



University-Based Living Labs in South Korea: Practices, Governance, and Implications for Intelligent Society

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Abstract. As intelligent society continues to develop, living labs have increasingly been adopted as a means of organizing real-life experimentation and collaborative innovation. Existing studies, however, tend to treat living labs primarily as technological testing environments. This study argues that living labs are better understood as governance platforms that organize multi-actor collaboration, sustain feedback processes, and support the continuation of experimental outcomes. Focusing on university-based living labs in South Korea, this study examines how these platforms operate through an analytical framework of actors, mechanisms, and outcomes. The findings suggest that universities play a key role as intermediaries connecting governments, firms, and citizens. More importantly, their contribution lies not only in facilitating co-creation but also in sustaining coordination and enabling the realization of experimental outcomes beyond project boundaries. The study highlights university-based living labs as a meso-level form of experimental governance in intelligent society.

Keywords: Living Labs; Governance Platforms; University-Based Innovation; Intelligent Society; South Korea; Public Management

1 Introduction

The emergence of intelligent society has brought renewed attention to how governance is organized under conditions of technological acceleration and social complexity. Traditional top-down approaches are increasingly challenged by uncertainty, fragmentation, and the need for continuous adaptation, leading to growing interest in more experimental and participatory forms of governance [1].

Within this context, living labs have emerged as a practice-oriented approach that combines real-world experimentation with stakeholder engagement. South Korea provides a particularly relevant empirical setting, given its sustained investment in smart city development since the late 2000s [2]. While earlier initiatives were largely technology-driven, more recent policy directions have shifted toward citizen participation and living lab-based experimentation [3]. Universities have been increasingly incorpo-

rated into these processes through smart campus initiatives, interdisciplinary programs, and collaborative projects with governments and firms.

This study asks: **How do university-based living labs in South Korea function as governance platforms in the context of intelligent society?** It argues that living labs should be understood not merely as experimental environments but as platform-based governance arrangements that organize collaboration, sustain feedback, and enable the continuation of experimental outcomes.

2 Living Labs as Governance Platforms

2.1 From Experimental Sites to Governance Arrangements

Living labs are commonly defined as real-life environments for user-centered innovation. Early research emphasizes co-creation, open innovation, and the importance of testing solutions in everyday contexts [4][5][1]. Over time, however, the focus has shifted from viewing living labs as technical testbeds to understanding them as collaborative processes. Recent studies highlight that the core of living labs lies in their ability to organize interaction among multiple actors and sustain iterative cycles of experimentation, feedback, and adjustment [5]. In this sense, they can be understood as governance arrangements embedded in real-world contexts.

2.2 The Platform Logic of Living Labs

This shift suggests that living labs operate through a platform logic. The analytical focus moves from “place” to “platform,” emphasizing how collaboration is organized, how feedback is sustained, and how outcomes extend beyond projects. First, living labs connect heterogeneous actors and facilitate coordination across institutional boundaries [5]. Second, they rely on iterative processes of co-creation, testing, and adjustment [1]. Third, their effectiveness depends on the realization of outcomes beyond experimentation. Shin and Lee show that many projects fail after the pilot stage, highlighting the importance of sustained coordination and support [6].

2.3 Universities as Living Lab Platforms

Universities provide particularly suitable settings for living labs due to their hybrid nature, combining research, teaching, and social engagement [7]. They can act as facilitators, coordinators, and evaluators within collaborative processes [5]. At the same time, universities face institutional constraints, including limited incentives for cross-sector collaboration and difficulties in balancing stakeholder interests [7]. Their effectiveness as governance platforms therefore depends on supportive organizational conditions.

2.4 Research Gap and Analytical Approach

Existing studies tend to focus on innovation outcomes or sustainability impacts, while paying less attention to governance functions [8][7]. This study addresses this gap by analyzing university-based living labs as governance platforms using an actors–mechanisms–outcomes framework.

