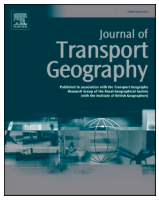
Journal of Transport Geography 134 (2026) 104651

Contents lists available at ScienceDirect

Journal of Transport Geography

journal homepage: www.elsevier.com/locate/jtrangeo



How urban living lab funding shapes research practices: A critical analysis of 15 European urban accessibility and connectivity projects

Göran Smith [a,b,c,*], Christina Lindkvist [c,d,e]

[a] Department of Mobility and Systems, RISE Research Institutes of Sweden, Box 14092, 400 20 Gothenburg, Sweden
[b] Institute of Transport and Logistics Studies, University of Sydney Business School, NSW 2006, Australia
[c] K2 – the Swedish Knowledge Centre for Collective Mobility, Bruksgatan 8, 222 36 Lund, Sweden
[d] Department of Urban Studies, Malmö University, 205 06 Malmö, Sweden
[e] Institute of Urban Research, Malmö University, 205 06 Malmö, Sweden

ARTICLE INFO

Keywords:
Urban living labs
Urban sustainability transitions
Accessibility
Connectivity
Research funding
Research methodology

ABSTRACT

The concept of urban living labs (ULLs) has in recent years influenced not only local government practices but also research approaches. Yet, existing studies have mostly conceptualized ULLs as a mode of governance. Complementing this perspective, this paper analyzes how research funding that encourages ULLs shapes funded projects and, consequently, their potential to inform policy–practice transformations contributing to urban sustainability transitions. Fifteen projects on urban accessibility and connectivity, funded by JPI Urban Europe, are analyzed through a critical review of the call text, project applications, and project reports, supported by interviews, questionnaires, and validation seminars. The paper, which adopts a sustainability transitions perspective, identifies four key mismatches between the transformative ambitions of the funding call and the realized scope of the projects: persistent power imbalances, innovation bias, limited strategic and tactical activities, and under-theorization of core concepts and urban contexts. It further illustrates how these mismatches reflect the requirements set by the funding call. The contribution to the literature on ULLs is threefold: the analysis highlights the role of ULLs as a research methodology, identifies limitations of this methodology as currently operationalized, and illustrates how research funding structures contribute to these limitations. The findings underscore the need for more flexible and democratic ULL funding calls that accommodate a broader spectrum of research approaches, ensure significant local stakeholder involvement throughout the entire project lifecycle, and place greater emphasis on cumulative knowledge production and clearly articulated impact logics.

1. Introduction

In recent decades, a participatory approach for experimentation has gained prominence as a means of addressing and governing urban sustainability challenges, particularly in Europe (Evans et al., 2016), including in transport (Joost et al., 2025; Kronsell and Mukhtar-Landgren, 2020; Loorbach et al., 2021; Smeds, 2025). A fundamental concept within this approach is *urban living labs* (ULLs), meaning "sites devised to design, test and learn from social and technical innovation in real time" (Marvin et al., 2018, p. 1). Seen as parts of a wider politics of experimentation (Bulkeley et al., 2016) or turn towards experimental governance (Caprotti and Cowley, 2017; Kronsell and Mukhtar-Landgren, 2018), the literature on sustainability transitions has mainly viewed ULLs as a new mode of governance that provides protected space for urban experimentation (e.g., Evans et al., 2021; Voytenko et al., 2016), which beyond niche innovation and growth can facilitate process learning among participating organizations (von Wirth et al., 2019).

In addition to transforming governance practices, it has been recognized that ULLs can elevate research by creating space for transdisciplinary, action-oriented research in real-life settings (Scholl et al., 2018), allowing researchers to "…avoid the artificiality of traditional laboratories" (Cuomo, 2022, p. 7). Accordingly, the concept of ULLs (alongside the spread of other related concepts[1]) has also significantly shaped the research landscape. The European network of research council's Joint Programming Initiative (JPI) Urban Europe notes, for instance, that it "strongly support the implementation and development

This article is part of a Special issue entitled: 'Urban Living Labs' published in Journal of Transport Geography.

* Corresponding author at: Department of Mobility and Systems, RISE Research Institutes of Sweden, Box 14092, 400 20 Gothenburg, Sweden.
E-mail address: goran.smith@ri.se (G. Smith).

[1] Overlapping terms include testing ground, hatchery, incubator, making space, testbed, hub, city laboratory, urban lab, and field lab (Steen & von Bueren 2017) as well as transition arena and transition lab (Nevens et al., 2013).

https://doi.org/10.1016/j.jtrangeo.2026.104651
Received 29 October 2024; Received in revised form 26 February 2026; Accepted 29 March 2026
Available online 18 April 2026

of urban living labs", arguing that the outcomes of so-called open processes can address urban challenges more effectively than other approaches and that "urban experimentation [therefore] has an important role to play in more systemic urban transformations and to transform cities to the better" (Urban Europe, 2024a, p. 1). In fact, a review of academic literature on living labs found that the term appeared in scholarly discussion first in the 1990s, when European research and innovation institutions began funding living lab projects (Hossain et al., 2019). This strategy accelerated following the 2006 founding of the European network of living labs (Cuomo, 2022), which lists 184 ongoing living labs situated mostly across Europe but also in Africa, Asia, North America and South America in their catalogue of members (ENOLL, 2025). 85% of these labs identify as "research driven" (ibid.).

Despite this influence on research practices, limited attention has been given to ULL as a research methodology (Dell'Era and Landoni, 2014). Given the wide variety of forms that ULLs can take (Bulkeley et al., 2019), and the frequent deviations of practices from ideal principles (Scholl and De Kraker, 2021), further research is needed to understand how the ULL methodology can facilitate impactful research. We have, moreover, found few papers that discuss how research funding promoting ULL approaches influences research activities even though it has been noted that such funding influences the manifestation of ULLs (Voytenko et al., 2016) and "sometimes leads to a choice for a living lab approach without relating it to the project aims" (Steen and Van Bueren, 2017, p. 29).

To address this research gap, the aim of this paper is to explore how research funding that encourages the use of ULLs and related experimental approaches shapes the funded projects and thereby their potential to make an impact. Impact here means project outcomes that lead to policy-practice transformations, which in turn contribute to urban sustainability transitions (cf. Schneidewind et al., 2016). We do this by analyzing how European research and innovation projects funded under such conditions strive to make impact. Specifically, we analyze 15 projects funded by a JPI Urban Europe call that welcomed and encouraged ULL approaches. Grounded in the recognition that a radical transition to fossil-free, zero-emission transport systems is needed, the call set out to fund projects aimed at advancing sustainable urban accessibility and connectivity.

Through a thematic analysis of the call text, project applications, and progress reports, supported by interviews, a questionnaire study, and validation seminars, we identify four mismatches between the transformative intent of the call and the scope of the projects: power imbalances across stakeholders, innovation bias, limited focus on strategic and tactical activities, and shallow engagement with key concepts. We, moreover, illustrate how the funding conditions have contributed to these mismatches. The paper thus extends existing knowledge about ULLs by (i) highlighting the role of ULLs as a research methodology, (ii) identifying limitations of this methodology as currently operationalized, and (iii) illustrating how research funding structures contribute to these limitations. To cater for more transformative research going forward, we provide recommendations on how to make future ULL funding calls more flexible and democratic.

The next chapter provides a brief overview of the literature on ULLs and introduces the frameworks and conceptualizations that underpin our theoretical lens on how ULL research can contribute to urban sustainability transitions. The Materials and methods section then describes the analyzed funding call and research projects. It also outlines the data collection and analysis processes. Next, we present our findings, organized according to seven questions that structured the analysis. Finally, the Concluding discussion section, first provides a summary of the results. This is followed by a discussion on contributions to the literature on ULLs, practical implications, and avenues for further research.

2. Theoretical lens

2.1. Urban living labs

While the concept of ULLs is widely adopted, the literature on ULLs offers no consensus on a definition (Hölscher and Frantzeskaki, 2021; Schliwa, 2013; Ståhlbröst, 2008; Hillgren, 2013). As Taylor (2021) observes, the diversity in objectives and practices challenges the development of a coherent taxonomy. Rooted in the 1940s development of action research (Soeiro, 2021) and later the quadruple helix open innovation initiatives in the 1990s (Nesti, 2018), the concept has evolved to denote geographically or organizationally bounded experimental sites and governance structures for multi-stakeholder engagement aimed at advancing urban sustainability transitions (Voytenko et al., 2016). Accordingly, both semi-permanent structures for repeated urban experimentation, such as government-led innovation platforms, and one-off experiments, such as research-oriented demonstration projects, can be regarded as ULLs (e.g., Bulkeley et al., 2019; Marvin and Silver, 2016). Given our interest in ULL as a research methodology rather than a mode of governance, we classify research that adhere to the following principles for collecting, analyzing, and interpreting data as ULLs:

- Utilizes an explicit place-based focus to address urban challenges (Bulkeley et al., 2016)
- Collect data through one or several in situ experiments (Voytenko et al., 2016)
- Involves local stakeholders in cocreation activities (Steen and Van Bueren, 2017)
- Uses iterative processes for experimentation and learning (von Wirth et al., 2019)

Achieving tangible impact on urban sustainability transitions, which often take decades to unfold (see next section), is an unrealistic expectation for individual research projects. ULL research can, however, still contribute to these transitions. We conceptualize this as a two-step process: first, research informs policy-practice activities, second, these activities influence urban sustainability transitions, for instance by stimulating niche innovations or destabilizing the prevailing regime (Kanger et al., 2020). Examples of research outcomes that can cater for such impact include actionable and robust knowledge, technological and social innovations, frameworks for action, and procedural and tacit insights from participating in the research process (Schneidewind et al., 2016).

