providing dedicated funding, expanding accredited training, producing multilingual guidance, supporting cross-border networks, aligning with European OS standards, and implementing monitoring and evaluation frameworks for CS projects.

The CeOS_SE project demonstrates that CS can become a structural component of OS in the Western Balkans. Serbia's experience shows that strategic policy support, institutional leadership, and active community engagement can foster rapid and sustainable CS ecosystem development. Libraries, particularly UNILIB, have proven essential as mediators between science and society, enabling collaboration, learning, and inclusive research participation. Long-term institutional commitment and cross-sectoral cooperation remain vital for the continued mainstreaming of CS and ensuring that research meets societal needs.

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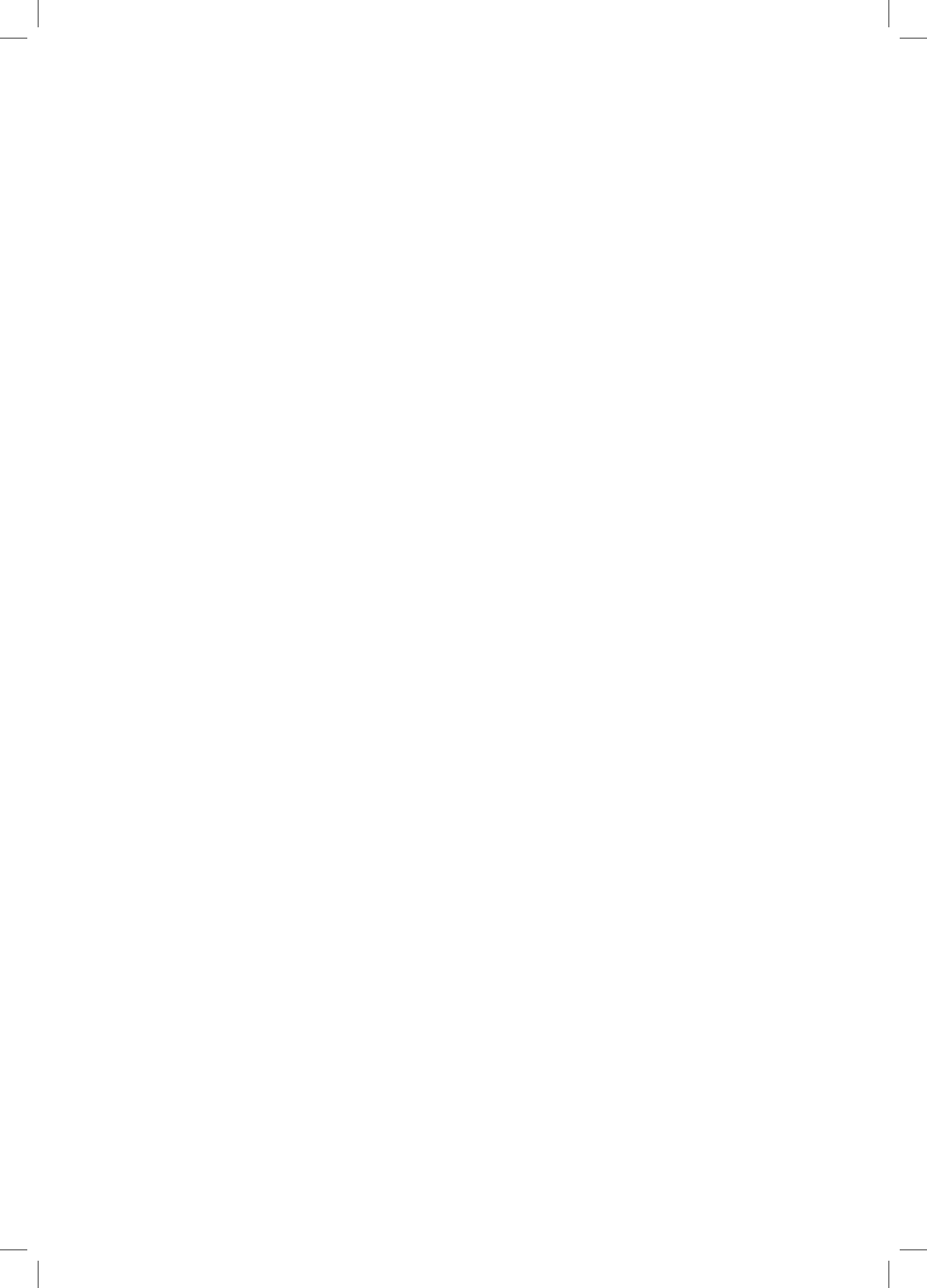
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THE ROLE OF HUNGARIAN LIBRARIES IN SPREADING CITIZEN SCIENCE

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In Western Europe, citizen science is one of the most popular library tasks today, whether in public or academic libraries. An increasingly important goal in library strategy is to reach out to society and strengthen public involvement. At the same time, we see and feel that although the basic tasks and general guidelines of libraries are the same not only throughout Europe but throughout the world, the acceptance and use of citizen science in the Central and Eastern European region is different and has a different dynamic. Librarians in the region are trying to adopt the research methodology of citizen science in different ways. In Hungary, despite the fact that there are an increasing number of citizen science projects in natural sciences, the involvement of libraries was not at all typical until the 2020s. The Association of Hungarian Librarians recognised the potential and role of libraries in citizen science. Under the aegis of the Association, we launched the Citizen Science Roadshow in November 2024, bringing together libraries (and librarians).

The Citizen Science Roadshow

At the 2023 election of the Association of Hungarian Librarians, a new president and a new board took over the leadership, which also brought about a renewal of the association's work. This led to the first centrally announced mini-conference in September 2023, when we presented citizen science methodology and the only citizen science project at that time in which a library was an active participant, the Amber Habitat Research Project¹ initiated by Buda Campus of Hungarian University of Agriculture and Life Sciences. Even after the conference, many people saw and still see citizen science as a task rather than an opportunity, but this was nevertheless a turning point, when the Metropolitan Ervin Szabó Library in Budapest also showed keen interest in the new research methodology.

