

Citizen Science Platforms and the Reconfiguration of Urban Ecological Governance: Policy and Planning Implications from South Korea

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The rapid expansion of digital platforms has fundamentally reshaped the production, circulation, and institutional use of urban knowledge. Beyond functioning as technical infrastructures, platforms increasingly operate as socio-political devices that structure participation, standardize data, and mediate relationships between citizens and public authorities. In urban and regional planning debates, platformization has been widely examined in the context of platform capitalism, smart cities, and data-driven governance. However, comparatively little attention has been paid to non-profit, public-interest platforms and their potential to foster collaborative governance. In particular, while citizen science has grown through digital platforms that enable large-scale ecological monitoring, existing research has primarily focused on data accuracy and educational effects, leaving underexplored how platform-mediated data practices may reconfigure local ecological governance and planning processes. This study addresses this gap by analyzing how citizen science platforms structure ecological monitoring practices and examining their potential to reshape urban ecological governance, with a focus on policy and planning implications.

The study investigates the case of the Uiwang Community Ecology Research Group, a local citizen-led ecological monitoring initiative based in Uiwang City, South Korea. The group conducts regular monitoring activities in everyday urban spaces such as riversides, parks, and residential green areas, and systematically uploads observation data to a citizen science platform (primarily NatureRing). Unlike expert-led or short-term projects, the group represents a sustained, community-based initiative that interacts with local governance bodies such as the municipal sustainability council and volunteer centers.

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The research adopts a qualitative case study design combining semi-structured interviews and participant observation. Sixteen in-depth interviews were conducted with fifteen members and the group leader between September 2025 and January 2026. In addition, participant observation was undertaken through bi-monthly monitoring sessions from August 2025 to January 2026, documenting observation practices, data recording processes, platform uploads, and group discussions. Interview questions addressed motivations for platform use, perceptions of platform features (e.g., ranking systems, challenges, comment functions), understandings of scientific contribution, and views on collaboration with local authorities. The analysis is guided by a three-stage conceptual framework linking (1) offline ecological practice, (2) platform mediation, and (3) governance connection.

The first stage conceptualizes citizen science practice as a loop of observation–recording–data production. Field observations are conducted collectively, often involving experienced members guiding newcomers in species identification and habitat interpretation. Observations are photographed, discussed, and later uploaded with species names and metadata. “Recording” is understood not merely as documentation but as the core identity of the group: data accumulation transforms sporadic observation into long-term monitoring. However, observation is shaped by participants’ interests, seasonal visibility, and accessibility, introducing potential biases in species and site coverage.

The second stage highlights platform mediation. The platform transforms heterogeneous field experiences into standardized, searchable, and cumulative datasets through automated metadata attachment and structured input formats. Interactive functions such as “species identification requests,” comments, likes, rankings, and thematic challenges encourage sustained engagement. These features convert individual hobby-like observation into socially validated participation embedded in a broader community of users. Members reported that ranking systems and cumulative species counts fostered motivation and continuity, while peer feedback improved attentiveness to species characteristics. Importantly, the “identify this species” function enables cross-validation: users can request identification support from the wider platform community, and selected responses are incorporated into official records. This mechanism facilitates distributed expertise and iterative correction, strengthening data reliability despite the non-professional status of contributors. At the same time, the platform’s interface and

design implicitly shape what counts as recordable or valuable, potentially steering observation practices toward visually distinctive or easily identifiable species.

The third stage examines governance connection. The accumulated data do not remain confined to the platform but are mobilized in local governance contexts. Initially, ecological monitoring was not recognized as formal volunteer activity by the local volunteer center. Through persistent submission of observation records and compiled reports, the group eventually secured official recognition of monitoring as volunteer service. Data are also reported to the municipal sustainability council and used in environmental festivals and educational programs. Members use accumulated records in ecological education sessions and publish annual compilations of local species data. In this way, platform-mediated data are translated into collective assets and function as a “language of collaboration” in interactions with local authorities.

A particularly illustrative example concerns a development project in which a protected species was not detected during a short-term environmental impact assessment but was later found after construction had begun. The group leader emphasized that long-term, continuous monitoring data could provide more robust evidence of species presence than one-time assessments. Although the group does not position itself as a confrontational environmental movement, it envisions data-based dialogue with municipal authorities as a strategic approach to influence planning decisions. Rather than relying on slogans or protest, members advocate using accumulated ecological records to substantiate conservation claims in redevelopment or land-use conflicts. This orientation reflects a shift from adversarial activism to evidence-based partnership within urban ecological governance.

The findings yield three key insights. First, citizen science platforms transform dispersed personal observations into standardized and cumulative datasets that can be reinterpreted as community-level public resources. Platform mediation facilitates the transition from informal hobby to structured monitoring practice, enabling data reuse in education, festivals, and public communication. Second, interactive and gamified features enhance sustained participation and foster peer learning, resulting in incremental improvements in data reliability and ecological literacy. Platform-based cross-validation processes demonstrate that distributed knowledge networks can partially compensate for the absence of formal scientific training. Third, citizen-generated data hold potential to serve as mediating tools in local governance by providing empirically grounded reference

points in planning debates. Through sustained accumulation, these data may complement formal environmental assessments and support more adaptive, place-based planning.

Despite these promising dynamics, the study also identifies limitations. The institutional integration of citizen science data into formal planning instruments remains weak. Although data are used in education and public events, systematic procedures for incorporating them into environmental impact assessments, biotope mapping, or land-use planning are underdeveloped. Administrative feedback mechanisms are limited, and data verification systems rely largely on peer interaction rather than formal expert review. Consequently, the governance role of citizen science remains largely potential rather than fully institutionalized. Furthermore, the single-case design constrains generalizability, and the study does not quantitatively evaluate data accuracy or algorithmic influence.

Theoretically, this research contributes to urban and regional planning debates by conceptualizing citizen science platforms not merely as tools for data collection but as governance devices that mediate relationships between citizens and municipalities within processes of digital transformation. It extends discussions of platformization beyond commercial platform urbanism to consider public-interest, community-based platforms as infrastructures of collaborative governance. By integrating offline ecological practice with online data mediation and governance linkage, the study proposes a framework for understanding how digital participation may reconfigure ecological governance without necessarily replacing existing institutions.

From a policy perspective, the findings suggest three implications. First, institutional pathways are needed to incorporate long-term citizen-generated data into planning procedures, for example as supplementary references in environmental impact assessments or biodiversity mapping. Second, feedback systems linking municipalities, experts, and citizen scientists should be established to enhance data credibility and participant efficacy. Third, platform features that successfully motivate sustained participation—such as thematic challenges—could be aligned with local planning priorities to encourage collective monitoring of specific sites or species relevant to development debates.

In conclusion, the case of the Uiwang Community Ecology Research Group demonstrates that platform-mediated citizen science can contribute to the incremental

reconfiguration of urban ecological governance by structuring participation, standardizing ecological knowledge, and enabling data-based collaboration. However, realizing its full planning potential requires institutional recognition, verification mechanisms, and formal integration into decision-making processes. Future comparative research across different cities and platform types will be essential to assess the broader applicability of this governance model and to clarify the conditions under which citizen-generated data can meaningfully influence urban and regional planning.