Most studies on ULLs have, however, focused on either their experimental and/or governance functions. This leaves a gap, which this paper tries to address; ULLs are rarely explicitly discussed as structured research methodologies. The studies that engage with ULLs as knowledge-producing research apparatuses, moreover, pinpoint challenges such as definitional ambiguity (Huang and Thomas, 2021; Steen and Van Bueren, 2017), a prevailing top-down perspective that overlooks individual-level knowledge production (Shen et al., 2025; Westman and Castán Broto, 2022), and limited attention to methodology robustness and ethics (Dekker et al., 2020; Hossain et al., 2019; Taylor, 2021), indicating that further analysis is needed to understand the conditions under which ULLs cater for impactful research.

This need is echoed in the literature that critically examines how ULLs are organized. Despite the emphasis on co-creation (Evans et al., 2016; Särkilahti et al., 2022), scholars have highlighted ULL's frequent alignment with hierarchical, top-down frameworks and institutional agendas (Shen et al., 2025; Nesti, 2018; von Wirth et al., 2019). ULLs might therefore reinforce existing societal power dynamics, thereby excluding divergent, more radical perspectives such as those of grassroots movements, and instead entrench an expert-driven research tradition, which favor incremental changes (Westman and Castán Broto, 2022). While ULLs offer opportunities to test radical ideas, they can also

be exclusionary, entrenching existing socio-technical regimes by reflecting the perspectives of regime actors, and thereby creating or perpetuating injustices (Marvin et al., 2018) and producing outcomes that favor regime interests over the public good (von Wirth et al., 2019; Shen et al., 2025).

Concerns have furthermore been raised about the lack of long-term stability. ULLs are often supported by timebound research funding (Hodson et al., 2018). This makes their continuation and expansion dependent on finding new funding sources, which may limit their transformative potential (Voytenko et al., 2016; 2018). Tensions also persist between the flexible ULL approach and the structured routines of public administration (Berglund-Snodgrass and Mukhtar-Landgren, 2020). Nesti (2018) notes that this mismatch can impose demands on public officials to adopt "radically new mind-sets" (p. 321).

Researchers have, moreover, highlighted a trade-off between local, contextual learning and the production of knowledge with broader applicability (Dekker et al., 2020). Some argue that place-specific knowledge, especially that emerging from lay actors and grassroots involvement, is critical for distinguishing transferable insights (Shen et al., 2025; Särkilahti et al., 2022; Westman and Castán Broto, 2022). Others, particularly from a systems-change perspective favored by research funders such as JPI Urban Europe, emphasize the need for trans-urban learning to extend impact beyond local settings (Scholl et al., 2022). To overcome this trade-off, scholars have in recent years advocated for a *meta-lab* approach, defined as the coordination of learning across distributed experiments to inform sustainability transitions (ibid.). Within this framework, knowledge intermediaries, such as research organizations, are seen as crucial for facilitating connections across stakeholder groups and urban contexts, thus amplifying the impact potential of ULLs (see Matschoss et al., 2021; Wolfram et al., 2019).

2.2. Urban sustainability transitions

Our analysis is concerned with ULL research's potential to drive policy-practice transformations, which in turn contribute to urban sustainability transitions. Urban sustainability transitions are here defined as "fundamental and structural changes in urban systems through which persistent societal challenges are addressed" (Frantzeskaki et al., 2014, p. 1). To conceptualize how such transitions happen, we adopt the Multi-Level Perspective (MLP), which theorizes that innovations can only reconfigure the socio-technical system if change processes across landscape, regimes, and niches levels are aligned (Geels, 2002). The landscape is the social, material, and spatial context in which regimes and niches operate. This encompasses governmental structures and infrastructures, or what Geels (2002) refers to as wider "technology-external factors" (p. 1260). Developments at this level can cause regimes, such as the institutional environments that give stability and meaning to the actors within urban mobility (see Fünfschilling and Truffer, 2014), to destabilize. This creates an opportunity for niche innovations to develop. If successful, these innovations can transform or replace the prevailing regime (Markard et al., 2012). The niches are conceptualized as protected spaces in which the innovations can develop without being subject to the selection pressure of existing regimes (Kemp et al., 1998). A typical carrier of a niche is a research and innovation project or program (Raven et al., 2016).

Our choice to use MLP to conceptualize sustainability transitions is motivated by its systemic and integrated view of socio-technical change which effectively captures the multi-layered nature of urban systems (Geels, 2012; Whitmarsh, 2012). This aligns with our ambition to openly explore the many ways in which ULL research projects might contribute to urban sustainability transitions. In this study, the long-term MLP serves, however, mainly as a backdrop theory that informs our conceptual lens. To understand how sustainability transitions can be deliberately influenced in the short and medium-term, we complement it with the prescriptive Transition Management (TM) framework.

The TM framework, which has inspired the ULL methodology (Bulkeley et al., 2016), describes strategies for influencing sustainability transitions by challenging regimes and supporting niche innovation (Loorbach, 2010; Rotmans et al., 2001), "Transition management is about trying to challenge, alter and replace existing unsustainable regimes and exploring in a more experimental way potential and desirable possible future transitions" (Loorbach, 2022, p. 3). The framework suggests the combination of four types of governance activities to manage sustainability transitions: strategic activities (30+ years), such as developing visions and establishing a transition arena, tactical activities (5–15 years), such as developing coalitions and transition agendas, operational activities (0–5 years), such as experimenting and translating outputs into action, and reflexive activities, such as evaluating and reflecting (Loorbach, 2010). TM has been criticized for being overly managerial and focused on niche innovation, thus disregarding the complexity of sustainability transitions and the role of power and politics in them (Rotmans et al., 2007). In recent years, TM has, however, evolved to also support the destabilization of current regimes (see Hebinck et al., 2022), address agency issues (Loorbach et al., 2017), and harness the creativity of design disciplines (see Loorbach, 2022).

The prescriptive TM framework complements the descriptive MLP by providing a process-oriented framework, which breaks down sustainability transitions into tangible activities that can be purposefully organized (Jackson et al., 2014). For this study, it provides a taxonomy of intervention mechanisms that we use to operationalize how ULL research projects can contribute to urban sustainability transitions. Together, the two frameworks, despite their weaknesses such as MLP's underplay of agency (Smith et al., 2005) and TM's overplay of manageability (Shove and Walker, 2007), help us to see both the big picture of how urban sustainability transitions occur and the granular process of how individual research projects' can influence them by informing policy-practices.

With regard to the "urban" in urban sustainability transitions, urban areas face specific challenges in relation to sustainability transitions due to cities' complex governance structures, diverse populations, high demands for services, and issues for providing healthy, sustainable, and accessible environments (Bulkeley et al., 2016; Frey and Zimmer, 2001; Urban Europe, 2019a). At the same time, dense urban areas can host shared resources and solutions that require numerous users to be financially sustainable, which is the base of the urban ecology (Jacobs, 2011). In this paper, we understand cities as a complex web of socio-technical, political, and cultural systems that are under constant (re) construction. This perspective is inspired by critical urban theory, which views cities as socially constructed, contested, and malleable spaces, where dominant institutional arrangements (i.e., prevailing socio-technical regimes) often suppress possibilities for more sustainable and just urban systems (Brenner, 2009). By foregrounding the role of contestation and recognizing that cities are not "fixed", this perspective highlights both the challenges and opportunities for influencing urban sustainability transitions.

The literature on urban sustainability transitions has, for the most part, treated urban contexts as generic backdrops for experimentation, rather than as active, variable, and complex systems that shape and are shaped by sustainability transitions (Novalia et al., 2026). In contrast,

Hölscher and Frantzeskaki (2021) offer three analytical perspectives to address urban transformations: "in cities", "of cities", and "by cities". The in cities perspective focuses on the city as a place, a melting pot of complex, diverse, and contesting interests and intersections. The transformative potential of cities is deeply entrenched in socio-spatial contexts. The strength of this perspective therefore lies in its embedded research inquiry into the "black box" of a city, or its subparts, uncovering situated and contextual knowledge. The second perspective, transformation of cities, investigates the outcomes of transformation dynamics in urban (sub)systems, considering new urban functions, local needs and interactions, and implications for sustainability. This perspective strives to explain and assess how transformation dynamics affect the functioning of urban systems. Finally, the transformation by cities perspective examines the roles of cities in contributing to global change, and what these roles means for governance at other levels.

In our analysis, we primarily draw on the in cities perspective. We set out to explore the potential of research projects, shaped by funding that encourages the use of ULLs and related experimental approaches, to produce outcomes that can influence transformations in cities (urban sustainability transitions) by informing policy-practice activities.

3. Materials and methods

Our research design can be described as a theoretically informed exploratory analysis of multiple cases, which are studied in parallel using several qualitative data collection and analysis techniques. The object of study is how funding encouraging ULLs and related experimental approaches shape research projects, while the subjects, or cases, are research projects produced through such funding. The purpose is exploratory and the approach theory-building (see Thomas, 2011).

3.1. Cases and case selection

JPI Urban Europe was created in 2010 by the European Commission with the ambition of developing a hub that can facilitate research on a scale which cannot be carried out by nations alone. JPI Urban Europe is thought to be able to "achieve outcomes on a much larger scale, leading to much more complex research results which can be compared and contrasted across nations" (Urban Europe, 2024b, p. 1).

One of its major instruments is the ERA-NET Cofund Urban Accessibility and Connectivity (ENUAC), which was established under the European Commissions' Horizon 2020 framework. The aim of ENUAC is to "create and consolidate a transnational ecosystem for inter- and transdisciplinary research and innovation and enhanced science-policy cooperation to drive transitions towards such sustainable, inclusive models for urban accessibility and connectivity" (Urban Europe, 2021, p. 7). The plan is to put out a series of funding calls for research and innovation projects as well as various accompanying measures. The first call was launched in late 2019 (see Urban Europe, 2019a). Focusing on addressing urban accessibility and connectivity issues, the call included two pathways: research and innovation. ULL approaches were welcomed for the research pathway and encouraged for the innovation pathway.

