*J Euro Eco His.*
*ISSN : 0391-5115*
*Volume 7, Issue 2 ( 2026)*
THE JOURNAL OF EUROPEAN ECONOMIC HISTORY

# Urban Living Labs in India's Smart Cities: Public Awareness, Participation Willingness and Sustainability Perceptions

**Ananya Bhardwaj**
Research Scholar, Department of Economics, Manipal University Jaipur,
Jaipur-Ajmer Express Highway, Dehmi Kalan, Jaipur, Rajasthan
Corresponding author: Ananya Bhardwaj; ananyajpr@gmail.com

**Shilpi Gupta**
Associate professor, Department of Economics, Manipal University Jaipur,
Jaipur-Ajmer Express Highway, Dehmi Kalan, Jaipur, Rajasthan
shilpi.gupta@jaipur.manipal.edu

**Abstract**
Urban Living Labs have recently gained a lot of attention globally but their application is still missing in urbanization of developing economies especially India. India's Smart Cities Mission provides a pathway for its structured implementation but there is rarely any evidence of public awareness and participatory readiness. This paper mainly discusses the public knowledge and willingness along with a primary survey of 103 respondents across Rajasthan. The formal awareness is low but there is a strong willingness to participate, broad support for public-private models. Sustainable green infrastructure has also emerged as the most dominant preference for development. A study on secondary initiatives from Goa, Kuala Lumpur also provide a base for a comparative framework. The paper contends that there is a strong need of systematic integration of systematic policies and frameworks and public receptivity is a latent asset that can be highly used through awareness and government policies.

**Key Words:** Urban living labs, smart city, sustainability, public participation, green infrastructure, India

## Introduction

One of the defining forces of the twenty-first century is rapid urbanization. According to estimates, 68% of people on Earth will reside in cities by 2050, with emerging nations bearing the majority of this increase (United Nations, 2018). India is not different, with over 500 million people expected to live in cities by 2030. The nation has severe problems with resource scarcity, infrastructure overload, and environmental deterioration, all of which are concentrated in its cities. Highlighting this, the idea of Urban Living Labs (ULL) in a structured way where urban factors co-design, test, and revise solutions to sustainability concerns in real-world settings has risen as a governance innovation with significant promise.
The ULL can be successfully implemented through test areas. This model is different from the other existing models due to the participatory nature which involves citizens, local government, commercial businesses, and research institutions in routine problem-solving procedures (Steen and van Bueren, 2017). This strategy has succeeded considerably in both Europe and North America, with cities like Amsterdam, Barcelona, and Helsinki demonstrating measurable gains in sustainability outcomes through ULL-driven governance (Voytenko et al., 2016). Its adoption in Asia has been concentrated in technologically advanced economies also like South Korea, Japan, and Singapore. Despite its size and the presence of

supporting policy frameworks like the Smart Cities Mission (SCM), which was introduced in 2015, as well as a few cities like Chandigarh, Bengaluru, and Delhi, India has only seen irregular implementation, most notably in Goa under a Denmark-India bilateral project.

This discrepancy is caused by both institutional and intellectual factors. Although ULL may be recognized in theory by local governments and urban planners, there is hardly any information about the public's preparedness and willingness to engage in co-creative urban governance initiatives. Without public backing, ULL could become a moderately unsuccessful sustainability that is technically sound but socially indifferent. This work immediately addresses that gap. It examines attitudes toward sustainable urban development, public knowledge of ULL, and self-reported willingness to participate in and support ULL initiatives. It is based on a primary survey of 103 respondents throughout Rajasthan. Secondary case evidence from Kuala Lumpur, Malaysia, and Goa, India, places domestic findings in a comparative framework.

Three contributions are made by the paper. First, it closes a gap in the literature dominated by European case studies by offering one of the few empirical evaluations of ULL awareness among the Indian populace. Second, it reveals a notable discrepancy between strong buried participatory readiness and poor formal awareness, which has consequences for ULL outreach and design. Third, it suggests a framework for combining disparate sustainability projects in smart cities in India into a more organized ULL model that is in line with Sustainable Development Goal 11 (SDG-11- Sustainable Cities and Communities).