1 <https://entzkonyvtar.wordpress.com/borostyan-elohely-kutatas-projekt/>

We launched the roadshow more than a year later, which seems like a long time in reflection, but the organisers volunteered to take on the roadshow in addition to their existing work. It is important to emphasise that during this one-year preparation period, we tried to reach as wide an audience as possible and learned from European results and trends around us. In September 2024, foreign speakers Thomas Kaarstedt, Anne Katrine Overgaard (University of Southern Denmark), and Tiberius Ignat (Scientific Knowledge Services) helped with the preparations at a two-day English-language workshop, to which we invited all interested library directors and, of course, the president and secretary general of the Association. This was followed by a period of active organisation, and a permanent roadshow team was set up with the cooperation of Ágnes Kovácsné Koreny, Director General of the Metropolitan Ervin Szabó Library, Budapest; Beáta Darabosné Maczkó, Director of the Entz Ferenc Library, Buda Campus, Hungarian University of Agriculture and Life Sciences and Dóra Kalydy, Deputy Director General of the Library and Information Centre of the Hungarian Academy of Sciences. Three colleagues of the Metropolitan Library (Ágnes Kerékgyártó, Emese Kovács, and Tamás Bedekovits) and one colleague (Andrea Simon) of the Library of the Hungarian Academy of Sciences participated in the preparatory meetings and serve as facilitators at the events.

Between November 2024 and November 2025, we held workshops at six locations (Budapest, Metropolitan Ervin Szabó Library, Szeged, Pécs, Miskolc, Eger, Győr). We selected all locations so that we could invite staff from different types of libraries to collaborate. The roadshow team plans to continue inviting staff from county libraries, university libraries, and church libraries in cities to present the opportunities available to them. At the Annual Conference of the Association of the Hungarian Librarians held in Debrecen in 2025, we also gave presentations on citizen science topics during the half-day program of the Academic and Special Libraries Section, presenting the structure of the roadshow and inviting projects and initiatives launched as a result of the roadshow with the aim of arousing interest in the topic among colleagues who have not yet heard of citizen science.

The Framework

The roadshow is essentially an off-site training session. The program consists of three presentations, each lasting 30 minutes. The first presentation is about the principles of citizen science and its significance for libraries (presenter:

Dóra Kalydy, Library and Information Centre of the Hungarian Academy of Sciences), followed by Ágnes Kovácsné Koreny, who presents foreign examples and introduces the citizen science projects of the Ervin Szabó Metropolitan Library. The third presentation is given by Beáta Darabosné Maczkó, head of the Entz Ferenc Library and Archives, on the Amber Habitat Research Project, which has been ongoing for two years and is being carried out using citizen science methodology.

The three speakers, who work in three different types of libraries, present the projects from three different perspectives, describing the circumstances of their implementation and the results achieved at their given institutions. Another clear goal is to highlight the cooperation between local libraries as a particularly good setting for citizen science projects. Public libraries and university libraries are natural partners, each strong in different areas, thus complementing each other well. During the morning training sessions, we incorporated two group tasks into the lectures, which allowed us to get faster feedback on the interpretation of what was heard and made the several-hour training session more interactive.

Our experience during the past years has proven that citizen science projects have a place in Hungarian libraries. The most significant achievement is that library managers have recognised that citizen science projects can help them raise awareness of their services and activities. Participation in citizen science projects is a fundamental task for both public and university libraries. With the methodology of research support, we simultaneously add value and build the local community. The aim of the Roadshow team is to visit one location per every second month over the next year, and then we would like to organize a professional day for those libraries and librarians who participated in a local training session. This program provides an opportunity to get to know each other and help each other move forward.

University courses

The Library and Information Centre of the Hungarian Academy of Sciences is a committed supporter and implementer of Open Science, so in addition to organizing the roadshow, we are also making efforts to ensure that citizen science is included in university courses. There are two types of training: one is specifically for those who will be facilitators of citizen science projects,

working in aggregators, libraries, museums, or archives, or even teachers in local communities, who can bring together local initiatives and thus support researchers and volunteers.

We have launched such a course at University of Tokaj under the framework of the Cultural Heritage Department, which is open to all students (pedagogues, tourism professionals, cultural heritage experts, viticulturists and winemakers). The course consists of 12 lectures and aims to introduce students to the basics of citizen science research methodology and the structure of individual projects, so that students are already familiar with the concept of citizen science during their Bachelor's programme to see the potential it offers, so that if they are later approached with such a request by a researcher or the volunteers themselves, they will know not only the basic concepts but also where to find more information.

The other type of training is specifically designed for PhD students. The course gives young researchers at the beginning of their careers the opportunity to learn about citizen science research methodology and how to apply it in their own work. An important objective of the course is to help students understand the research methodology process through practical examples. Through an independent project assignment, they will develop a citizen science project related to their field of expertise. The independent project assignment will give them the opportunity to process, apply, and further develop the knowledge they have gained during the lectures. We plan to implement the course at the University of Sopron, integrating it into the Research Support course, where students can apply the research methodology of citizen science to their existing knowledge of open science.

Conclusion

Experience in recent years has shown that the proactive role of libraries and their achievements and experience in various areas of open science greatly contribute to the effectiveness of citizen science programs and courses. In Central and Eastern Europe, the perception and role of libraries is very different from that in Western Europe, but it is clear that involvement in citizen science projects strengthens and supports trust in library services as well.

CITIZEN SCIENCE IN PUBLIC LIBRARIES: THE RÁDAY MIHÁLY MEMORIAL PROJECT

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Project name / acronym

Ráday Mihály Emlékprojekt / Mihály Ráday Memorial Project

Date or period when the project was done

November 2024 – September 2025 (project preparation phase)

September 2025 – February 2026 (project implementation phase)

Funding

The project is implemented within the regular operational framework of the Metropolitan Ervin Szabó Library. Funding is provided through institutional resources, including staff time, infrastructure, and existing digital services; no separate external project funding is allocated.

Coordinator / main organiser of the project

Metropolitan Ervin Szabó Library, Budapest (Fővárosi Szabó Ervin Könyvtár, FSZEK)

Scientific field

Urban history, cultural heritage studies, library and information science (with citizen science methodology)

Why Is Citizen Science Relevant for Public Libraries?

In recent years, citizen science has become increasingly visible in academic and cultural heritage discourse. In the context of public libraries, however, it is still primarily understood as a practical question: in what ways, under what conditions, and with what added value can a library involve the public in research activities that meet scholarly standards. This question is particularly relevant for public libraries, which traditionally function simultaneously as knowledge intermediaries, community spaces, and locally embedded public institutions.

The application of citizen science in libraries is not a new phenomenon, even if the term *citizen science* itself has only become widely used over the past decade and a half, particularly since the 2010s, in scientific and cultural heritage contexts. Numerous earlier, civil-based initiatives can be identified – especially in the fields of local history, cultural heritage, and urban research – that may today be regarded as precursors of citizen science, even if their operational logic was closer to crowdsourcing.