3 Analytical Framework

3.1 Actors–Mechanisms–Outcomes Framework

This study adopts an analytical framework that conceptualizes university-based living labs as governance platforms structured around actors, mechanisms, and outcomes. Actors include universities, governments, firms, and citizens, who together form collaborative networks in real-life settings [5]. Within these arrangements, universities are not treated merely as spatial hosts, but as organizational intermediaries that connect heterogeneous stakeholders and coordinate interaction across institutional boundaries.

Mechanisms refer to the processes through which collaboration is organized and sustained. These include co-creation, facilitation, pilot testing, feedback loops, and realization processes [1][6]. Rather than viewing living labs as one-off experiments, this study emphasizes their recursive character: problems are identified, solutions are jointly developed and tested, and feedback from users and partners is incorporated into subsequent rounds of adjustment. In this sense, the governance significance of living labs lies not only in experimentation itself but also in their capacity to structure iterative learning and cross-sector coordination.

Outcomes include governance innovation, campus and community improvement, and ecosystem development [9]. These outcomes are not understood solely in terms of technical performance or short-term project success. They also include broader institutional effects, such as strengthened cooperation among public, private, and civic actors, the embedding of experimental practices into organizational routines, and the continuation of selected solutions beyond the pilot stage. Accordingly, the actors–mechanisms–outcomes framework allows this study to examine university-based living labs not simply as innovation sites, but as meso-level governance arrangements.

3.2 Case Selection and Typology Construction

This study uses a qualitative comparative synthesis of university-based living lab cases in South Korea. Rather than conducting an original impact evaluation, it analyzes secondary evidence from policy documents, university project materials, and peer-reviewed studies to identify recurrent governance patterns across cases. Cases were included when they met four criteria: (1) the initiative was university-based or university-anchored; (2) experimentation took place in a real-life setting rather than in a purely laboratory environment; (3) the case involved collaboration among multiple actors beyond the university itself; and (4) sufficient public documentation was available to identify actors, mechanisms, and post-pilot trajectories.

On this basis, this study examines 12 focal project sites grouped into four ideal-typical configurations: smart campus ($n = 4$), social innovation ($n = 2$), industry-linked ($n = 3$), and educational/pedagogical ($n = 3$). The typology is analytical rather than mutually exclusive. Some initiatives contain overlapping characteristics, but each case is classified according to its dominant governance purpose and organizational logic.

3.3 Operationalizing the Shift from “Lab-as-a-Place” to “Lab-as-a-Platform”

To clarify this study’s theoretical contribution, this study further operationalizes the distinction between “lab-as-a-place” and “lab-as-a-platform.” A place-based arrangement mainly refers to a bounded physical site in which technologies or services are tested under real-life conditions. By contrast, a platform-based arrangement is identified through four analytical indicators: (1) the coordination of multiple actors across institutional boundaries; (2) the presence of iterative feedback and adaptation rather than one-off pilot testing; (3) some degree of institutional embedding in university structures, municipal routines, or partner networks; and (4) the existence of realization pathways beyond experimentation, such as scaling, policy uptake, or curricular integration. Cases displaying at least three of these four characteristics are treated as predominantly platform-based. This distinction does not deny the spatial dimension of living labs; rather, it helps explain when a living lab functions not only as a test site but also as a governance platform.

Figure 1 presents the analytical framework of this study, conceptualizing university-based living labs as governance platforms structured around actors, mechanisms, and outcomes. Actors include governments, universities, firms, and citizens, with universities positioned as key coordinators. Mechanisms consist of iterative processes such as needs identification, co-creation, pilot testing, and feedback loops. These processes generate outcomes including governance innovation, campus and community improvement, and ecosystem development. The feedback links across stages highlight the continuous and recursive nature of living lab processes, through which collaboration is organized, learning is sustained, and outcomes are progressively realized and scaled.