## 1. Literature Review

In the early 2000s, innovation studies and urban governance theory gave rise to the idea of ULL, which gained popularity after the European Network of Living Labs (ENoLL) initiative in 2006. In four dimensions of aim, activities, participants, and context; Steen and van Bueren (2017) identified nine distinctive features of ULL. Their paradigm distinguished ULL from traditional urban experimentation by emphasizing learning and co-creation, not only the use of technology. This was expanded upon by Chroneer, Stahlbrost, and Habibipour (2019), who looked at how ULL features differ in different implementation scenarios and discovered that the main causes of variance are stakeholder makeup and governance structure.

Scholarly interest in the connection between ULL and smart city frameworks is developing. Engels, Wentland, and Pfotenhauer (2019) claim that ULL act as "test beds for future societies," generating technical knowledge about urban systems and testing theories of government. A ULL framework may combine this dual aim, which is particularly pertinent in the context of the Smart Cities Mission, as Indian cities are simultaneously developing participatory government structures and deploying technological platforms.

From the demand side, Menny, Palgan, and McCormick (2018) demonstrated that user involvement fluctuates systematically between ULL stages, with design and assessment stages showing lower citizen engagement than implementation. Their findings indicate that information campaigns and readily accessible interaction platforms must be used to intentionally engage public participation. Juujärvi and Lund's (2016) study on early-stage ULL in Finland found that pre-implementation stages, like knowledge exchange and relationship development, are the most underfunded. Long-term involvement rates are impacted by this.

Astonishingly little research has been done on ULL in developing countries. Abdullah, Ahmad, and Zainal (2020) found that although professional understanding of ULL far exceeded

community awareness, the general public's willingness to learn and participate was surprisingly high in their study of blue-green ULL in Kuala Lumpur. This mismatch between formal knowledge and participative intent is the primary dilemma this study examines in the Indian context. While Levenda (2018) identified affordability and technology adoption as key obstacles in developing-economy ULL, Bulkeley and Coenen (2017) emphasized the necessity of ULL designs that align individual interests with organized community and national goals as a particularly acute challenge in diverse urban populations like India.

## 2. Conceptual Framework

• The literature on participatory governance, which holds that public involvement is crucial to the legitimacy and effectiveness of urban sustainability projects, serves as the foundation for this study (Fung, 2006). As active co-creation venues rather than passive recipients of citizen input, ULL physically operationalizes this concept. This analytical paradigm distinguishes three facets of public awareness and readiness for ULL:

• Cognitive readiness: awareness and understanding of ULL as a concept and its relationship to sustainability.

• Attitudinal readiness: perceived importance of sustainable development and the role of ULL in advancing it.

• Behavioural readiness: self-reported willingness to participate in ULL initiatives and advocate for them.

The method is consistent with the Theory of Planned Behaviour (Ajzen, 1991), which links attitudes and subjective norms to behavioural intentions. It is assumed that in the context of ULL, attitudinal readiness (sustainable development is essential) and cognitive readiness (I know what ULL are) predict behavioural readiness (I am willing to engage). A significant gap between cognitive and behavioural readiness would indicate that knowledge asymmetry rather than genuine disagreement is the primary barrier to public involvement, a conclusion with direct policy implications.

## 3. Data and Methodology

Convenience sampling has been used to collect primary data using in-person interviews and a standardized questionnaire delivered via Google Forms. The study, which was designed for adults living in Rajasthan's cities, garnered 103 valid responses. The questionnaire was split into two parts: (i) a multiple-choice section that recorded implementation model preferences, and (ii) a Likert-scale section that used a five-point scale (1 = Strongly Disagree to 5 = Strongly Agree) to gauge awareness, attitudes, and participatory intent regarding ULL.

The ten survey criteria that match the three-dimensional readiness framework outlined in Section 3 are shown in Table 1. News outlets, official documents, and published case studies provided secondary data regarding ULL deployment in Malaysia (Kuala Lumpur) and India (Goa). These cases were selected because of their thematic relevance to awareness asymmetry; they both show excellent professional comprehension of ULL and low community-level distribution, which is comparable to the situation in Rajasthan. The frequency distributions of the most and least answers for each parameter are reported via descriptive primary data analysis. The study does not claim statistical representativeness due to the convenience sample; instead, the findings are suggestive and intended to stimulate more comprehensive, stratified surveys.