A total of 86 project proposals were submitted in the first evaluation phase. 37 of these were invited for the full proposal stage. In the end, 15 project proposals were selected for funding and eventually launched in early 2021:

- ASAP – Awaken sleeping assets project (3 years, €1,4 M funding from ENUAC)
- CATAPULT – Policies for automated mobility solutions for cities (2 years, €743 k)
- COCOMO – Competing mobility solutions in urban contexts (3 years, €1,2 M)
- DyMoN – Dynamic mobility nudge (3 years, €993 k)
- EASIER – Seamless, sustainable everyday urban mobility (3 years, €1,5 M)
- EX-TRA – Experimenting with city streets to transform urban mobility (3 years, €1,6 M)
- GeoSence – Geofencing for urban traffic management and planning (3 years, €1,5 M)
- ITEM – Inclusive transition towards electric mobility (3 years, €1,2 M)
- JUSTICE – Spatio-temporal and socio-cognitive accessibility (3 years, €858 k)
- MyFairShare – Individual mobility budgets for carbon reduction (3 years, €1,5 M)
- SmartHubs – Smart mobility hubs as game changers in transport (3 years, €2,0 M)
- SortedMobility – Self-organized rail traffic for decentralized mobility (3 years, €1,3 M)
- TAP – Triple access planning in the face of deep uncertainty (3 years, €1,4 M)
- TuneOurBlock – Transforming urban quarters to human scale environments (3 years, €887 k)
- WalkUrban – Walkable urban neighborhoods (3 years, €995 k)

Our analysis covers these 15 projects and the funding call through which they were supported. This scope was predetermined by the project this paper is a product of (see Acknowledgements). The case selection method can therefore reasonably be criticized for convenience bias. Given its focus on the European level, it may also be criticized for aligning too closely with previously studied cases of ULLs. Still, it provided access to a diverse set of urban sustainability transitions focused projects funded by JPI Urban Europe, which has been a key stakeholder in the development and dissemination of the ULL approach (Voytenko et al., 2016). The funding call, moreover, explicitly encouraged the use of ULLs and other co-creative approaches. Hence, the case selection meets the criteria needed to address our exploratory purpose.

3.2. Data collection and analysis process

The analysis builds on seven sets of empirical materials. The primary material was the call text (including its eligibility and assessment criteria), the project applications that won funding, and the progress reports the projects had issued at the point of analysis. Additionally, the analysis was supported by a report summarizing insights from 24 interviews and 91 questionnaire responses from participants in the projects (Papa and Cioboata, 2024) and a word frequency analysis of the applications and progress reports as well as two of JPI Urban Europe's strategy documents[2] (Arhipova et al., 2024).

The analysis, which was conducted by five people in three research teams, followed the process of structured qualitative content analysis described by Kuckartz and Rädiker (2023). This process outlines a multiphase approach to coding and categorizing textual data that combines deductive and inductive reasoning, theory is used to inform the initial category structure, which is then refined based on the empirical data.

The starting point for our analysis was to develop a method for assessing the projects' potential to contribute to urban sustainability transitions, specifically regarding improved urban accessibility and connectivity (the focus of the call). Drawing on the TM framework, we operationalized this potential impact into two main aspects. First, how well the projects aimed to challenge existing structures and practices within urban mobility and land-use planning regimes (see destabilization in Loorbach et al., 2021). Second, the extent to which the projects: develop visions and establish transition arenas, structure problems and

[2] The roadmap of the Driving Urban Transitions partnership (DUT, 2022) and the research and innovation agenda of JPI Urban Europe (Urban Europe, 2019b).

Table 1
Key questions posted to the material.

Focus	Question	Purpose	Inspirations from TM
Visions & objectives	What is the project about and what are its main visions and objectives?	Understand what the projects were about, what impact objectives they had, and what future visions the project ideas were based on.	Vision development; long-term goal formulation; future anticipation; transition agenda (Loorbach, 2010)
Concepts	How are the notions of accessibility and connectivity conceptualized?	Understand whether the projects took a stance in relation to the concepts and, if so, what these stances were, and how this had influenced the project designs.	–
Problems	Which accessibility and connectivity problems are covered, and how are these produced?	Understand which accessibility and connectivity challenges the projects had chosen to focus on, how this choice was motivated, and how those challenges were described.	Problem structuring (Loorbach, 2010); reframing problems (Loorbach et al., 2017)
Actors & roles	How was the consortium built, and who is involved in what activities and in which roles?	Understand who has been involved in shaping the proposal, who was planned to participate in which roles, how it turned out, and who is intended to lead the transformation of project insights into activities beyond the project.	Intersectoral collaboration (Loorbach et al., 2017); selective participation in transition arenas (Loorbach; 2010)
Experiments	How are experiments set up, and what are their objectives?	Understand how the project activities involving 'real-world actions' were planned, what they were intended to lead to, and how they turned out.	Learning-by-doing (Loorbach, 2022); transition experiments (Loorbach, 2010); monitoring and evaluation (Loorbach et al., 2017)
Impact logics	How are outputs from the project transformed into action, and by whom?	Understand how the project planned for the handling of knowledge, tools, and other developments during the project to contribute to transitions, and how it turned out.	Mobilizing transition networks; social learning; institutionalization of emerging transitions (Loorbach et al., 2017).
Urban context	How is the urban context described, and how does this influence the project plans?	Understand how the project described the urban contexts in focus and the conditions for accessibility and connectivity they create, and how this affects the project plan including to whom and where insights should be disseminated.	–

formulate transition agendas, initiate transition experiments and mobilize resulting networks, and finally, evaluate these experiments and adjust based on lessons learned (see strategic, tactical, operational, and reflexive activities in Loorbach, 2010).

Based on this operationalization, we developed a list of questions focused on five themes: visions and objectives, problems, actors and roles, experiments, and impact logics. We also constructed a corresponding coding structure, which we tested in a pilot study covering three of the funding applications. The results from this initial coding were compiled in a spreadsheet and discussed in the entire research team. Our main insight from this exercise was that our questions did not adequately capture how the applications addressed key concepts central to the call, which limited our ability to assess the projects' potential to make impact. To address this, we added two additional questions: one focusing on the concepts of accessibility and connectivity, and another focusing on the urban context. The refined coding structure encompassed seven questions and themes, as shown in Table 1.

For an overview of how these questions were applied to the empirical material, see Fig. 1. The process began with two parallel activities. In one, the 15 projects were analyzed independently. Funding applications and progress reports detailed the project plans, activities, and formal motivations, while interview and questionnaire responses provided contextual perspectives and informal explanations. By integrating these data sources, we were able to conduct a robust and nuanced analysis. In the other activity, the questions were applied to the call text. Insights from both activities were summarized in brief reports and subsequently reanalyzed in a comparative review, which also triangulated them with the results of the word frequency analysis. The outcomes were summarized in memos outlining tentative responses to the seven key questions. To establish credibility and confirmability (see Lincoln and Guba, 1985), these responses were compiled into a slide deck and presented at two virtual validation seminars.

The first seminar invited all members of the Accessibility and Connectivity Knowledge Hub for the Urban Transformation in Europe. Eleven members of the hub (who also analyzed the ENUAC portfolio) provided reflections. The second seminar invited representatives from the 15 analyzed ENUAC projects, 12 representatives attended and provided feedback. The feedback from the two seminars helped us validate, refine, and prioritize the findings, which are presented next.

4. Results and analysis

4.1. What are the projects about and what are their main visions and objectives?

The call, "entitled Joint call for proposals for research and innovation projects on urban accessibility and connectivity", built on a vision of attractive, sustainable, and economically viable urban areas in which Europeans, and their surroundings can thrive, "…a radically [sic] transition to a fossil-free, zero emission transport system is needed" (Urban Europe, 2019a, p. 4). The objective was to create a portfolio of projects which address urban accessibility and connectivity problems, and which develop and test new ways of amending them. The call was open to a broad range of project types, from research to innovation. All projects were expected to be "solution-oriented" and contribute to policymaking. Still, the emphasis on tangible short-term impact was higher for innovation-oriented projects.

This broad scope was reflected in the funded projects, which vary significantly in their points of departure and objectives. Most projects share an implicit vision of cities with higher air quality, improved accessibility, better connectivity, and increased safety.[3] This vision often involves a reduced role for private cars and a multimodal mobility system with many options for active and shared travel. Inherent goal conflicts were, however, rarely discussed in applications and reports. Examples include the competition for space between mobility modes, the ambition to reduce travel versus dependency on last-mile freight, and the balance between enhanced travel options and a transport-light society.

The projects, moreover, report few objectives related to visioning, goal formulation, or developing transition agendas, which can be contrasted with the strategic and tactical transition activities outlined in Loorbach (2010). Likewise, the projects rarely set out to destabilize or break down prevalent regimes (cf. Loorbach et al., 2017). Instead, although not explicitly stated, the projects aim to contribute to existing visions, agendas, and niche innovations by generating new knowledge, often about user needs, building knowledge platforms and databases, and providing policy recommendations, indicators, design guidelines,

[3] In a few cases, more specific visions were explicitly stated. For instance, EXTRA aimed to "…contribute to the development of a proactive vision and strategy of change towards a 'post-car' city" (EX-TRA, 2020, p. 6).

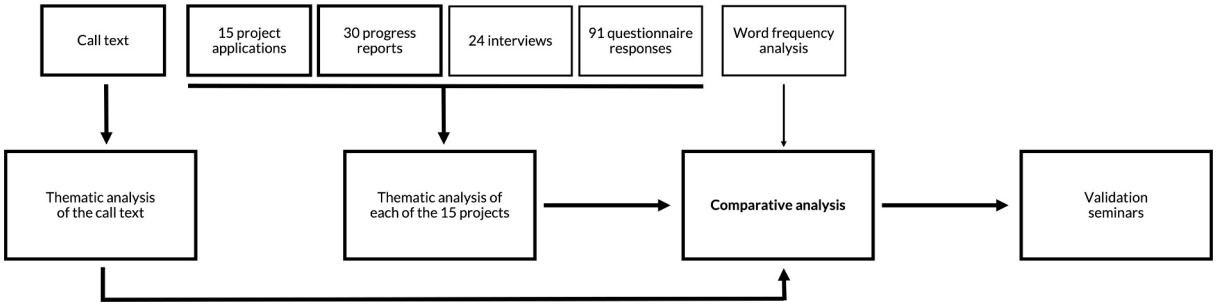


Fig. 1. Analysis process.

implementation frameworks, and other tools. Additionally, some have technical objectives.