One such example is the Hungarian *Fortepan*¹ project, where volunteers contribute collectively to the identification, description, and contextualisation of historical photographs, creating a widely used visual source base for urban and social history research. On an international level, similar principles underpin the *Queens Memory Project*² in New York, in which residents, under the professional guidance of a public library and university partners, collect interviews, photographs, and local historical documents to build a community archive. Comparable initiatives also include volunteer-based programmes for the processing of historical sources – such as the transcription of parish records, census data³, or ship logs⁴ – through which large numbers of citizens contribute to making archival and library collections searchable and usable.

While these initiatives share a reliance on community participation, local knowledge, and institutional support, it is important to distinguish clearly between crowdsourcing and citizen science. Crowdsourcing projects typically invite volunteers to carry out well-defined tasks – such as transcription, description, or data entry – whereas citizen science, in a stricter sense, involves more active participation in the research process itself, including the interpretation of research questions, the contextualisation of data, and, in some cases, the joint understanding of results. From a contemporary library perspective, citizen science does not represent a break with earlier practices, but rather their further development: a recognition that libraries provide an appropriate institutional framework for involving non-professional researchers, fostering source-critical thinking, and ensuring the long-term preservation and

1 Fortepan: <https://fortepan.hu/hu/> (Last caught: 27 December, 2025)

2 Queens Memory Project: <https://www.queenslibrary.org/programs-activities/arts-culture/queens-memory-project> (Last caught: 27 December, 2025)

3 FamilySearch Indexing: https://www.familysearch.org/en/wiki/FamilySearch_Indexing (Last caught: 27 December, 2025)

4 Old Weather projekt: <https://www.oldweather.org/> (Last caught: 27 December, 2025)

accessibility of the knowledge produced. In this sense, the public library is not merely a location or infrastructure, but an active intermediary between the academic sphere, civil participants, and the wider public.

This paper presents a concrete case study from a library-based initiative illustrating how citizen science can be implemented within a large metropolitan public library network. The project discussed is not an experimental pilot, but the result of deliberate institutional preparation, building simultaneously on historical precedents and contemporary library services. Its aim is not only to realise a specific research project, but to demonstrate how citizen science can become an integral and sustainable element of library practice.

Institutional Context

The Metropolitan Ervin Szabó Library as a Citizen Science Environment

The Metropolitan Ervin Szabó Library (FSZEK) operates as Budapest's public library network, comprising 47 branch libraries, while also fulfilling a national special library function in sociology. This dual role – combining broad public reach with research-level collections—creates a distinctive institutional environment for citizen science initiatives. The library possesses the infrastructure, professional expertise, and community connections required to implement such projects successfully.

Within FSZEK's strategic objectives for the period 2021–2027, innovative and sustainable service development, as well as the exploration and application of new methodologies, play a prominent role. Citizen science fits into this framework not as a standalone programme, but as an extension of existing library functions, including collection development, information services, education, and community engagement. In this sense, citizen science is not an "extra" activity, but a set of tools that strengthens the library's mediating role by involving new participants in the creation and interpretation of scholarly knowledge.

The library's institutional role in citizen science projects can be understood at several levels. First, the library provides an informational background by ensuring access to printed and digital sources, databases, and the methodological knowledge required to use them effectively. Second, it assumes an educational and facilitative role by preparing volunteers for data collection, source-critical

research, and the documentation of results. Third, it offers technical, legal, and organisational frameworks for the management, preservation, and public dissemination of the data produced.

In the case of FSZEK, this mediating function between academic researchers, civil volunteers, and local communities is particularly significant. The library operates as a neutral, safe, and legitimate space where different levels of knowledge and motivation can meet. This position enables citizen science to move beyond mere data collection and become a shared learning process and a form of community experience.

It was within this institutional context that the Ráday Mihály Memorial Project was launched, deliberately building on FSZEK's local history collections, digital infrastructure, and community networks. The project aims not only to address a specific research question, but also to demonstrate how a public library can integrate citizen science methods into its long-term operations in a sustainable way.

The Ráday Mihály Memorial Project

The Ráday Mihály Memorial Project is a citizen science initiative launched by the Metropolitan Ervin Szabó Library, focusing on the urban history of Budapest's inner city through a renewed methodological framework. Its distinctive feature lies in the conscious integration of the legacy of an earlier, civil-based urban heritage survey with the contemporary infrastructural, educational, and data-management capacities provided by a public library.

The initiative originated in one of FSZEK's branch libraries, the Körúti Könyvtár (Boulevard Library), located along Budapest's Grand Boulevard, in close proximity to Király Street. This location is not merely a geographical detail but a defining contextual factor. The library operates in a dense urban environment where historical layers, everyday use, and intensive tourism coexist.

Király Street connects two markedly different inner-city districts. Inner Erzsébetváros, part of the historic Jewish Quarter, has become one of the city's most intensively used tourist and nightlife areas, characterised by hospitality venues, ruin bars, and cultural landmarks. In contrast, Inner Terézváros features a more elegant, bourgeois urban fabric linked to the UNESCO World Heritage environment of Andrassy Avenue and traditionally associated with

theatres and the arts. Király Street itself forms a transitional zone between these urban worlds, functioning both as an overloaded inner-city street and as a major commercial and transport axis.

In this complex and often tension-laden, yet culturally rich environment, it is particularly significant that the citizen science initiative emerged from a local public library. As a stable and trusted cultural institution, the Körúti Könyvtár provides a natural point of connection for local residents, interested volunteers, and urban historical research. The project thus does not approach the area from the outside but develops as an organic part of everyday urban life.

Historical Background and Point of Departure

The project's direct historical predecessor was a large-scale survey initiated in the early 1980s at the call of Mihály Ráday, a prominent urban historian and heritage activist. Hundreds of volunteers were mobilised to document the building stock of Budapest's inner districts through photographs, interviews, and descriptive records, resulting in influential books that remain key sources for urban history research.

Although this early initiative did not use the term citizen science, it fulfilled its essential criteria: it involved civil participants, operated under professional guidance, and aimed to produce knowledge of public interest. At the same time, the information environment and technical possibilities of the period inevitably limited the precision, verification, and long-term usability of the collected data.

Contemporary Library Reinterpretation

The Ráday Mihály Memorial Project, launched by FSZEK, consciously builds on this legacy while clearly differentiating itself in methodological and institutional terms. The project focuses on the section of Király Street between the Small and Grand Boulevards, examining approximately sixty buildings. Its dual objective is to document the current state and functions of these buildings and to enable systematic comparison with data recorded in the early 1980s.

A key innovation lies in the structured methodological framework within which volunteer work is embedded. Under the professional leadership of local historian Judit N. Kósa, the library developed training materials covering source-critical research, the use of digital databases, and standardised documentation practices. These materials ensure that the data collected by volunteers are comparable, verifiable, and suitable for long-term research use.