**Table 1: Survey Parameters and Frequency Distribution of Responses**

| Sl. No. | Parameter | Least (%) | Most (%) | Interpretation |
|---|---|---|---|---|

*J Euro Eco His.*
*ISSN : 0391-5115*
*Volume 7, Issue 2 ( 2026)*
THE JOURNAL OF EUROPEAN ECONOMIC HISTORY

| | | | | |
|---|---|---|---|---|
| 1 | Knowledge about ULL | 12.6 | 12.6 | Uniformly distributed low baseline awareness |
| 2 | ULL–sustainable living relationship | 3.9 | 16.7 | Majority recognise the link |
| 3 | Importance of sustainable development | 0.0 | 67.0 | Near-unanimous priority |
| 4 | Influence of ULL on daily life | 1.9 | 22.3 | Moderate perceived impact |
| 5 | Public participation is essential | 1.0 | 56.3 | Strong consensus |
| 6 | Benefit of private sector inclusion | 0.0 | 41.7 | Positive but not unanimous |
| 7 | Smart city implementation: goodness | 1.9 | 37.9 | Broadly positive perception |
| 8 | Scattered ULL can be integrated | 1.0 | 19.6 | Uncertainty about scalability |
| 9 | Willingness to participate | 1.0 | 43.1 | High latent engagement |
| 10 | Willingness to spread awareness | 1.0 | 46.6 | Strong advocacy potential |

*Source: Authors' primary survey data*

## 4. Findings

### 5.1 Awareness and Attitudes

Figure 1 displays the Likert-scale distribution for five basic attitudinal characteristics. The most noteworthy statistic concerns the importance of sustainable infrastructure: 67% of respondents placed it in the highest category, and no respondent regarded it as least important. This almost universal prioritizing of green growth shows that the attitudinal foundation for ULL adoption is present, even in circumstances where formal awareness of ULL as a concept is minimal.

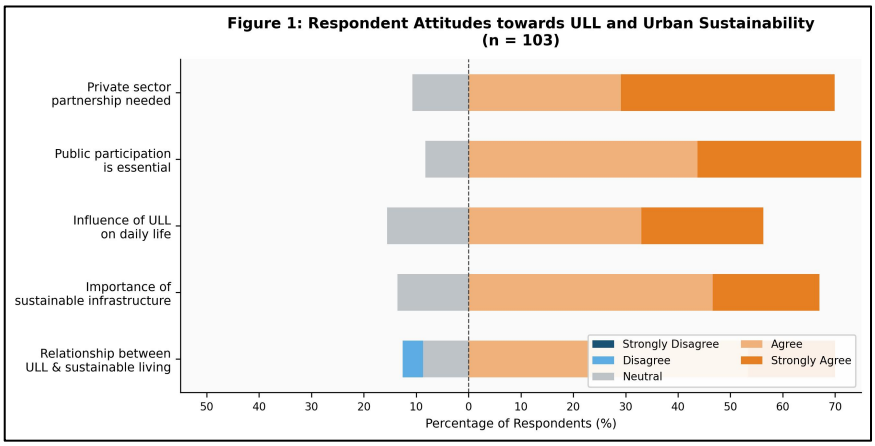


**Figure 1: The attitude of Respondents towards ULL and Urban Sustainability**

*Source: Authors' primary survey data*

Despite the fact that most respondents had no prior exposure to the term "urban living lab," 70% of respondents felt that ULL and sustainable living have a favourable association. This implies that even though the formal term is new, the idea makes sense when defined functionally as cooperative, sustainability-focused urban experimentation. The perception of ULL's impact on day-to-day living was more evenly divided (22.3% most, 1.9% least), suggesting a moderate degree of uncertainty regarding proximal consequences. This is in line with ULL's status as an emerging idea with little domestic awareness.