4.2. How are the notions of accessibility and connectivity conceptualized?

Two fundamental perspectives on accessibility are "people-based" and "place-based" (Miller, 2005).[4] Following the place-based accessibility perspective, the call text defined (sustainable) accessibility and connectivity collectively as "the ease with which activities and opportunities may be reached in an urban transport system, with lower negative environmental impacts" (Urban Europe, 2019a, p. 2). Additionally, the call text stated that accessibility is not evenly distributed in cities and identified specific social groups in need of improved accessibility. It did, however, not explicitly define what types of activities and opportunities people need better access to.

In comparison, the call text provided a more concrete conceptualization of connectivity, stating that "network connectivity reflects the directness of routes, using different modes to travel between points" (Urban Europe, 2019a, p. 2)[5], and noting that this concept applies to both passenger and freight transport. This contrasts with definitions of connectivity such as "...a measure of the minimum number of network components (nodes or edges) which must be removed from a connected network to disconnect that network" (Nel et al., 2018, p. 922). These definitions argue that connectivity contributes to network resilience through redundancy and hierarchic efficiency (see also Boeing, 2017). In comparison, the call text more narrowly framed connectivity in operational network terms.

The projects' theoretical and conceptual understandings of accessibility and connectivity were, for the most part, not elaborated on in either the applications or the reports, even though the terms were frequently used. The project JUSTICE was an exception. Although a definitive definition was not provided, a theoretical overview of transport justice was used to discuss problems of accessibility, and the application stated that the project would "...assess spatial justice using a multifaceted notion of accessibility, [where] ...urban stakeholders need to be involved in the theoretical framework construction [and] ...relevant spatiotemporal modelling methods should be used to measure PT [public transport] accessibility" (JUSTICE, 2020, p. 5). So, even though the project addresses social justice and accessibility for vulnerable groups, it employs a place-based accessibility perspective, where people's actual movements, desires, and travel demands are secondary.

4.3. Which accessibility and connectivity problems are covered, and how were these produced?

The call specified five challenges and linked these to problems such as a lack of consideration to interdependencies between mobility and other systems in current planning tools, a lack of methods and tools to assess the impacts of mobility innovations, poor design of public spaces vis-á-vis current and future mobility needs, a lack of citizen involvement in decision making, and a gap between sustainability ambitions and mobility practices. In terms of how the problems were produced, the call text referenced research published in transport policy journals as well as sustainability transitions and business journals.

The applications mirrored these challenges and problems, often framing the projects as "solution-oriented", as instructed by the call text. The projects therefore set out to solve problems related to shared mobility, public transport, and inclusiveness, among other things. The described owners of these problems were typically public sector organizations and/or end-users (i.e., citizens). Regarding how the problems were identified, previous European studies were commonly cited as evidence, which aligns with the call text's emphasis that projects should "…build on existing knowledge and experiences as achieved in earlier relevant European, national and regional research and innovation (R&I) programs, pilots and test implementations and field labs" (Urban Europe, 2019a, p. 7). In contrast, the involved public and civil sector organizations, i.e., the problem owners, were less visible as active voices regarding issues of accessibility and connectivity in the applications and reports. The applications and reports, moreover, listed few activities aimed at reaching joint perceptions of the addressed problems (cf. reframing the problem in Loorbach et al., 2017).

4.4. How were the consortium built, and who is involved in what activities in which roles?

As defined in the call text, the project proposals had to include three eligible partners from at least three participating countries. The partners could stem from various positions within the research and innovation landscape and across disciplines. Of 21 participating funding organizations, 15 permitted funding to municipal organizations, 17 to companies, and 14 to non-governmental organizations (NGOs). The call text highlighted the importance of transdisciplinary approaches for co-creating the project ideas and designs: "Projects are expected to take a transdisciplinary and preferably co-creative approach already from the early project formulation stages." (Urban Europe, 2019a, p. 8).

The 15 projects that won funding are supported by consortia composed of universities, large companies, small and medium enterprises, non-profit research organizations, research institutes, municipalities and cities, and other public organizations. Still, the 15 project

[4] Accessibility is slippery concept. Geurs and van Wee (2004) has defined it as "...the extent to which land-use and transport systems enable (groups of) individuals to reach activities or destinations by means of a (combination of) transport mode(s)" (p. 128). They, moreover, report the following overlapping perspectives: the potential of opportunities for interaction, the ease with which any land-use activity can be reached from a location using a particular transport system, the freedom of individuals to decide whether to participate in different activities, and the benefits provided by a transport/land-use system (ibid.).

[5] Drawing on the concept of Triple Access Planning, the call text also extends the discussion of connectivity to include digital connectivity.

Table 2
Roles of cities and regions (and their companies) in the ENUAC projects.

Project	Pathway	Coordinator	Work package leader	Co-applicant	Co-operation[a]
ASAP	Innovation	No	No	Yes	Yes
CATAPULT	Innovation	No	No	No	Yes
COCOMO	Research	No	No	No	Yes
DyMoN	Research	No	No	Yes	Yes
EASIER	Research	No	No	Yes	Yes
EX-TRA	Research	No	No	Yes	Yes
GeoSence	Innovation	No	No	Yes	Yes
ITEM	Research	No	No	No	Yes
JUSTICE	Research	No	Yes	Yes	Yes
MyFairShare	Innovation	No	No	No	Yes
SmartHubs	Research	No	No	Yes	Yes
SortedMobility	Research	No	No[b]	No[b]	No
TAP	Research	No	No	Yes	Yes
TuneOurBlock	Innovation	No	Yes	Yes	Yes
WalkUrban	Research	No	Yes	Yes	Yes

[a] Yes, if the application either identifies city- or region-controlled organizations as co-operation partners or includes letters of support from such actors.
[b] The consortium includes, however, state-owned organizations as co-applicants, including SNF that leads one work package.

coordinators (main applicants) are all dedicated research organizations from Western Europe. As for cities and regions, they are represented in some form in all applications but one. The city and region organizations, nonetheless, have marginal roles in many projects, they only lead work packages in three projects and are not included as co-applicants in five consortiums, see Table 2. This reflects the role of "practitioners and/or target audience" envisioned in the call. The call only required such actors to be directly involved in the workload of innovation-oriented projects, while in research-oriented projects they should be "involved at least as advisors" (Urban Europe, 2021, p. 11). Additionally, when city and regional organizations serve as project partners, they are still not always included in the central decision-making entities.

As for companies and NGOs, they have somewhat more active roles on average, especially consultancies specialized in European-level research projects. Nonetheless, research organizations dominate both the work and decision making in the projects. For example, in the TAP project, the four research organizations undertake 94% of the workload (177 person-months), while the remaining 6% (eleven person-months) is shared among the eleven other organizations within the project consortium.

Yet, most of the applications emphasized that their international and intersectional project consortiums are vital both for executing the projects and for translating project outcomes into action and impact. The logic behind the consortia selection was often described approximately as follows: research organizations provide scientific and domain expertise and undertake most of the work, cities and regions offer local knowledge, problems and premises, engage citizens and other local stakeholders, and help translate outcomes into policy, NGOs and companies bring access to new ideas and tools. This logic, along with the consortia motivations outlined in the applications, arguably resembles the "selective participation" approach of TM, which suggests initially gathering so-called frontrunners before expanding transition networks (Loorbach, 2010).

4.5. How are experiments set up, and what are their objectives?

The call opened for two tracks: the research pathway and the innovation pathway. It welcomed a ULL approach for research-oriented projects and encouraged it for innovation-oriented projects. In an appendix, the call described ULLs as follows: "…an umbrella notion for methodological tools when the challenge at hand is understood to benefit from or even require experimental approaches and substantial co-creation between stakeholders and urban actors." (Urban Europe, 2019a, p. 59).

The call text stressed that all innovation-oriented projects should have an "emphasized focus on experimentation, testing, implementation, evaluating and spreading results" (Urban Europe, 2019a, p. 10). They should, moreover, be carried out in close collaboration with practitioners. Regarding the objectives of experimentation, the call text noted that: "ULLs "can play an excellent role in creating stakeholder, public, private, citizen and end-user involvement in the co-creation of solutions for sustainable and inclusive mobility and freight transport" (Urban Europe, 2019a, p. 18). The call text also highlighted that the purpose of ULLs is not necessarily to produce new and original knowledge, but to respond to challenges and explore ways to shape synergies out of urban sustainability dilemmas.

In the end, JPI Urban Europe categorizes three projects as hosting ULLs: MyFairShare, SmartHubs, and WalkUrban (Urban Europe, 2021). Next to all applications highlighted, however, iterative co-creation and experimentation "in cities" with local stakeholders and citizens either as an essential component of their project designs and/or as an ambition for policymaking that they wanted to help policymakers achieve. Hence, we perceive all projects as adhering to a ULL research methodology (see ULL principles in the Theoretical lens section).

The emphasis on co-creation and experimentation was driven by several arguments. First, involving local stakeholders, including citizens, is crucial for developing their acceptance and interest. Second, finetuning solutions requires an iterative approach. Third, participation enhances learning as stakeholders gain firsthand experience: "For companies, the use of a co-creation process guarantees that they confront themselves with realities of end users with specific requirements and needs. The developed (new mobility) solutions will thereby be more socially accepted and therefore market-ready." (CATAPULT, 2023, p. 8).