Partnerships and Collaboration

The project is based on an extensive network of partners, including civil heritage organisations, the relevant district municipalities, higher education institutions (particularly architecture and history programmes), and other cultural heritage institutions. The group of volunteer researchers is highly diverse, comprising residents, amateur historians, university students, photographers, and librarians. This diversity represents both a challenge and a resource, managed through the library's facilitative role.

Roles and Responsibilities of the Library

FSZEK's role in the project is multifaceted. The library provides access to printed and digital sources – such as local history collections, databases, and archival guides – without which research would not be possible. It also supplies the technical infrastructure for data recording: photographs, interviews, descriptions, and metadata generated during the project are deposited in the library-operated digital repository and made publicly accessible after review.

Legal and ethical frameworks form another crucial component. The library manages volunteer agreements, data-protection declarations, and compliance with relevant regulations, thereby safeguarding both participants and the long-term usability of the resulting database.

Citizen Participation and Research Tasks

Volunteers undertake a wide range of tasks, including photographic documentation of buildings, interviews with residents, video recordings, and archival research into the history of selected buildings. Participation extends beyond mechanical data collection: volunteers engage with their own research questions and personal motivations, while shared methodological standards ensure coherence and comparability.

Outputs and Expected Results

The project's primary output is a structured, searchable urban history database integrating photographs, maps, descriptive texts, and interviews. Additional outputs include educational materials, methodological guidelines, and publications offering transferable models for other libraries. In the longer term, the project provides a foundation for theses, academic journals, and further urban historical research.

Heritage and Innovation

The Ráday Mihály Memorial Project represents both a tribute to a historic civil initiative and a contemporary library innovation. While the earlier survey relied primarily on civic commitment and local knowledge, the FSZEK project places library infrastructure, digital tools, and methodological awareness at its core. The two layers reinforce rather than negate each other: historical experience provides legitimacy, while current library practice offers a sustainable framework for citizen science.

Communication, Public Visibility, and Institutional Legitimacy

Throughout the project, communication was treated not as a supplementary activity but as a fundamental precondition of citizen science. From the preparatory phase onward, the library sought to ensure transparency regarding objectives, methods, and anticipated impacts.

FSZEK informed the two district municipalities affected by the project at an early stage, inviting feedback and institutional dialogue. The library also consulted recognised experts—architects, urban historians, and researchers—during the planning phase, strengthening methodological robustness and professional legitimacy.

Volunteer recruitment relied on a multi-channel communication strategy, including printed leaflets, the library's website and event calendar, and coverage in local district newspapers. This approach ensured a diverse volunteer base extending beyond regular library users.

Public lectures by historian Judit N. Kósa on the history of Király Street and the project itself served both educational and motivational purposes, enabling dialogue and personal engagement. Communication continued during data collection through short videos presenting building histories and volunteers' personal narratives, highlighting the human dimension of citizen science.

Structured presentations of individual buildings are published in the library's digital repository, ensuring open access to results and reinforcing the principle of community knowledge.

Challenges, Lessons Learned, and Library Relevance

The project revealed challenges extending beyond a single research initiative, particularly regarding participation, methodological consistency, and institutional responsibility. These challenges underline that citizen science in a library context cannot function without clear frameworks, sustained support, and institutional commitment.

Key lessons include the necessity of structured training, ongoing coordination, and ethical safeguards. The library's role as a professional coordinator—rather than an authority imposing interpretations—proved essential.

From a library perspective, the project demonstrates that citizen science functions most effectively as an integrated practice linked to collections, educational roles, and digital services. Its *best practice* value lies in the balance between facilitation, methodological rigour, and community engagement.

Summary of Key Lessons

The experience of the Ráday Mihály Memorial Project indicates that citizen science in public libraries is most effective when:

- participation is guided by clear institutional goals and frameworks,
- volunteer training and support are integral components,
- the library maintains an active but non-dominant role,
- long-term preservation and accessibility of data are ensured.

These lessons offer guidance not only for FSZEK but for other public libraries seeking to integrate citizen science into sustainable practice.

Conclusions

The Ráday Mihály Memorial Project illustrates that citizen science represents not merely a methodological option for public libraries, but a question of institutional identity. It shows how libraries can function as mediating spaces where local knowledge, civic participation, and academically grounded research reinforce one another.

The project confirms that citizen science becomes sustainable in a library context only when it is embedded in existing collections, services, and infrastructures.

It also demonstrates that public libraries, when operating within clear ethical and methodological frameworks, can serve as credible and effective actors in citizen science, contributing simultaneously to scholarly quality, community engagement, and the responsible stewardship of cultural heritage.



IMPLEMENTATIONS AND EXAMPLES OF CITIZEN SCIENCE PROJECTS AND NETWORK IN SLOVENIA: THE CENTRAL ROLE OF LIBRARIES

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Citizen science has a well-established tradition in Slovenia. As early as the 1970s, researchers began systematically involving non-professional participants in research processes. One of the first ones was Dr. Marija Makarovič at the Slovene Ethnographic Museum, who engaged local communities in ethnological research. Another key figure was Dr. Zdravko Mlinar, who mobilised citizens as volunteer contributors in his sociological research on the town of Žiri.

Despite this long-standing practice, citizen science remained fragmented. Various terms were used to describe public participation in research, including participatory, amateur, community, popular, and civic science. This terminological diversity reflected both disciplinary differences and the absence of a unifying framework. A significant conceptual turning point occurred in 2021, when Dr. Mlinar proposed the term "občanska znanost", which can be translated as residents' science or municipality residents' science. The term emphasises inclusivity, local engagement, and collective knowledge production beyond formal citizenship, aligning well with contemporary European understandings of citizen science.

The Role of the Central Technical Library at the University of Ljubljana

Academic and research libraries have become key institutional actors in advancing citizen science by bridging the gap between scientific research and the wider public. In Slovenia, this role has been most prominently undertaken by the Central Technical Library at the University of Ljubljana (CTK), a publicly funded academic library established in 1949 as a library of the University of Ljubljana, but is now an independent public institution and an associated

member of the University of Ljubljana. CTK primarily provides library and information services to students and staff in technology and natural sciences, while also supporting users from other universities, research organisations, public institutions, and non-profit and for-profit organisations. Its services are based on professionalism, quality, user orientation, and the use of modern technologies, positioning the library as a central integrative hub connecting higher education, research, and other public organisations in Slovenia.