### 5.2 Participation and Governance Preferences

Self-reported willingness across four involvement factors is summarized in Figure 2. Spreading awareness (46.6%) and actively participating in ULL (43.1%) receive the highest scores, both of which significantly above the nearly zero "least willing" responses. The main empirical finding

of the research is this asymmetry: public receptivity to ULL is a resource rather than a barrier. According to the participatory governance literature, respondents view ULL as citizen-centred rather than expert-driven, as evidenced by the 56.3% of respondents who regarded public engagement as the most crucial component for ULL success.

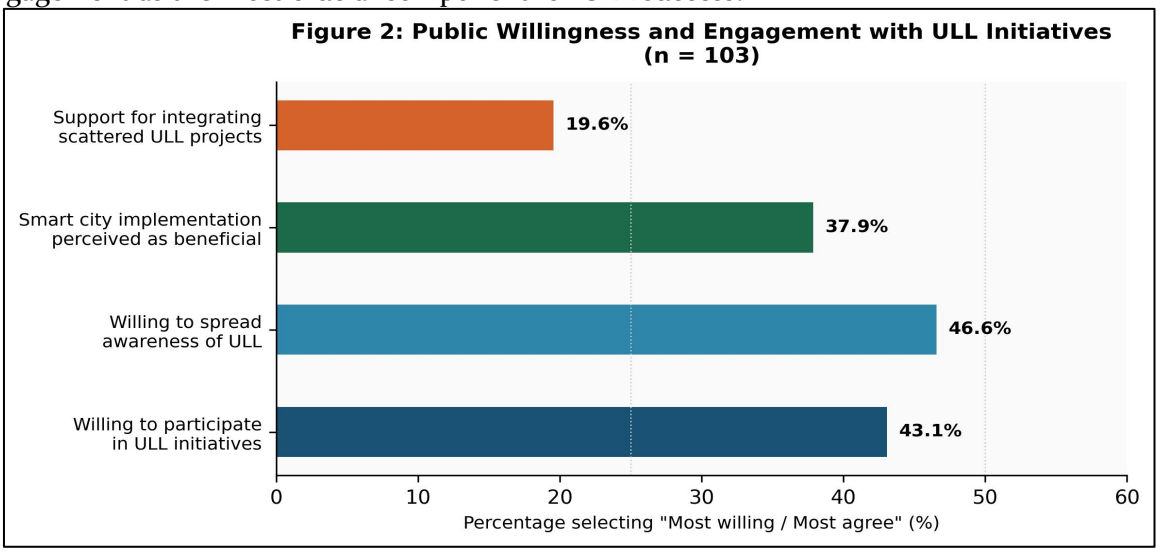


**Figure 2: Public Willingness and Engagement with ULL Initiatives**

*Source: Authors' primary survey data*

The persistent rightward skew is evident in Figure 3, which shows grouped comparisons of the least and most replies for each of the 10 parameters. For eight of the ten parameters, the "most agree" share surpasses 16%, while the "least agree" share consistently dips below 13%. The lone exception is "scattered ULL can be integrated" (most: 19.6%), which expresses sincere doubt regarding the feasibility of India's presently dispersed sustainability programs to be logically combined under a ULL framework. This conclusion implies that the scaling issue of ULL is viewed as institutional and technological rather than a question of public opposition, which has obvious consequences for policy design.