The list of methods for cocreating experiments mentioned in the applications was both extensive and varied, featuring both bottom-up and top-down approaches (i.e. emerging from citizen initiatives and local community engagement or driven by institutional agendas and strategic planning). Several applications also highlight a bottom-up approach (e.g., EASIER, JUSTICE, and WalkUrban). Still, given the absence of citizen/user representatives and local stakeholders in the decision-making and executing entities of most projects (see the previous section), we argue that the experimentation methodologies of the project portfolio on average follow a conventional top-down logic.[6]

Regarding experimentation objectives, the SmartHubs project exemplifies the diverse ambitions pursued through experiments in the ENUAC projects. The SmartHubs project plan includes five ULLs, each following the same sequential phases: reviewing existing mobility hubs,

[6] This is also how scopes are motivated in most applications, concepts are applied to rather than derived from local problems.

designing new participatory tools, implementing redesigned mobility hubs, evaluating the impacts of these redesigns, and engaging in learning and knowledge exchange through stakeholder workshops. Despite this common framework, the objectives of the five ULLs vary significantly:

- The ULL in Vienna aims to "find the most optimal design of mobility hubs."
- The ULL in Brussels aims to "demonstrate the SmartHubs co-creation process"
- The ULL in Hauge/Rotterdam aims to investigate the "different levels of digital-physical"
- The ULL in Munich aims to test a portable depot for parcel delivery in different areas
- The ULL in Istanbul focuses on mobility hubs in "unplanned and growing urban developments in an emerging economy" (all quotes from SmartHubs, 2020, p. 5)

Notably, these objectives include repeating experiments in different contexts, which Loorbach (2010) describes as "broadening", but neither focus on "scaling" the mobility hub concept, nor permanenting the ULLs. This contrasts with the emphasis in TM on institutionalizing emergence (Loorbach, 2022). Instead, as discussed next, the projects' impact logics centered on achieving impact after the projects.

4.6. How are outputs from the project transformed into action, and by whom?

The desired impact for projects within the research pathway, according to the call text, is to make progress towards answering the questions: "How do cities really function" in a way that can contribute to wider knowledge in urban studies, and "what works when attempting to improve cities" in a manner that can be generalized enough to serve as useful knowledge for decision makers and practitioners. For projects within the innovation pathway, the desired impact is: "advance towards the development, implementation, demonstration, testing, evaluation, and uptake of approaches for new products, services, policies, practices, and processes, with potential for improving economic, social, or environmental sustainability in cities" (Urban Europe, 2019a, p. 11).

In other words, the call put quite different expectations on research- and innovation-oriented projects. Still, the call text noted that all projects are expected to make a clear contribution to the attainment of transport policy objectives at local, regional, national and European scales. Project outputs should be targeted towards decision making and innovation. In terms of how these are transformed into action, and by whom, the call text asked applicants to describe two principal mechanisms for making impact, which can be equated with the TM concept of selective "transition arenas" and wider "transition networks" (Loorbach, 2010): how stakeholders will be engaged, contribute to the project and translate results into local action, and plans for broadly disseminating project outputs and outcomes.

The project designs mirror this request. Most applications put forward local partners such as city organizations and industry partners, as both beneficiaries of project outcomes and the key actors for transforming them into impact that contribute to the objectives stated in the call text. The local organizations involved as co-applicants were thought to "learn-by-doing" and expand their networks by participating in the projects. They were also thought to benefit from local insights and guidelines (research pathway projects) as well as tailor-made tools (innovation pathway projects) which they can easily apply after the projects. For instance, the ITEM project reported new problem understandings, policy learnings, and capacity building among policy-makers and service providers in the four case-study cities as well as development of tailored tools as their vehicles for making impact. Likewise, industry partners were thought to be able to implement new insights and tools in their ongoing practice. Generally, co-creation elements were hailed as important for achieving results in both applications and reports: "As the JUSTICE project relies on a genuine co-construction [sic] method involving both policy-makers and city-users, it is expected that these players take advantage of the project outcome. Not only general guidelines, but also clear contributions to the implementation of relevant, local transport policy policies are targeted" (JUSTICE, 2023, p. 13).

Additionally, the organizations engaged as co-operative partners were described as actors that would transform project outputs into action within other European cities and services than the ones directly involved in the projects. Many projects organized these partners into advisory, reference, or exploitation committees. Other frequently mentioned channels for wider dissemination of results and creating impact were academic publications, patents, websites and social media, and dissemination through established European forums and networks. Several projects are also hoping that their experiments will showcase the value of trialed concepts and tools as positive examples and thus pave the way for wider deployment. When asked to report actual impacts in the progress reports, many projects acknowledged that the impact from a single project is hard to determine, especially in the short term given that the value will materialize by the end of the projects or after their closure. Most projects therefore reported dissemination activities that might contribute to making an impact rather than actual impact. The impact statements in the progress reports were, moreover, in most cases, written in future tense. This was the case for both research-oriented and innovation-oriented projects.

4.7. How is the urban context described, and how does this influence the project plans?

The call text treated urban context as a quite uniform, assuming that "usable and accessible instruments, approaches, policy options and tools…" targeting the European level will "…help cities, citizens, communities, businesses and institutions" across Europe (Urban Europe, 2019a, p. 7). Emphasizing transnational benefits, the call demanded a consortium spanning at least three countries and used learning experiences from international collaboration and implementation in diverse urban contexts as arguments for how the portfolio would contribute to the ambition of attaining more complex research results and achieving larger scale outcomes than nations can carry out alone (Urban Europe, 2024b).

The portfolio of projects indeed represents numerous urban areas in Europe. However, few of them provided detailed descriptions of the specific urban contexts or the motivations for the chosen scale (such as street, neighborhood, district, or city) in applications and reports, even though specific cities were mentioned as partners and urban areas were described as sites for ULLs and experiments. Differences between the included sites and related challenges were also seldomly discussed. Instead, a pan-European project organization was generally considered to promote cohesive planning across the involved cities. For instance, the EASIER project argued that "exchanging lessons learned by cities in different countries (Ingvardson and Nielsen, 2018) will accelerate the learning process and facilitate the development of a more sustainable regulatory framework" (EASIER, 2020, p. 6).

The urban context was thus treated as a pre-given spatial situation, the project applications and reports mostly failed to identify national and international differences in urban mobility governance. Such differences could significantly impact the outcomes and scalability of the activities performed within the projects. There were, however, exceptions. One was TuneOurBlock, whose application commented on the

scalability between different cities in relation to the varying contexts and the difficulties in applying blueprints to different urban environments. The project WalkUrban was another. Their application featured a rare motivation of scale and context: "We have chosen the neighborhood scale since it captures the design features of local streets and public space most relevant for walking behavior and routing" (WalkUrban, 2020, p. 4).

5. Concluding discussion

5.1. Summary of findings

Focusing on urban sustainability transitions, we set out to explore how research funding that encourages ULLs and related experimental approaches shapes the funded projects and, consequently, their potential to make an impact. Our analysis of 15 ongoing urban accessibility and connectivity projects funded through ENUAC finds that the projects encompass a wide variety of urban experimentation activities, involve local stakeholders, and focus on producing tangible solutions that contribute to urban transformations, see Table 3.

Table 3
Summary of findings.

Focus	Summary of findings
Visions & objectives	The projects align with the call's vision of car-light cities with many options for active and shared travel. Their objectives center on operational and reflexive contributions to niche innovation, with less focus on regime destabilization and on strategic and tactical activities.
Concepts	With a few notable exemptions, the key concepts (accessibility and connectivity) are under-theorized in the projects. Accessibility is mostly approached from a place-based perspective while connectivity is understood in terms of route efficiency rather than network resilience.
Problems	The projects address problems in line with the call's framing of accessibility and connectivity-related challenges. The problems are in the funding applications mainly motivated through previous studies, not through local experiences or reframing activities with stakeholders.
Consortiums	All project coordinators are Western European research organizations. Cities and regions are represented in the projects but have mostly marginal roles in execution and decision-making. In contrast, companies and NGOs have somewhat more active roles.
Experiments	While only three projects are categorized as ULLs, all adhere to the ULL research methodology. Many different objectives are pursued through experimentation, ranging from finetuning solutions to collective learning, but the focus on institutionalization is limited.
Impact logics	The projects present two key mechanisms for making impact: local impact at project sites through tailored tools and "learning-by-doing" among local stakeholders, and broader dissemination through reference groups, networks, platforms, and publications.
Urban context	With a few notable exemptions, the urban contexts are often vaguely described, and few projects motivate chosen scales or discuss how local conditions influence the project design. Instead, superficial assumptions of pan-European transferability of findings dominate.

5.2. Contributions to the literature on urban living labs

The analysis makes three principal contributions to the literature on ULLs. First, it highlights the role of ULL as a research methodology, which contrasts with the popular perspective that ULL is a manifestation of an emergent mode of experimental governance that can outperform other modes by enabling collective learning from real-world interventions through place-based, iterative, inclusive, and reflexive processes (e.g., Evans et al., 2016).

While previous literature has acknowledged that ULLs are "established at the boundaries between research, innovation and policy" (Bulkeley et al., 2016, p. 13) and argued that ULLs can serve as sites where researchers and policy-practitioners collaborate in knowledge production (Hossain et al., 2019; Ivanova and Huizenga, 2023; Laborgne et al., 2021), few studies have explicitly reflected on how the ULL methodology informs research practices. An important exception is provided by Dekker et al. (2020), who discuss living labs as a methodology for public administration research. Our analysis complements their literature review by illustrating how the ULL methodology shapes the formation and execution of research projects. Specifically, the ULL principles of place-based focus, data collection through real-world experiments, involvement of local stakeholders in co-creation activities, and iterative processes for experimentation and learning permeate the analyzed research projects strategies for collecting, analyzing, and interpreting data.