CTK's strategic focus on openness and innovation was clearly stated in its Development Plan (2020–2025), which identified the provision of open science infrastructure at the University of Ljubljana as one of its core goals. A key element of this objective is the establishment of a contact point for the implementation of citizen science, aligned with the principles of BESPOC (Broad Engagement in Science, Point of Contact). This framework positions the library as an accessible entry point for researchers, students, and members of the public interested in participatory research, while also ensuring institutional support, methodological guidance, and ethical awareness.

The library's systematic engagement with citizen science intensified from 2020. Building on earlier professional discussions, such as the Focus on Open Science meeting in 2017, CTK began mapping organisations and initiatives active in citizen science and exploring opportunities for collaboration. The explicit aim was to foster the inclusion of diverse user groups – students, pupils, retirees, and other members of the public – into research and knowledge production processes. This work was supported by the development of a Creative Workshop (makerspace) within the library, which provided physical infrastructure for hands-on experimentation, prototyping, and community-based research activities.

Through a combination of strategic planning, infrastructural development, and active outreach, CTK has positioned itself not merely as a support service but as a key institutional mediator and catalyst for citizen science in Slovenia. Its unique position at the intersection of academia and society enables the library to translate abstract policy goals of Open Science into concrete practices that are accessible, inclusive, and sustainable.

Policy Alignment and Institutional Recognition

The strategic importance of citizen science was formally recognised at the national level with the adoption of the Resolution on the Scientific Research and Innovation Strategy of Slovenia 2030, which explicitly promotes citizen science as part of Open Science. The subsequent Action Plan for Open Science, adopted in 2023, operationalised this commitment and identified specific activities to support the development of citizen science.

CTK was actively involved in drafting the Action Plan, drawing on its previous research, advocacy, and educational activities. As a result, the library was designated as the lead implementing partner for several citizen science actions, receiving targeted funding and institutional recognition. This formal role further highlights the strategic position of libraries as stable, trusted institutions capable of coordinating complex, multi-stakeholder initiatives.

The citizenscience.si portal: A National Information Infrastructure

One of the most significant outcomes of CTK's work is the establishment of the national citizen science portal, citizenscience.si. Initiated in late 2022 and developed entirely in-house, the portal was designed as a central digital infrastructure for citizen science in Slovenia. Drawing inspiration from international best practices, particularly the Austrian platform Österreich forscht, the portal serves multiple functions: information dissemination, project visibility, infrastructure mapping, and access to guidelines and tools.

The decision to retain the English term citizen science in the web address reflects both terminological pragmatism and international interoperability. From a library perspective, the portal demonstrates how digital services can support participatory research by lowering entry barriers, addressing diverse user groups (from children to senior citizens), and integrating researchers, practitioners, and the general public within a shared knowledge environment.

The Slovenian Citizen Science Network: Libraries as Connective Infrastructure

The establishment of the [Slovenian Citizen Science Network](#)¹ represents a further institutional innovation led by CTK. The Network was conceived as a voluntary, non-formal partnership framework connecting stakeholders across civil society, the public sector, education, local and national government, and the private sector.

Public libraries were prioritised as key partners due to their strong local presence, community trust, and established networks. Their proximity to residents enables them to serve as entry points for citizen participation and as intermediaries between local knowledge and academic research. Academic and research libraries, in turn, contribute methodological expertise, research infrastructure, and international connectivity.

The Network operates without formal statutes or contractual obligations, relying instead on consensus-building and thematic working groups. This flexible governance model has proven effective: within its first year, the Network expanded rapidly, attracting over 60 partner organisations and individuals from a wide range of disciplines. CTK's hybrid position (embedded in academia while remaining accessible to the public) has been instrumental in sustaining this growth.

Citizen Science Projects in Slovenian Libraries

In addition to their coordinating and infrastructural roles, Slovenian libraries actively participate in citizen science projects across various domains, including environmental sustainability, cultural heritage, health, and digital humanities. These projects demonstrate how libraries can serve as research partners, facilitators of public engagement, and providers of technical and organisational support.

1 PARTNERS | Mreža občanske znanosti

Local history activities

The collection, preservation, and interpretation of local history materials have long been core responsibilities of public libraries in Slovenia. In recent decades, these activities have increasingly developed into participatory research practices that can be recognised as established forms of citizen science. Libraries actively involve local residents in documenting cultural heritage by publishing local history materials, conducting collaborative research initiatives, and digitising heritage collections, which are made accessible through national and regional online platforms such as [Kamra](#)². An important aspect of these activities is the systematic collection of personal memories and privately held materials through initiatives such as the [Days of Collecting Memories](#)³ project. In these projects, libraries organise the gathering, professional processing, and digitisation of contributions provided by citizens. In doing so, libraries act as mediators between professional research standards and community knowledge, enabling local heritage to become a shared research resource and empowering residents as active contributors to knowledge production.

The Seed Library

[The Seed Library](#)⁴ initiative, launched in 2019 at the France Bevk Public Library Nova Gorica, exemplifies how public libraries can support citizen science by fostering environmental awareness, biodiversity conservation, and community participation. The library provides both physical infrastructure (a dedicated seed exchange space) and organisational coordination, enabling citizens to participate in the collection, sharing, and regeneration of locally adapted plant varieties. Currently, it is available in 21 libraries in Slovenia, and in 2025 the project went international with four public libraries in Croatia. Importantly, the library developed a custom digital application to track seed circulation, ensuring transparency, traceability, and data collection relevant to biodiversity monitoring. Librarians curate educational materials, organise workshops, and moderate exchanges, acting as knowledge intermediaries between informal gardening practices and broader sustainability goals. Through this model, the library transforms everyday community practices into a structured citizen science activity with long-term societal and environmental impact.

2 KAMRA | Mreža občanske znanosti

3 Zbiranje spominov o tovarni Rog - Mestna knjižnica Ljubljana

4 SEED LIBRARY | Mreža občanske znanosti

SiDock@home

CTK offered to help the project "covid.si" with setting up the website and promotion of the project. Following discussions with the research team, the site was translated into English within two days, significantly increasing its international visibility and accessibility. CTK also promoted the project through its communication channels, extending its reach to a broader public audience. The participation grew and the project soon evolved into [SiDock@home](#)⁵. Beyond digital support, the library contributed tangible infrastructure and resources. Library computers were made available for integration into the project's distributed computing efforts, enabling members of the public to contribute computing power to scientific research. Simultaneously, CTK's newly established makerspace was mobilised to produce "wuhobrani": 3D-printed straps designed to make prolonged mask-wearing more comfortable. These were produced using the library's 3D printers and distributed during the pandemic, illustrating how citizen science, makerspace activities, and community support can intersect within a library setting. CTK remains involved in the SiDock@home project.