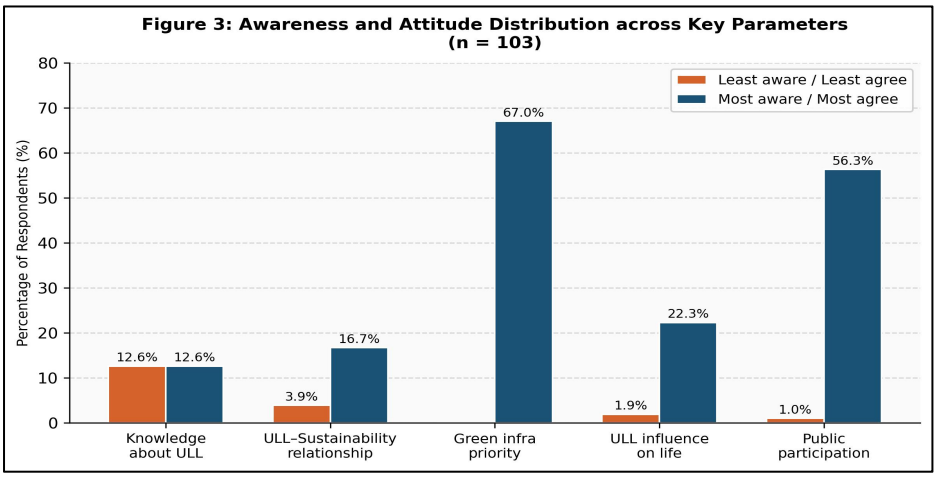


**Figure 3: Awareness and Attitude Distribution across Key Parameters**

*Source: Authors' primary survey data*

## 5. Case Study: Urban Living Labs in Practice

### 6.1 Project Urban Living Labs, Goa, India

The Project Urban Living Lab (PULL) in Goa, a collaborative project between Denmark and India carried out under a Memorandum of Understanding between the Royal Danish Embassy and the Imagine Panaji Smart City Development Limited (IPSCDL), is the most advanced ULL effort in India. Using a sandbox approach, PULL's design introduces globally tested ideas into an urban Indian setting, assesses fit, and iterates based on local response. Its goals include cooperative urban planning, policy research, and knowledge creation.

Its goals include cooperative urban planning, policy research, and knowledge creation. PULL is important as a proof of concept rather than as a model for national replication since it shows that, with institutional collaborations and foreign knowledge transfers in place, ULL can be operationalized within India's Smart Cities Mission framework. The Goa scenario is as another example of the awareness asymmetry found in this survey; PULL mostly functions at the professional and policy levels, with little public awareness diffusion.

Its goals include cooperative urban planning, policy research, and knowledge creation. PULL is important as a proof of concept rather than as a model for national replication since it shows that, with institutional collaborations and foreign knowledge transfers in place, ULL can be operationalized within India's Smart Cities Mission framework. The Goa scenario is as another example of the awareness asymmetry found in this survey; PULL mostly functions at the professional and policy levels, with little public awareness diffusion.

### 6.2 Blue- Green Urban Living Labs, Kuala Lumpur, Malaysia

The Sungai Bunus Retention Area served as the focal point of Kuala Lumpur's blue-green ULL effort, which combined green land-use planning and water body management into a single experimental framework. Professional stakeholders showed significantly more knowledge of the blue-green infrastructure paradigm than community members, according to Abdullah, Ahmad, and Zainal (2020). Crucially, however, after the notion was introduced, the community's eagerness to learn and engage was high. poor initial awareness does not predict poor participatory intent, which is consistent with the findings of the Rajasthan study. The experience in Kuala Lumpur indicates that rather than public apathy, awareness campaigns and community involvement strategies are the missing link between ULL design and ULL implementation.

## 6. Discussion

Three conclusions that have implications outside of Rajasthan are revealed when the survey results are compared with the case data.

First, the cognitive-behavioural gap between great participatory purpose and low formal awareness is not unique to Rajasthan. ULL is still professionally contained in Kuala Lumpur and, indirectly, other growing Asian towns. This gap is an opportunity rather than a structural barrier. Through targeted awareness efforts, community-level demonstration projects, and outreach programs at schools and colleges, it might be swiftly closed. A latent advocacy network that ULL designers have not yet mobilized is represented by the 48% of respondents who are willing to actively raise awareness of ULL.

Second, the institutional design of India's Smart Cities Mission, which already uses Special Purpose Vehicles (SPVs) that combine public authority and private administration, is consistent with the strong preference for public-private partnership as an implementation

strategy (41.7%). This implies that rather than requiring completely new institutional arrangements, ULL can be grafted onto current governance institutions, significantly lowering implementation friction.

Third, a real governance issue is reflected in the uncertainty surrounding the integration of distributed ULL (19.6% most; the lowest positive score across all characteristics). At the moment, India's sustainability efforts are divided into: Sanitation is handled by the Swachh Bharat Mission, water and transportation are handled by AMRUT, ICT and infrastructure are handled by the Smart Cities Mission, and green cover is handled by state-level initiatives. The conceptual foundation for integration is provided by a ULL framework, which views the city as a single experimental area as opposed to a collection of vertical plans. However, public knowledge is insufficient to overcome the institutional will to carry out this integration.