As a second contribution, the analysis illustrates that the ULL methodology (predictably) is not a panacea for urban sustainability transitions (cf. von Wirth et al., 2019). Previous research has identified several challenges associated with participatory and experimental research approaches frequently applied to urban issues, such as action research and field tests. Notwithstanding criticisms related to research quality, it has been noted, for instance, that it is challenging to balance the engagement versus distance dilemma for researchers (Köhler et al., 2019), mobilize all affected stakeholders and ensure they have appropriate roles (Sørensen and Paulsson, 2020), manage diverging expectations and objectives (Isaksson et al., 2022; van Waes et al., 2021), and to cater for long-term impacts given temporary project structures (Torrens and von Wirth, 2021). Extending these works, we identify four key mismatches between the transformative intent of the analyzed funding call, and the scope of the projects.

First, consistent with previous studies of power asymmetries in research-led ULLs (Mukhtar-Landgren et al., 2026), the analysis finds a power imbalance resulting in research organizations dominating work and decision-making. In most cases, research organizations defined, motivated, and designed the projects, while other actors, such as local public authorities, civil sector organizations, and private companies, provided the tools and arenas needed to perform the project and the legitimacy required for winning funding. Only one project reported a process where the project proposal was revised according to input from local stakeholders. The notion of ULLs builds on the idea of "… employing working methods to integrate people into the entire development process as users and co-creators" (Bulkeley et al., 2016, p. 13). Similarly, TM builds on the concept of "learning-by-doing" and "doing-by-learning" (Loorbach, 2022). It follows that if local stakeholders are not involved in the doing, they will not experience much learning. This is problematic given that the analyzed project portfolio is based on a logic in which local stakeholders are key for translating project outputs into lasting impact. Limited local involvement in project formulation and decision-making arguably also lowers the likelihood of systemic effects since uninvolved local actors are less likely to engage in institutionalizing project outcomes, such as ULLs.

Second, the analysis highlights that the portfolio suffers from an innovation bias, meaning that it largely neglects regime break up and destabilization (see Loorbach et al., 2017). The projects focus almost exclusively on developing and testing new solutions and supporting their diffusion. This contrasts with the theory of change that underpins the MLP, which argues that destabilization of the prevailing regime is needed to create windows of opportunity for the diffusion of niche innovations, such as new ways of improving urban accessibility and connectivity (Geels, 2002; see also Geels, 2014; Hebinck et al., 2022).

Third, the analysis reveals that the projects focus on operational and reflexive activities at the expense of strategic and tactical activities, such as visioning, establishing a shared transition agenda, building long-term coalitions, and (re)framing the addressed problems (see Loorbach, 2010). Due to the limited involvement of local stakeholders in problem formulation, project design, and execution, this narrow focus on operational levels contributes to weak alignment between many projects and

local transition or policy agendas. Consequently, there is an increased risk of perpetuating the frequently reported gap between research-funded experiments and sustained practices (e.g., Smith, 2022).

Fourth, the analysis illustrates that few projects elaborate on key concepts, such as urban accessibility and connectivity. The terms are frequently used in project applications and reports but are rarely defined. Few applications, moreover, explicitly discussed which urban contexts project outputs might be applicable to, and complexities related to contextual factors were largely ignored. This limits the potential for robust theoretical contributions from the research undertaken. It also makes it challenging to assess the transferability of developed knowledge and tools, which runs counter to ULL ambitions of formalized knowledge production and replication (Steen and Van Bueren, 2017). Similarly, it conflicts with the call's goal of producing generalizable findings that advance knowledge about cities (Urban Europe, 2019a).

As a third contribution, our analysis illustrates clear links between these mismatches and the funding structure. The call put emphasis on the importance of co-creation with local stakeholders in both the preparation of proposals and the execution of projects. Still, it positioned "practitioners" as involved in or advisors to the projects, rather than as leaders of them. The process of developing proposals was also tailored to research organizations' need for external funding and their capacity to set up pan-European partnerships. This conflicted, however, with local stakeholders' focus on local issues and limited capacity to take on time consuming tasks such as formulating and leading research and innovation projects, given that urban austerity shrinks the capacity of local governments (Gray and Barford, 2018). The call thus set up research organizations to dominate work and decision making. Similarly, the call treated key concepts rather loosely and did not require projects to clearly define conceptualizations or operationalizations. By contrast, it required all proposals to motivate, and thus reflect on, issues such as gender aspects and the added value of international collaboration. While the main condition explaining the portfolio's innovation bias is probably the significant challenges associated with deliberate destabilization, such as ethical considerations and political contestation associated with picking losers (Koretsky et al., 2023), it is also a reflection of the focus of the call, which adheres to JPI Urban Europe's aim to "transform urban areas into centers of innovation and technology" (Urban Europe, 2021, p. 2). Finally, the call provided funding for a maximum of three years, thus effectively delimiting the scope of the projects to operational and reflexive activities.

5.3. Practical implications

To address the four abovementioned mismatches, we recommend funders that want to encourage ULL research to issue more flexible and democratic funding calls so that they accommodate a broader spectrum of research approaches, such as building on grassroots initiatives or leveraging routine public sector projects as sites for experimentation (see Torrens and von Wirth, 2021). We, moreover, see a need to explore new approaches to ensuring that local stakeholders can be, and are, actively and significantly involved in project formulation, execution, decision-making, and afterlife. As an example, the Swedish research council for sustainable development puts out calls for collaborative research projects for which only cities and regions may serve as the main applicants.

In terms of scope, the funded research projects should preferably collectively span both operational and reflexive activities, aligning with strategic and operational activities at both global and local levels. We also encourage funders to place greater emphasis on cumulative knowledge production and the transferability of outcomes by providing instructions and/or assessment criteria that require applicants to define the object of the study, articulate the impact logic, and take a position on key concepts. You get the answers you ask for, and what gets measured gets done. If ULL research funding is intended to contribute to urban sustainability transitions, it is crucial that the instructions (or guiding questions) and evaluation criteria align with an underpinning theory of change that explains how research projects can influence these processes, whether directly or indirectly.

5.4. Limitations and avenues for further research

We have analyzed a small set of ongoing research projects. While keeping this in mind and acknowledging that the analysis does not encompass activities beyond the projects nor review output quality or assess actual impact on sustainability transitions, we argue that the analysis showcases how current funding structures enable and constrain which problems are pursued, which actors do what, and which theories of change project logics are based on. Beyond studies that assess the impact of ULL projects across other domains and geographical scales, and compare them with projects using other research methodologies, there are several avenues for research that could further strengthen and extend our findings. These include analyzing: (i) how different types of funding schemes influence the diversity of experimental approaches and the extent to which experimental practices become institutionalized, (ii) whether power imbalances manifest differently across various types of ULLs, and (iii) the practical and ethical challenges of funding ULLs aimed at regime destabilization.

Generative AI and AI-assisted technologies in the writing process

During the preparation of this manuscript, the authors used ChatGPT and Copilot to check sentence structure, word choice, grammar, and spelling. After using these tools, the authors reviewed and edited the content as needed and take full responsibility for the content of the published article.

CRediT authorship contribution statement

Göran Smith: Writing – original draft, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization. **Christina Lindkvist:** Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization.

Funding

Göran Smith and Christina Lindkvist report financial support was provided by Swedish Research Council for Sustainable Development [2022-02523]. Göran Smith also reports a relationship with French National Research Agency that includes: travel reimbursement.

Acknowledgements

This paper is a product of the project ACUTE – Accessibility and Connectivity Knowledge Hub for Urban Transformation in Europe. We are grateful for the valuable contributions of all project members. We are especially thankful to David Mowitz, Isak Vencu Öhrlund, Sigma Dolins, and Steven Sarasini for their involvement in developing the analytical approach and in conducting important parts of the reported analysis, to Enrica Papa, Sabina Cioboata, Aïta Cissé, and Irina Arhipova for conducting other data collections and analyses within the ACUTE project that have greatly benefited our study, and to Hans Häuslmayer for his leadership of the project. We also appreciate the insightful feedback from representatives of the analyzed ENUAC projects, the special issue editors, and the anonymous reviewers, which has helped us improve our analysis.

Data availability

For access to the call text, applications, and progress reports, please contact JPI Urban Europe. For access to interview and questionnaire data, please contact Hans Häuslmayer.

References

Arhipova, I., Paura, L., Bumanis, N., 2024. D4.1 report on synthesized results for the development of future DUT programme.

Berglund-Snodgrass, L., Mukhtar-Landgren, D., 2020. Conceptualizing testbed planning: urban planning in the intersection between experimental and public sector logics. Urban Plan. 5 (1), 96–106. https://doi.org/10.17645/up.v5i1.2528.

Boeing, G.D., 2017. Methods and Measures for Analyzing Complex Street Networks and Urban Form. University of California, Berkeley.

Brenner, N., 2009. What is critical urban theory? City 13, 198–207. https://doi.org/10.1080/13604810902996466.

Bulkeley, H., Coenen, L., Frantzeskaki, N., Hartmann, C., Kronsell, A., Mai, L., et al., 2016. Urban living labs: governing urban sustainability transitions. Curr. Opin. Environ. Sustain. 22, 13–17. https://doi.org/10.1016/j.cosust.2017.02.003.

Bulkeley, H., Marvin, S., Palgan, Y.V., McCormick, K., Breitfuss-Loidl, M., Mai, L., et al., 2019. Urban living laboratories: conducting the experimental city? Eur. Urban Reg. Stud. 26 (4), 317–335. https://doi.org/10.1177/0969776418787222.

Caprotti, F., Cowley, R., 2017. Interrogating urban experiments. Urban Geogr. 38 (9), 1441–1450. https://doi.org/10.1080/02723638.2016.1265870.

CATAPULT, 2023. Project Progress Report: PoliCies for Inclusive, Demand-Oriented and Target Group-Specific Automated Mobility Solutions for Cities.

Cuomo, F., 2022. Urban living lab: an experimental co-production tool to foster the circular economy. Sociol. Sci. 11 (6), 260. https://doi.org/10.3390/socsci11060260.