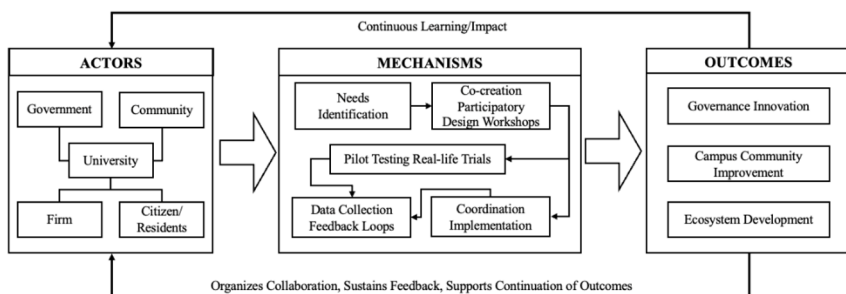


Fig. 1. Analytical Framework of University-Based Living Labs as Governance Platforms

4 University-Based Living Labs in South Korea

To operationalize both the actors–mechanisms–outcomes framework and the distinction between place-based and platform-based arrangements, Table 1 summarizes the main types of university-based living labs in South Korea.

Table 1. Empirical Basis of the Typology

Type	Focal cases / project-sites	N	Dominant governance purpose	Main evidence base
Smart Campus	Yonsei University Smart Campus Challenge, Anyang University Smart Pole / traffic-welfare services Hanshin University urban data PM management service; Korea National University of Transportation mobility/safety projects	4	Campus-city infra-structural experimentation and service co-ordination	Smart City Korea / Smart Campus Challenge materials; project descriptions
Social Innovation	Cheonan Smart City Living Lab (Dankook University); Yonsei CWC community-oriented projects	2	Citizen participation, articulation of local needs, and community problem-solving	Smart city living lab guidelines; university/community project materials
Industry-linked	Busan EDC Smart Village; Yonsei ISi Last-mile Delivery Living Lab; Yonsei ISi Innovation Ecosystem Exploration Living Lab	3	Public-private-people intermediation, validation, and scaling	Official ISi materials; prior studies on university-industry living labs
Educational / Pedagogical	IPAID/CWC living-lab educational cooperation in Vietnam; Rwanda; Indonesia	3	Curricular embedding, student co-creation, and diffusion of living-lab practices	IPAID educational co-operation materials; teaching portfolios

The table summarizes four ideal-typical forms of university-based living labs observed in South Korea. Smart Campus Living Labs use campuses and adjacent urban areas as testbeds for smart mobility, energy, and safety services, coordinated among universities, firms, and local governments to improve infrastructure and public services. Social Innovation Living Labs, often anchored in community-oriented universities and programs, focus on co-creation with citizens through workshops and community projects to address local social problems and channel community needs into policy discussions. Industry-linked Living Labs, such as Yonsei’s ISi Living Lab, operate as multi-stakeholder platforms where firms, public institutions, and citizens co-develop and test technologies in real-life settings, thereby strengthening innovation networks and cross-sector governance. Finally, Educational or Pedagogical Living Labs integrate the living lab approach into teaching and international cooperation, empowering students as co-creators in “glocal” problem-solving projects and turning universities into experimental learning organizations that diffuse living-lab-based governance practices across curricula and partner institutions

4.1 Smart Campus Living Labs

Smart campus living labs represent one of the most institutionalized forms of university-based experimentation in South Korea. These initiatives have been actively promoted through national programs such as the Smart Campus Challenge, launched in 2020 under the broader smart city policy framework [2]. The program initially selected eight universities across the country, including Yonsei University, Anyang University, Hanshin University, and Korea National University of Transportation. These projects typically involved collaboration among universities, municipal governments, and technology firms and focused on areas such as smart mobility systems, pedestrian safety, campus security, and integrated data platforms.

From the perspective of actors, these living labs bring together university research institutes, local governments, private companies, and campus users. In many cases, each project involved multiple pilot sites within and around campus areas, extending the experimental scope beyond university boundaries.