From Manuscript to the Word

The citizen science project [From Manuscript to the Word](#)⁶, coordinated by the National and University Library (NUK), highlights the role of libraries in digital humanities and cultural heritage preservation. The project invites volunteers to transcribe handwritten manuscripts of the poet Srečko Kosovel, thereby improving the accessibility and usability of digitised materials in the Digital Library of Slovenia.

The library provides digitised source material, transcription guidelines, reference editions, and quality-control mechanisms, ensuring that citizen contributions meet scholarly standards. Librarians manage the workflow, coordinate peer verification among volunteers, and integrate the corrected texts into institutional repositories. In this way, the library serves as both a technical platform and an epistemic authority, enabling meaningful public participation while safeguarding academic quality and long-term preservation.

5 SIDOCK | Mreža občanske znanosti

6 FROM MANUSCRIPT TO THE WORD | Mreža občanske znanosti

From the Library to the City 2.0 Changing City Spaces

The project [From the Library to the City 2.0 Changing City Spaces](#)⁷ was developed by the University Library of Maribor and demonstrates how academic libraries can facilitate citizen science focused on urban studies, memory, and spatial change. Building on a long-standing series of guided walks, the library transformed the initiative into a structured citizen research project, engaging participants in investigating changing urban spaces through ethnographic and interdisciplinary methods.

The library provides methodological guidance, access to archival and contemporary sources, coordination of fieldwork, and dissemination of results. By hosting meetings, workshops, and public presentations, the library creates a sustained learning community and ensures continuity across project cycles. This example illustrates how libraries can support citizen science not only by providing access to information, but also by structuring research processes and fostering dialogue between academia and local communities.

A Collaborative Journey from Fiction to Facts

The project [A Collaborative Journey from Fiction to Facts](#)⁸ underscores the role of libraries as inclusive spaces for science communication, critical thinking, and intergenerational learning. It addresses the persistence of folk wisdom, myths, and misinformation by engaging citizens in the systematic collection, analysis, and verification of commonly held beliefs.

Libraries served as primary sites for recruitment, workshops, and public engagement, offering trusted and neutral environments where participants could reflect on how knowledge is formed and validated. Librarians supported logistics, outreach, and facilitation, and contributed to the project's emphasis on information literacy and responsible knowledge sharing. By embedding the project within library spaces, the initiative reached diverse audiences and strengthened the library's role as a mediator between scientific evidence and everyday knowledge practices.

7 FROM THE LIBRARY TO THE CITY 2.0 – CHANGING URBAN SPACES | Mreža občanske znanosti

8 WISDOM UNDER THE MAGNIFYING GLASS | Mreža občanske znanosti

The Strategic Importance of Libraries in Citizen Science

Across citizen science projects, libraries contribute far more than space or promotion. They provide infrastructure, professional expertise, ethical oversight, continuity, and community trust, all of which are essential for sustainable citizen science. By integrating citizen science into their core missions – education, access to knowledge, cultural preservation, and community development – Slovenian libraries demonstrate their potential to act as long-term anchors of participatory research ecosystems.

In Slovenia, the coordinated efforts of CTK and its library partners show how libraries can move beyond supportive roles to become drivers of citizen science ecosystems. As new projects continue to emerge in public, academic, and special libraries, this model provides a transferable framework for integrating citizen science into library services and national research strategies.

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**INTERVIEWS WITH PARTICIPANTS
IN CITIZEN SCIENCE PROJECTS**



Project name / acronym

Ráday Mihály Emlékprojekt / Mihály Ráday Memorial Project

Date or period when the project was done

November 2024 – September 2025 (project preparation phase)

September 2025 – February 2026 (project implementation phase)

Coordinator / main organiser of the project

Metropolitan Ervin Szabó Library, Budapest (Fővárosi Szabó Ervin Könyvtár, FSZEK)

Scientific field

Urban history, cultural heritage studies, library and information science (with citizen science methodology)

JUDIT N. KÓSA

Journalist, writer, historian

How would you, as the project researcher, assess the Mihály Ráday Memorial Project?

The idea for the Mihály Ráday Memorial Project came from two fundamental experiences. Firstly, when I was young, I watched Mihály Ráday's¹ television program with great enthusiasm, which raised awareness of the importance of heritage protection and urban knowledge in Hungarian society, and which gave rise to a strong urban preservation movement that is still active today. The other was that, thanks in great part to Mihály's encouragement, I myself became a researcher of Budapest's history. I have been engaged in microhistorical research for thirty years, exploring the background of individual houses, people, and documents, and in my daily work I can see how dramatically the possibilities have expanded with the digitization of library documents and archives and the emergence of databases available on the internet. In addition, I have long seen how strong people's interest is in

1 Mihály Ráday was the creator and editor of a very popular television programme called "Our grandchildren won't see it either" broadcasted by Hungarian Television from 1980 onwards, dealing with the preservation and protection of Hungary's built heritage. "Our grandchildren won't see it either..." was discontinued in 2010. https://hu.wikipedia.org/wiki/Ráday_Mihály

the history of the city and the everyday lives of its former citizens. More and more people want to go beyond the broad brushstrokes of history and try to get closer to "how it really was."

The starting point for the project is that the Körút Branch Library serves readers from two districts of Pest, VI and VII, and we have been working closely with Andrea Kuczkó, the branch-library's director, for quite some time: I have given numerous lectures and guided tours for interested parties. Seeing their enthusiasm, the idea was born to turn things around a bit: to help readers become capable of conducting their own research into the city's history and familiarize themselves with the available sources and databases.

Good groundwork for this was laid by the city preservation movement's book series *Adalékok...* (Additions...), which, in addition to recording what our selected target area, the "inner" Király Street, was like forty years ago, also reflects the possibilities of urban history research at the time. Even a random sample survey—focused on the Körút Branch Library's own building—showed that the oral tradition recorded in the 1980s, the memories of residents preserved more legends than actual facts, and before comprehensive digitization, archival research also produced rather poor results.

The Ráday Memorial Project was an unusual citizen science research project in that its primary goal was not to support the scientific work of a professional researcher, but rather to conduct a comparative assessment of a particularly significant part of the city. We also wanted to familiarize civilians with the research process and its possibilities. This is particularly important because the participants were mostly elderly people who enthusiastically follow content related to the city's history on community platforms, but had not previously used accessible online databases to verify information or find answers to their questions.

The project can definitely be considered successful in that it has resulted in the creation of an online database of photographs and text documenting the condition of the inner section of Király Street at the end of 2025. This can be compared with the survey conducted forty years ago, corrected if necessary, and freely expanded, thus serving as a basis for future research.