Dekker, R., Franco Contreras, J., Meijer, A., 2020. The living lab as a methodology for public administration research: a systematic literature review of its applications in the social sciences. Int. J. Public Adm. 43 (14), 1207–1217. https://doi.org/10.1080/01900692.2019.1668410.

Dell'Era, C., Landoni, P., 2014. Living lab: a methodology between user-centred design and participatory design. Creat. Innov. Manag. 23 (2), 137–154. https://doi.org/10.1111/caim.12061.

DUT, 2022. Driving Urban Transitions to a Sustainable Future Roadmap. Driving Urban Transitions.

EASIER, 2020. Proposal: Seamless Sustainable Everyday Urban Mobility.

ENOLL, 2025. Members Catalogue 2025. Retrieved from: https://enoll.org/our-network/#m-catalog.

Evans, J., Karvonen, A., Raven, R., 2016. The experimental city: New modes and prospects of urban transformation. In: Evans, J., Karvonen, A., Raven, R. (Eds.), The Experimental City. Routledge, pp. 1–12.

Evans, J., Vácha, T., Kok, H., Watson, K., 2021. How cities learn: from experimentation to transformation. Urban Plan. 6 (1), 171–182. https://doi.org/10.17645/up.v6i1.3545.

EX-TRA, 2020. Proposal: EXperimenting with city streets to TRAnsform urban mobility (EX-TRA).

Frantzeskaki, N., Broto, V.C., Coenen, L., Loorbach, D., 2014. Urban Sustainability Transitions. Routledge, New York.

Frey, W.H., Zimmer, Z., 2001. Defining the city. In: Paddison, R. (Ed.), Handbook of Urban Studies. SAGE Publications, pp. 14–35.

Fünfschilling, L., Truffer, B., 2014. The structuration of socio-technical regimes—conceptual foundations from institutional theory. Res. Policy 43 (4), 772–791. https://doi.org/10.1016/j.respol.2013.10.010.

Geels, F.W., 2002. Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. Res. Policy 31 (8–9), 1257–1274. https://doi.org/10.1016/S0048-7333(02)00062-8.

Geels, F.W., 2012. A socio-technical analysis of low-carbon transitions: introducing the multi-level perspective into transport studies. J. Transp. Geogr. 24, 471–482. https://doi.org/10.1016/j.jtrangeo.2012.01.021.

Geels, F.W., 2014. Regime resistance against low-carbon transitions: introducing politics and power into the multi-level perspective. Theory Cult. Soc. 31 (5), 21–40. https://doi.org/10.1177/0263276414531627.

Geurs, K.T., Van Wee, B., 2004. Accessibility evaluation of land-use and transport strategies: review and research directions. J. Transp. Geogr. 12 (2), 127–140. https://doi.org/10.1016/j.jtrangeo.2003.10.005.

Gray, M., Barford, A., 2018. The depths of the cuts: the uneven geography of local government austerity. Camb. J. Reg. Econ. Soc. 11 (3), 541–563. https://doi.org/10.1093/cjres/rsy019.

Hebinck, A., Diercks, G., von Wirth, T., Beers, P.J., Barsties, L., Buchel, S., et al., 2022. An actionable understanding of societal transitions: the x-curve framework. Sustain. Sci. 17 (3), 1009–1021. https://doi.org/10.1007/s11625-021-01084-w.

Hillgren, P.A., 2013. Participatory design for social and public innovation: living Labs as spaces for agonistic experiments and friendly hacking. In: Manzini, E., Staszowski, E. (Eds.), Public and Collaborative: Exploring the Intersection of Design, Social Innovation and Public Policy. DESIS Network, pp. 75–88.

Hodson, M., Evans, J., Schilwa, J., 2018. Putting urban experimentation into context: integrating urban living labs and city-regional priorities. In: Marvin, S., Bulkeley, H., Mai, L., McCormick, K., Voytenko, Y. (Eds.), Urban Living Labs: Experimenting with City Futures. Routledge, pp. 37–51.

Hölscher, K., Frantzeskaki, N., 2021. Perspectives on urban transformation research: transformations in, of, and by cities. Urban Transforma. 3 (1), 2. https://doi.org/10.1186/s42854-021-00019-z.

Hossain, M., Leminen, S., Westerlund, M., 2019. A systematic review of living lab literature. J. Clean. Prod. 213, 976–988. https://doi.org/10.1016/j.jclepro.2018.12.257.

Huang, J.H., Thomas, E., 2021. A review of living lab research and methods for user involvement. Technol. Innov. Manag. Rev. 11 (9/10), 88–107. https://doi.org/10.22215/timreview/1467.

Ingvardson, J.B., Nielsen, O.A., 2018. How urban density, network topology and socio-economy influence public transport ridership: empirical evidence from 48 european metropolitan areas. J. Transp. Geogr. 72, 50–63. https://doi.org/10.1016/j.jtrangeo.2018.07.002.

Isaksson, K., Oldbury, K., Marsden, G., 2022. Lessons learned about experimentation in an era of transformation. In: Oldbury, K., Isaksson, K., Marsden, G. (Eds.), Experimentation for Sustainable Transport? Risks, Strengths, and Governance Implications. Linnefors Förlag, pp. 207–224.

Ivanova, D., Huizenga, S., 2023. Imagineering the city: the living lab mystique and its discontents. J. Sci. Commun. 22 (3), Y02. https://doi.org/10.22323/2.22030402.

Jackson, M., Lederwasch, A., Giurco, D., 2014. Transitions in theory and practice: managing metals in the circular economy. Resources 3 (3), 516–543. https://doi.org/10.3390/resources3030516.

Jacobs, J., 2011. The Death and Life of Great American Cities. Modern Library.

Joost, J.M., Lanzendorf, M., Weicker, T., 2025. Mobility transition through labs in real-world contexts. The contribution of transdisciplinary approaches in creating sustainable transportation systems. J. Transp. Geogr. 124, 104153. https://doi.org/10.1016/j.jtrangeo.2025.104153.

JUSTICE, 2020. Proposal: Joining Urban Morphology, Spatio-Temporal and Socio-Cognitive Accessibility for an Inclusive City Environment.

JUSTICE, 2023. Project Progress Report: Joining Urban Morphology, Spatio-Temporal and Socio-Cognitive Accessibility for an Inclusive City Environment.

Kanger, L., Sovacool, B.K., Noorkõiv, M., 2020. Six policy intervention points for sustainability transitions: a conceptual framework and a systematic literature review. Res. Policy 49 (7), 104072. https://doi.org/10.1016/j.respol.2020.104072.

Kemp, R., Schot, J., Hoogma, R., 1998. Regime shifts to sustainability through processes of niche formation: the approach of strategic niche management. Tech. Anal. Strat. Manag. 10 (2), 175–198. https://doi.org/10.1080/09537329808524310.

Köhler, J., Geels, F.W., Kern, F., Markard, J., Onsongo, E., Wieczorek, A., et al., 2019. An agenda for sustainability transitions research: state of the art and future directions. Environ. Innov. Soc. Trans. 31, 1–32. https://doi.org/10.1016/j.eist.2019.01.004.

Koretsky, Z., van Lente, H., Turnheim, B., Stegmaier, P., 2023. Introduction: the relevance of technologies in decline. In: Koretsky, Z., Stegmaier, P., Turnheim, B., Van Lente, H. (Eds.), Technologies in Decline: socio-technical Approaches to Discontinuation and Destabilization. Routledge, pp. 1–12.

Kronsell, A., Mukhtar-Landgren, D., 2018. Experimental governance: the role of municipalities in urban living labs. Eur. Plan. Stud. 26 (5), 988–1007. https://doi.org/10.1080/09654313.2018.1435631.

Kronsell, A., Mukhtar-Landgren, D., 2020. Experimental governance of smart mobility: Some normative implications. In: Paulsson, A., Sørensen, C.H. (Eds.), Shaping Smart Mobility Futures: Governance and Policy Instruments in Times of Sustainability Transitions. Emerald Publishing Limited, pp. 119–135.

Kuckartz, U., Rädiker, S., 2023. Qualitative content analysis: methods, practice and software. SAGE Publications.

Laborgne, P., Ekille, E., Wendel, J., Pierce, A., Heyder, M., Suchomska, J., et al., 2021. Urban living labs: how to enable inclusive transdisciplinary research? Urban transforma. 3, 1–18. https://doi.org/10.1186/s42854-021-00026-0.

Lincoln, Y.S., Guba, E.G., 1985. Naturalistic inquiry. Sage Publications.

Loorbach, D., 2010. Transition management for sustainable development: a prescriptive, complexity-based governance framework. Governance 23 (1), 161–183. https://doi.org/10.1111/j.1468-0491.2009.01471.x.

Loorbach, D., 2022. Designing radical transitions: a plea for a new governance culture to empower deep transformative change. City Territ. Archit. 9 (1), 30. https://doi.org/10.1186/s40410-022-00176-z.

Loorbach, D., Frantzeskaki, N., Avelino, F., 2017. Sustainability transitions research: transforming science and practice for societal change. Annu. Rev. Environ. Resour. 42 (1), 599–626. https://doi.org/10.1146/annurev-environ-102014-021340.

Loorbach, D., Schwanen, T., Doody, B.J., Arnfalk, P., Langeland, O., Farstad, E., 2021. Transition governance for just, sustainable urban mobility: an experimental approach from Rotterdam, the Netherlands. J. Urban Mobility 1, 100009. https://doi.org/10.1016/j.urbmob.2021.100009.

Markard, J., Raven, R., Truffer, B., 2012. Sustainability transitions: an emerging field of research and its prospects. Res. Policy 41 (6), 955–967. https://doi.org/10.1016/j.respol.2012.02.013.

Marvin, S., Silver, J., 2016. The urban laboratory and emerging sites or urban experimentation. In: Evans, J., Karvonen, A., Raven, R. (Eds.), The Experimental City. Routledge, pp. 47–60.