Mechanisms in these projects are primarily based on pilot testing and data-driven feedback. For example, smart poles and sensor networks were installed to monitor traffic conditions, while AI-based CCTV systems were used to enhance safety management. These systems generated continuous streams of data, which were analyzed and fed back into service design. User feedback was collected through surveys, digital platforms, and participatory workshops involving students and local residents.

In terms of outcomes, these projects contributed to measurable improvements in campus services and infrastructure. However, evaluation reports indicate that their long-term sustainability depends heavily on continued funding and institutional support. Once pilot programs end, maintaining systems and stakeholder coordination becomes significantly more challenging.

4.2 Social Innovation Living Labs

Social innovation living labs place greater emphasis on participatory governance and community engagement. These projects extend beyond campus environments and focus on addressing local social problems through collaboration. A representative case is the Cheonan Smart City Living Lab, in which Dankook University has played a central role since the mid-2010s [3]. The project involved collaboration among university researchers, municipal authorities, and local residents. In several pilot initiatives, dozens of citizens participated in service testing and evaluation processes, particularly through simulated environments and real-life trials.

From an actor's perspective, these living labs include a wider range of participants, such as residents, community organizations, public officials, and university teams. Universities act as facilitators, organizing workshops, designing participation processes, and interpreting user feedback. Mechanisms in these cases emphasize co-creation and iterative feedback. Projects typically follow a multi-stage process, including problem identification, participatory design workshops, pilot testing, and evaluation. Citizen input is incorporated continuously, rather than only at the final stage. The outcomes include improved public services, increased citizen participation, and stronger connec-

tions between universities and local communities. At the same time, sustaining participation over time remains a key challenge. Many projects rely on temporary engagement structures, and integrating experimental results into formal governance processes is often difficult.

4.3 Industry-linked Living Labs

Industry-linked living labs in South Korean universities are embedded in broader smart city and innovation-ecosystem initiatives, which further clarifies their governance functions. The EDC Smart Village in Busan, for example, is operated as an experiential living lab within the national Eco Delta City project, where 56 households test more than 40 innovative technologies and services, including smart home devices, robotics, and digital healthcare solutions, in their everyday lives. Residents' interactions and feedback are systematically monitored and fed into evaluation processes that inform decisions about which solutions should be scaled up to the wider smart city, while firms use the collected data to refine products and business models. Yonsei University's ISi Living Lab further institutionalizes this role by explicitly positioning itself as a "4Ps" (people–public–private–collaboration) intermediary, running projects such as the Last-mile Delivery Living Lab and the Innovation Ecosystem Exploration Living Lab that coordinate technology firms, logistics providers, public agencies, and citizens through staged experimentation, iterative co-design workshops, and data-driven assessment.

Complementing these project-based accounts, empirical research on university–industry cooperation in Korea finds that living labs have a positive and direct impact on regional innovation networks by fostering repeated interactions, mutual learning, and knowledge exchange among firms, universities, and local stakeholders. At the same time, these studies highlight persistent obstacles to "realizing" living lab outcomes, including regulatory barriers, fragmented responsibilities, and the difficulty of sustaining coordination once external funding ends. In this context, universities' intermediary work—such as providing neutral spaces, translating between technical and policy languages, and maintaining long-term partnerships—becomes crucial for stabilizing cross-sector collaboration and for preventing industry-linked living labs from remaining one-off pilot projects. Taken together, these findings substantiate the view that industry-linked, university-based living labs in South Korea operate as meso-level governance platforms that mediate between technological innovation, market interests, and the broader public good in the emerging intelligent society.

4.4 Educational / Pedagogical Living Labs

Educational and pedagogical living labs represent a distinct shift toward internal organizational transformation, where the principles of experimental governance are integrated directly into the university's core mission of teaching and learning. A flagship example of this model is the City Within the City (CWC) project, spearheaded by the Institute for Poverty Alleviation and International Development (IPAID) at Yonsei University. Unlike other models that focus on external infrastructure, this approach conceptualizes the university itself as an experimental learning organization.