As far as my role is concerned, I definitely consider it a success that those who participated in the two introductory lectures and the consultation learned about the possibilities of research. From now on, whenever they see an old

photo or document on the internet, they will know how to identify, catalogue, and verify it. Another issue is that older participants who are not professional internet users probably found the introduction to databases technologically challenging, and some did not dare to embark on the research, sticking to photographing and describing houses. This is completely understandable, but it shows that next time it will be worth incorporating joint exercises into such training.

ANDREA KUCZKÓ

librarian, project coordinator
head of the Körút Branch Library
Metropolitan Ervin Szabó Library

What is the role of the library in the project?

The Körút Branch Library was the initiator of the project and also the coordinator of the research. After the lecture on Citizen Science², I was thinking how we could involve our readers and event attendees in research. Since local history lectures, book presentations, and city tours are regular and popular events at the library, I chose the topic of local history. I shared my idea with historian Judit N. Kósa, with whom I have been working for several years. She told me about her former research on Mihály Ráday, and after several discussions, the Mihály Ráday Memorial Project took shape. The library developed the theme of the project and hosted the introductory lecture. Applications for the research were sent to the library, where methodological lectures were held and assistance was provided for the research and for navigating the Budapest Electronic Archive. The library was also responsible for maintaining contact and communication, not only with volunteer researchers, but also with librarians, lawyers, and the building representatives of the houses located in the project's research area. We edited and refined the research results to make them accessible to anyone.

2 The first stop of the Citizen Science Roadshow was the Metropolitan Ervin Szabó Library in November 2024.

What were your expectations regarding the composition of the volunteer researchers, and who applied compared to your expectations?

I thought that the vast majority of applicants would be library readers or event attendees. I was right: 24 of the 34 volunteers had already visited the library. Young adults were hardly represented, with only three university students among the citizens, one of whom is studying cultural anthropology, which is why he was interested in the project. The vast majority of applicants were working professionals between the ages of 45 and 60, with a smaller number of retirees. Interestingly, several were over 70 years old. The gender ratio was more favourable than what we usually see at events: 26 women and 8 men participated in the research. Since we are talking about local history research, I thought that the Citizen Science researchers would be organized from among the people living in the area. This was true for the vast majority, but surprisingly, there were also applicants from the countryside, although they had spent their childhood in Erzsébetváros.³

What challenges did you face during the project?

In addition to the staff of the Körút Branch Library, colleagues from other organizational units also participated in the project. During the preparatory phase, it was difficult to find times when we could hold meetings alongside our daily tasks. As we had expected, it was a problem that the volunteers had different levels of IT skills and experience. Many of them were also volunteers in the Budapest100 movement, so searching the database, researching sources, and uploading photos was no problem for them. However, there were also citizens who, although very enthusiastic and motivated, had no basic IT skills. Therefore, in addition to group methodology lectures and presentations, individual "training" was also necessary. Due to our lack of experience, we did not know exactly how much work coordinating the research would entail for the project manager. It turned out to be much more than I had expected: I had to be on call every day because there were always inquiries about various problems, either by email, phone, or in person.

³ Erzsébetváros is the name of this district of Budapest, where the project took place.

JÁNOS JELEN

volunteer citizen science researcher

Former rector of Tan Kapuja Buddhist College. Currently retired. (71 years old)

Where did you hear about the Mihály Ráday Memorial Project, citizen science project?

I attended one of Judit N. Kósa's lectures, which took place at the Körút Branch Library. During the lecture, the head of the branch library, Andrea Kuczkó gave a brief presentation about this opportunity.

What motivated you to participate?

I have been living in Terézváros, on Hegedű Street⁴, since 1986. As I initially came across news items relating to the history of our house by chance (it is enough to mention Károly Eötvös, who once lived here), my interest grew. I gathered more and more information not only about the house, but also about the street. So, the Ráday project came in handy, providing a good opportunity to focus on the house at 54 Király Street – 1/a Hegedű Street.

Was it worth participating in the project? What experiences did you gain, and what useful knowledge did you acquire? If you had the opportunity, would you participate again?

I can say with confidence that every hour I spent researching the history of the selected houses only increased my interest. Beyond the specific facts, it is the life stories behind them that captivate me. The most difficult part is fitting the descriptions of these diverse fates into the framework of the project. I am happy to join every new initiative, as I get much more than just "exoticism": I get clues to better understand my own fate.

⁴ The building is located at the junction of Király Street and Hegedű Street.

Project name / acronym

Musical Intelligence in the Service of National Heritage

Date or period when the project was done

22–25 April 2024

Coordinator / main organiser of the project

National and University Library in Zagreb

Scientific field

Humanities, Music, Cultural heritage

TATJANA MIHALIĆ, PhD

National and University Library in Zagreb

Why do you think Citizen Science is a worth methodology for your research?

Citizen Science is a valuable methodology because it enables broader participation in the research process. In the case of research on musical intelligence, involving citizens and students helped us gather experiences from participants.

Do you work with a library? how do you share the duties?

I work with a library. The research team was responsible for designing the research methodology, coordinating the project activities, and analysing the collected data. The library supported the project by helping with communication, promotion of the project, recruitment of participants, and providing access to resources and space.

When and how often do you meet the volunteers?

We met volunteers during the initial phase of the research on musical sources.

What challenges did you have during the CS project?

One of the main challenges was coordinating the schedules of researchers, librarians, and volunteers. Another challenge was ensuring that all participants clearly understood the research tasks and objectives.

Are you satisfied with the outcome of your research project?

Yes, we are. The participation of volunteers enriched the research process and contributed valuable insights. In addition, the project strengthened cooperation between researchers, educational institutions, and the library.

DOLORES MUMELAŠ

librarian

National and University Library in Zagreb

Why does your library find it important to be part of Citizen Science projects?

The library sees Citizen Science as an opportunity to actively support research and learning within the community. By participating in such projects, the library promotes open science, encourages collaboration between researchers and citizens, and helps make scientific knowledge more accessible.

What is the role of the library in the project?

The library supported the project by promoting the initiative, helping recruit volunteers, and facilitating communication between researchers and participants. It also provided music resources and space for meetings and activities.

What additional results did you achieve during the project?

The project helped strengthen the connection between the library and the community. It also increased awareness of Citizen Science initiatives among pupils and other library users.

Did you have any challenges during the project?

Some challenges included coordinating communication between all project partners and ensuring that volunteers were properly informed about their tasks.

NATAŠA LEVERIĆ ŠPOLJARIĆ

prof. (volunteer of the project)

Music School Pavao Markovac and her students age 13–17

Where did you hear about the citizen science project you volunteered for?

I received an email with invitation from National and University Library in Zagreb.

Why did you participate in it?

My students were main participants, and they wanted to gain new experiences and knowledge.