Marvin, S., Bulkeley, H., Mai, L., McCormick, K., Palgan, Y.V., 2018. Introduction. In: Marvin, S., Bulkeley, H., Mai, L., McCormick, K., Voytenko, Y. (Eds.), Urban Living Labs: Experimenting with City Futures. Routledge, pp. 1–17.

Matschoss, K., Fahy, F., Rau, H., Backhaus, J., Goggins, G., Grealis, E., et al., 2021. Challenging practices: experiences from community and individual living lab approaches. Sustain. Sci. Pract. Policy 17 (1), 135–151. https://doi.org/10.1080/15487733.2021.1902062.

Miller, H.J., 2005. Place-based versus people-based accessibility. In: Levinson, D., Krizek, K. (Eds.), Access to Destinations. Emerald group publishing, pp. 63–89.

Mukhtar-Landgren, D., Hantson, M., Vitrano, C., Sträuli, L., Priya Uteng, T., Ryan, J., 2026. Epistemic justice in urban living labs: a framework for analysis applied to transport planning. Eur. Plan. Stud. 34 (1), 148–167.

Nel, D.H., Higgins, C.D., Bruyns, G., 2018. Urban design, connectivity and its role in building spatial resilience. In XXV international seminar on urban form 2018: urban form and social context: from traditions to newest demands, pp. 921–930.

Nesti, G., 2018. Co-production for innovation: the urban living lab experience. Polic. Soc. 37 (3), 310–325. https://doi.org/10.1080/14494035.2017.1374692.

Nevens, F., Frantzeskaki, N., Gorissen, L., Loorbach, D., 2013. Urban transition labs: co-creating transformative action for sustainable cities. J. Clean. Prod. 50, 111–122. https://doi.org/10.1016/j.jclepro.2012.12.001.

Novalia, W., Raven, R., Farrelly, M., 2026. The spatial dynamics of urban experimentation: a novel framework for recontextualisation across places. Cities 170, 106682. https://doi.org/10.1016/j.cities.2025.106682.

Papa, E., Cioboata, S., 2024. D1.1 (final) showcase of regional, national, european and international projects, ideas, initiatives on the topic of accessibility and connectivity – the ENUAC projects.

Raven, R., Kern, F., Verhees, B., Smith, A., 2016. Niche construction and empowerment through socio-political work. A meta-analysis of six low-carbon technology cases. Environ. Innov. Soc. Trans. 18, 164–180. https://doi.org/10.1016/j.eist.2015.02.002.

Rotmans, J., Kemp, R., Van Asselt, M., 2001. More evolution than revolution: transition management in public policy. Foresight 3 (1), 15–31. https://doi.org/10.1108/14636680110803003.

Rotmans, J., Loorbach, D., Kemp, R., 2007. Transition management: Origin, Evolution, Critique. Retrieved from. http://hdl.handle.net/1765/37240.

Särkilahti, M., Åkerman, M., Jokinen, A., Rintala, J., 2022. Temporal challenges of building a circular city district through living-lab experiments. Eur. Plan. Stud. 30 (7), 1333–1354. https://doi.org/10.1080/09654313.2021.1965963.

Schliwa, G., 2013. Exploring living labs through transition management-challenges and opportunities for sustainable urban transitions. Lund University masters thesis.

Schneidewind, U., Singer-Brodowski, M., Augenstein, K., 2016. Transformative science for sustainability transitions. In: Brauch, H.G., Spring, U.O., Grin, J., Scheffran, J. (Eds.), Handbook on Sustainability Transition and Sustainable Peace. Springer, pp. 123–136.

Scholl, C., De Kraker, J., 2021. Urban planning by experiment: practices, outcomes, and impacts. Urban Plan. 6 (1), 156–160. https://doi.org/10.17645/up.v6i1.4248.

Scholl, C., de Kraker, J., Hoeflehner, T., Wlasak, P., Drage, T., Eriksen, M.A., 2018. Transitioning urban experiments: reflections on doing action research with urban labs. GAIA Ecol. Perspect. Sci. Soc. 27 (1), 78–84. https://doi.org/10.14512/gaia.27.S1.15.

Scholl, C., de Kraker, J., Dijk, M., 2022. Enhancing the contribution of urban living labs to sustainability transformations: towards a meta-lab approach. Urban Transforma. 4 (1), 7. https://doi.org/10.1186/s42854-022-00038-4.

Shen, Z., Qian, J., Zhu, H., Tian, S., 2025. Framing urban living lab as a multi-dimensional knowledge model: experiences from Shenzhen overseas Chinese town wetland park. Urban Stud. https://doi.org/10.1177/00420980251314553, 00420980251314553.

Shove, E., Walker, G., 2007. CAUTION! Transitions ahead: politics, practice, and sustainable transition management. Environ. Plan. A 39 (4), 763–770. https://doi.org/10.1068/a39310.

SmartHubs, 2020. Proposal: Smart Mobility Hubs as Game Changers in Transport.

Smeds, E., 2025. Urban transport experimentation: A network or hybrid governance process? In: Perl, A., Ray, R., Reardon, L. (Eds.), Handbook of Transportation and Public Policy. Edward Elgar Publishing, pp. 147–166.

Smith, G., 2022. Smart mobility experimentation: Reflecting on a public transport authority's convoluted journey with mobility-as-a-service. In: Oldbury, K., Isaksson, K., Marsden, G. (Eds.), Experimentation for Sustainable Transport? Risks, Strengths, and Governance Implications. Linnefors Förlag, pp. 185–201.

Smith, A., Stirling, A., Berkhout, F., 2005. The governance of sustainable socio-technical transitions. Res. Policy 34 (10), 1491–1510. https://doi.org/10.1016/j.respol.2005.07.005.

Soeiro, D., 2021. Smart cities and innovative governance systems: a reflection on urban living labs and action research. Fennia - Int. J. Geogr. 199 (1), 104–112. https://doi.org/10.11143/fennia.97054.

Sørensen, C.H., Paulsson, A., 2020. Governance and citizen participation in shaping futures of smart mobility. In: Paulsson, A., Sørensen, C.H. (Eds.), Shaping Smart Mobility Futures: Governance and Policy Instruments in Times of Sustainability Transitions. Emerald Publishing, pp. 205–219.

Ståhlbröst, A., 2008. Forming Future IT: The Living Lab Way of User Involvement. Luleå Technical University. PhD dissertation.

Steen, K., Van Bueren, E., 2017. The defining characteristics of urban living labs. Technol. Innov. Manag. Rev. 7 (7). https://doi.org/10.22215/timreview/1088.

Taylor, L., 2021. Exploitation as innovation: research ethics and the governance of experimentation in the urban living lab. Reg. Stud. 55 (12), 1902–1912. https://doi.org/10.1080/00343404.2020.1826421.

Thomas, G., 2011. A typology for the case study in social science following a review of definition, discourse, and structure. Qual. Inq. 17 (6), 511–521. https://doi.org/10.1177/1077800411409884.

Torrens, J., von Wirth, T., 2021. Experimentation or projectification of urban change? A critical appraisal and three steps forward. Urban Transforma. 3 (1), 8. https://doi.org/10.1186/s42854-021-00025-1.

Urban Europe, 2019a. Joint Call for Proposals for Research and Innovation Projects on Urban Accessibility and Connectivity (European Commission Grant no 875022). JPI Urban Europe.

Urban Europe, 2019b. Strategic Research and Innovation Agenda 2.0. JPI Urban Europe.

Urban Europe, 2021. ENUAC Projects Catalogue 2021. JPI Urban Europe.

Europe, Urban, 2024a. Urban Living Labs in JPI Urban Europe. JPI Urban Europe. https://jpi-urbaneurope.eu/urbanlivinglabs/. accessed 2024–06-23.

Europe, Urban, 2024b. Introduction to JPI Urban Europe. JPI Urban Europe. https://jpi-urbaneurope.eu/about/intro/ accessed (2024–06-25 2024).

van Waes, A., Nikolaeva, A., Raven, R., 2021. Challenges and dilemmas in strategic urban experimentation: an analysis of four cycling innovation living labs. Technol. Forecast. Soc. Chang. 172, 121004. https://doi.org/10.1016/j.techfore.2021.121004.

von Wirth, T., Fünfschilling, L., Frantzeskaki, N., Coenen, L., 2019. Impacts of urban living labs on sustainability transitions: mechanisms and strategies for systemic change through experimentation. Eur. Plan. Stud. 27 (2), 229–257. https://doi.org/10.1080/09654313.2018.1504895.

Voytenko, Y., McCormick, K., Evans, J., Schliwa, G., 2016. Urban living labs for sustainability and low carbon cities in europe: towards a research agenda. J. Clean. Prod. 123, 45–54. https://doi.org/10.1016/j.jclepro.2015.08.053.

Voytenko, Y., McCormick, K., Evans, J., 2018. Urban living labs: catalyzing low carbon and sustainable cities in Europe? In: Marvin, S., Bulkeley, H., Mai, L., McCormick, K., Voytenko, Y. (Eds.), Urban Living Labs: Experimenting with City Futures. Routledge, pp. 21–36.

WalkUrban, 2020. Proposal: Walkable Urban Neighbourhoods – Freeing up Potential for Sustainable and Active Travel by Improving Walking and its Connections with Public Transport.

Westman, L., Castán Broto, V., 2022. Urban transformations to keep all the same: the power of ivy discourses. Antipode 54 (4), 1320–1343. https://doi.org/10.1111/anti.12820.

Whitmarsh, L., 2012. How useful is the multi-level perspective for transport and sustainability research? J. Transp. Geogr. 24, 483–487. https://doi.org/10.1016/j.jtrangeo.2012.01.022.

Wolfram, M., Borgström, S., Farrelly, M., 2019. Urban transformative capacity: from concept to practice. Ambio 48, 437–448. https://doi.org/10.1007/s13280-019-01169-y.