The primary mechanisms of this model are the institutionalization of living lab-based courses and the implementation of problem-based and glocal learning projects. In these initiatives, the "classroom" is extended to include real-world settings—ranging from local neighborhoods in South Korea to partner communities in Vietnam, Rwanda, and Indonesia. By addressing complex societal challenges through a "glocal" lens, these projects allow students to apply theoretical frameworks to practical problems, facilitating a continuous feedback loop between academic inquiry and social reality.

In terms of outcomes, this model drives significant pedagogical innovation by shifting the traditional hierarchy of knowledge. Students are no longer passive recipients but are fostered as co-creators of solutions. This process leads to profound student empowerment, as they take ownership of the innovation process from problem identification to field testing. Furthermore, by engaging with international partners, students develop a sense of global citizenship, learning to navigate diverse cultural and regulatory environments while addressing universal sustainable development goals.

From a governance function perspective, these living labs serve as a vehicle for the internal governance of universities. They facilitate the diffusion of living lab practices into the curricula, ensuring that experimental governance is not a peripheral activity but a central pillar of the educational experience. By aligning academic structures with experimental practices, universities transition into adaptive platforms that produce not only knowledge but also socially responsible innovators capable of navigating the complexities of an intelligent society.

The four types of university-based living labs described above—Smart Campus, Social Innovation, Industry-linked, and Educational—illustrate the diverse ways in which South Korean universities have institutionalized experimental governance. While their specific actors and objectives vary, they collectively function as platforms that mediate between state-led initiatives, market demands, and community needs. By examining these practices through the Actors–Mechanisms–Outcomes framework, it becomes clear that these labs are not isolated projects but interconnected nodes in a broader governance ecosystem. The following section will discuss the broader implications of these findings, focusing on the university's role as a meso-level intermediary and the challenges of sustaining these platforms in the long term.

5 Discussion

The analysis shows that university-based living labs in South Korea are better understood as governance platforms than as isolated experimental sites. Their importance lies not only in providing real-life testbeds but also in coordinating governments, firms, citizens, and internal university actors through iterative feedback and continued adjustment. In this sense, the findings support the shift from "lab-as-a-place" to "lab-as-a-platform." Universities matter because they can connect top-down policy agendas with bottom-up social needs, thereby reducing the gap between technological experimentation and practical governance.

At the same time, realization remains uneven across the four types. Smart campus living labs face relatively strong financial and infrastructural barriers after pilot funding

ends. Social innovation living labs are often effective in participation and local problem identification, but they face difficulty when citizen input is not embedded in formal governance routines. Industry-linked living labs confront the most complex coordination challenge because they must align commercial, regulatory, and public interests at the same time. By contrast, educational living labs show comparatively stronger continuity because they can be incorporated into recurring courses and curricula. These differences suggest that the governance value of living labs depends not only on experimentation, but also on the degree of institutional embedding beyond the pilot stage.

6 Conclusion

This study has argued that university-based living labs in South Korea should be understood as governance platforms that organize collaboration, sustain feedback, and support the continuation of experimental outcomes. Using an actor–mechanisms–outcomes framework, the study identified four ideal-typical configurations and showed that universities act not only as knowledge producers or physical hosts but also as intermediaries linking state agendas, market actors, and community needs. This study therefore clarifies the shift from “lab-as-a-place” to “lab-as-a-platform.”

The findings also speak to the broader context of intelligent society, understood here as a governance environment increasingly shaped by digital infrastructures, data systems, and AI-assisted coordination. In such a context, the key issue is not technology adoption alone, but the institutional capacity to manage participation, accountability, and long-term coordination. For policymakers, this implies the need to move beyond short-term pilot funding toward more durable support for realization and institutional embedding. Future research should further examine how university-based living labs address emerging issues such as data governance and algorithmic accountability.

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Disclosure of Interests

The author declares that there are no competing interests relevant to the content of this article.

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