Was it worth participating? If you had the opportunity, would you participate again?

The students were satisfied. I would participate again, depending on the interest of the students.

Project name

From the Library to the City 2.0: Changing Urban Spaces: Mlinska Street

Date or period when the project was done

2025 Autumn-ongoing

Coordinator / main organiser of the project

University of Maribor, Maribor University Library

Scientific field

Architecture and urban planning, social sciences, history and home studies

Project description

The project From the Library to the City 2.0: Changing City Spaces was developed by the University of Maribor Library as an upgrade of its series of walks From the Library to the City, which it has been running since 2013. Participants, in the role of citizen researchers, focus on selected areas, buildings, or phenomena in Maribor that have changed significantly over time. Through people's memories, written and visual sources, interviews, and other approaches, they try to explore the purposes that changing spaces offer over time, their meanings and value for people, as well as their potential for the future. The approaches in the project are based on ethnology and cultural anthropology but are also linked to interdisciplinary studies of the relationship between people and space. Each academic year, the group is formed anew and selects a space or a phenomenon related to buildings to explore. In the 2025/26 academic year, this is Mlinska Street. Under coordination, participants search for various sources, interpret the collected data, produce a wide variety of results,

and promote the annual findings. The aim of the project is, on the one hand, to bring together a group of researchers and, on the other, to establish direct contact with the local community and strengthen reflection on the importance and vision of spatial development.

MAJA PEGAN

cultural manager (researcher)

Why do you think Citizen Science is a worthwhile methodology for your research?

As an artist focused on the identity of place, I find Citizen Science a valuable methodology because it connects research directly to lived experience and shared knowledge. My thinking is shaped by writers such as Lucy Lippard, Yi-Fu Tuan, and Henri Lefebvre—especially Lippard's *The Lure of the Local*, which emphasizes how place is produced through everyday stories, attachments, and relationships. Artistic work can explore these layers, but it can also only go so far when it relies mainly on individual interpretation. Citizen Science helps me deepen my professional practice by learning concrete research skills (for example, how to work with archival sources) while, just as importantly, engaging with people through participatory methods that support a sense of belonging and reveal multiple perspectives. Personally, I'm not aiming for a scientific career; I see research, story-gathering, and then storytelling as an artistic practice that connects people. This is also where the broader impact begins: helping individuals and communities understand who they are and where they are—becoming more aware of a place and its *genius loci* as it continually changes through time, money, politics, nature, and, above all, through people.

Do you work with a library / museum / archive?

Yes—through this project I do. The citizen-science group is led by our university library, and Dr. Jerneja Ferlež is an excellent mentor with strong expertise in this kind of work. As much as time permits, I would love to spend even more time "buried" in libraries, museums, and archives. What I find especially valuable is the opportunity to learn how different types of archives function in practice—whether in a museum, a gallery, a formal archive, or even a church collection—and to understand what each of them can reveal about a place. I only wish I had more time to explore them all more deeply.

If yes, how do you share the duties?

Because the group is small but quite diverse in terms of backgrounds and skills, we share duties in a flexible and collaborative way. We use a shared drive to keep materials organized, and we meet regularly to coordinate progress and decide what needs to be done next. Dr. Jerneja Ferlež provides excellent guidance and helps us keep the research structured, but the division of tasks mostly happens naturally—people take on what fits their strengths and available time (for example, archival searching, field observations, documentation, or writing). The work is done promptly and shared openly, and there is a strong sense of mutual support: if someone needs help, they can ask and the group will step in.

When and how often do you meet the volunteers?

We meet the volunteers roughly every month to month and a half, usually in a structured group meeting to share updates, coordinate tasks, and plan the next steps. Between meetings we stay in touch as needed (for example via messages and our shared drive), and I'm confident the group would also be open to working in pairs or smaller teams if that was useful or offered.

What challenges did you have during the CS project?

For me as a participant, the main challenge has been availability. I would love to dedicate much more time to research—digging into archives and really absorbing all the possible sources with "all my senses"—but in practice time is tied to money in my work, and while we are also organizing a festival it can be difficult to add extra research hours. Another challenge has been working with older materials, especially texts in Gothic handwriting, which takes real practice to read. That said, online tools and shared learning in the group help a lot, and it has become part of the process of building new skills.

Are you satisfied with the outcome of your research project?

We are not there yet. :)

IRENA VERLIČ

retired librarian

Volunteer

Where did you hear about the citizen science project you volunteered for?

I learned about the citizen science project carried out by the University of Maribor Library through posts on social media. I then responded to an invitation from a former colleague with whom I used to work at the library—she is the coordinator of the project.

Why did you participate in it?

I decided to participate because I used to live in the area that is being researched in the citizen science project From the Library to the City 2.0: Changing Urban Spaces – Mlinska Street. I felt that my knowledge of the area could be valuable, and this proved to be true during the collaboration.

Was it worth participating? If you had the opportunity, would you participate again?

Participating was a great pleasure for me. If I had the opportunity again, I would gladly take part once more.

JERNEJA FERLEŽ

ethnologist and librarian

Librarian

Why does your library find it important to be part of CS projects?

The University of Maribor Library decided to coordinate and implement citizen science projects primarily because it supports the principles that citizen science promotes—engaging the wider public in scientific research, strengthening community connections, and building trust in science. As a library with a long tradition of organizing events in cooperation with the local community, we saw this as a natural extension of activities that were already part of our work.

What is the role of the library in the project?

By upgrading a project that the library had already implemented in the past, the library developed a concept that places an even stronger emphasis on participatory methods of public involvement. The project was then promoted and users of the library, as well as the wider public, were actively invited to participate.

The library formed a group of citizen researchers, introduced them to the concept, and designed the working process and dynamics—meetings approximately once a month, an introduction to the concept of citizen science, an explanation of the chosen research topic, the joint development of the research question, and then the active implementation of the project.

Through its communication channels, the library promotes the project and actively presents it within the Slovenian Citizen Science Network. The project has also been included in the catalogue of Slovenian citizen science projects.

What additional results did you achieve during the project?

The project is still ongoing, so the results are still emerging. One of the outcomes already becoming visible is the growing connection among the group of researchers, the mutual exchange of knowledge and skills, discussions about the meaning of urban spaces, and the ability to connect insights about the past, present, and future.

Did you have any challenges during the project?

Not really. Since we operate within a public institution where I am employed and the project has not generated additional costs so far, there have been no significant financial challenges. The main effort was explaining and justifying to the local community why we selected the specific area we are researching. The area is generally considered a degraded part of the city, which is precisely why it represented a special challenge for us, although externally the choice sometimes seemed unusual.