## 7. Conclusion

This study used a primary survey of 103 respondents and secondary case evidence from Goa and Kuala Lumpur to evaluate public knowledge of and preparedness for Urban Living Labs in Rajasthan, India. The results are consistent in a form that formal ULL awareness is low, but behavioural readiness to engage is higher than the scanty literature on Indian ULL would imply, and attitudinal similarity is with ULL values of sustainability, participation, and co-creation is confidently strong.

The consequences for policy are obvious. First, in order to promote ULL in Indian smart cities, a purposeful public communication plan is needed. The goal is to transform latent support into active involvement rather than to create support that does not already exist. Second, the respondents' chosen PPP implementation approach lowers the cost of institutional design because it is compatible with the current Smart Cities Mission architecture. Third, integrating unlike sustainability projects under a ULL framework is a good idea, but it increases the necessity of coordinating mechanisms at the state and local levels that go beyond what awareness campaigns can accomplish.

Future research should address the shortcomings of this study. Stronger inference might be possible with a stratified random sample from several Rajasthani cities, given the convenience sample restricts external validity. Regression-based models analysing predictors of participation willingness should be included in the descriptive analysis reported here; income, education, and past exposure to smart cities are obvious choices. With a target of 2031, the Jaipur ULL planning process will offer a natural experiment for long-term monitoring.

Urban Living Labs are not a cure-all for the existing problems. When awareness, institutional support, and participatory mechanisms are available, they function as a governance architecture. Two of these three requirements are more likely to be satisfied in Rajasthan and smart cities across India than the state of ULL implementation currently indicates. The intentional development of engagement infrastructure that can transform public willingness into public action is the institutional component that is lacking.

## References

1. Abdullah, J., Ahmad, R., and Zainal, M.H. (2020). The Blue-Green Urban Living Labs of Kuala Lumpur. Environment-Behaviour Proceedings Journal, 5(13), 359–367.

2. Ajzen, I. (1991). The Theory of Planned Behavior. Organizational Behavior and Human Decision Processes, 50(2), 179–211.
3. Bulkeley, H. and Coenen, L. (2017). Urban living labs and sustainability transitions. In: Evans, J. et al. (Eds.), Reprogramming the City. Routledge.
4. Chroneer, D., Stahlbrost, A., and Habibipour, A. (2019). Urban Living Labs: Towards an Integrated Understanding of Their Key Components. Technology Innovation Management Review, 9(3), 50–62.
5. Engels, F., Wentland, A., and Pfotenhauer, S.M. (2019). Testing Future Societies? Developing a Framework for Test Beds and Living Labs as Instruments of Innovation Governance. Research Policy, 48(9), 103826.
6. Fung, A. (2006). Varieties of Participation in Complex Governance. Public Administration Review, 66(S1), 66–75.
7. Juujärvi, S. and Lund, V. (2016). Enhancing Early Innovation in an Urban Living Lab: Lessons from Espoo, Finland. Technology Innovation Management Review, 6(1), 17–26.
8. Levenda, A.M. (2018). Experimentation, Governmentality and Urban Energy Transitions. Environment and Planning C: Politics and Space, 37(4), 663–682.
9. Menny, M., Palgan, Y.V., and McCormick, K. (2018). Urban Living Labs and the Role of Users in Co-Creation. GAIA, 27(S1), 68–77.
10. Ministry of Housing and Urban Affairs (2015). Smart Cities Mission: Mission Statement and Guidelines. Government of India, New Delhi.
11. Steen, K. and van Bueren, E. (2017). The Defining Characteristics of Urban Living Labs. Technology Innovation Management Review, 7(7), 21–33.
12. United Nations (2018). World Urbanization Prospects: The 2018 Revision. Department of Economic and Social Affairs, New York.
13. Voytenko, Y., McCormick, K., Evans, J., and Schliwa, G. (2016). Urban Living Labs for Sustainability and Low Carbon Cities in Europe: Towards a Research Agenda. Journal of Cleaner Production, 123, 45–54.