

Living Labs as Research Methodology: From Innovation Buzzword to Epistemic Tool

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Abstract: Living Labs have proliferated across EU-funded research programmes as vehicles for co-designing solutions to complex urban challenges, yet their methodological implications remain poorly understood. The literature primarily theorises Living Labs as platforms for co-creation and innovation delivery rather than as a research approach, leaving unexamined what they distinctively enable researchers to know. This paper investigates the epistemic capabilities the Living Lab approach makes available and how these differ from established field research methods. Drawing on four years of embedded experience within FOOD TRAILS, a Horizon 2020 project establishing urban food policy Living Labs across eleven European city-regions, a comparative framework is developed positioning Living Labs alongside case study research, ethnography, and participatory action research across six dimensions. The analysis identifies four epistemic capabilities that no single comparator method offers with comparable structural depth: extended engagement across complete policy implementation cycles; simultaneous access to diverse stakeholder perspectives through the quadruple helix architecture; real-time observation of dissemination and acceptance dynamics; and tracking emergent patterns through active intervention. The paper also documents a systematic theory-practice gap in which funded programme conditions constrain the realisation of these capabilities. These findings offer both a comparative methodological framework and practical guidance for scholars increasingly required to adopt a Living Lab approach.

Keywords: Living Labs; Research Methods; Epistemic Capabilities; Theory-practice Gap.

1. Introduction

Over the past two decades, Living Labs (LLs) have become a prominent feature of European research and innovation policy. Defined as user-centred, open innovation ecosystems that integrate research and innovation processes in real-life contexts through multi-stakeholder collaboration (Hossain et al, 2019; Leminen et al, 2012), Living Labs have proliferated across EU-funded programmes as vehicles for co-designing solutions to complex urban challenges (EnoLL, n.d.; McLoughlin et al, 2018). Their appeal lies in the distinctive promise that embedding research within real-world settings and actively involving users generates knowledge that established field studies cannot readily produce. Yet despite this proliferation, the scholarly status of Living Labs as a research methodology remains underdeveloped. The methodology literature lacks systematic understanding of what the Living Lab format makes epistemically available, how it differs from established field research methods, and under what conditions it adds distinctive value.

This gap matters with increasing urgency. As Living Labs become a standard requirement in European research funding Programmes, scholars are being invited to adopt a methodological approach whose epistemological implications remain poorly understood. Theoretically, a methodology that cannot be positioned within existing scholarly approaches cannot be rigorously evaluated. Practically, researchers need clarity on what they are being asked to do methodologically and what it means for the knowledge they can generate.

The scholarly literature on Living Labs has grown considerably since the concept gained traction in the mid-2000s (McLoughlin et al, 2018). Foundational work has established core definitional elements, including experimentation in real environments, co-creation, and user centrality (Dubé and Paré, 2003), as well as theoretical grounding in open innovation (Chesbrough, 2003; Chesbrough and Appleyard, 2007) and co-creation (Mulder and Stappers, 2009). Research has mapped actor roles and governance challenges (Nyström et al, 2014). However, bibliometric analysis confirms that Living Lab research remains fragmented, heavily concentrated in Europe, and predominantly practice-oriented, with persistent theoretical and methodological gaps (McLoughlin et al, 2018). Crucially, when researchers study Living Labs empirically, they most commonly reach for case study methodology - a pattern that confirms the perceived affinity between the two approaches whilst simultaneously underscoring the failure to theorise what Living Labs themselves enable as a methodology.

Living Labs share structural characteristics with established field research methods (Myers, 2019), including case study research (Yin, 2009), ethnography (Geertz, 1973; Hammersley and Atkinson, 2007), and participatory action research (PAR) (Baskerville and Myers, 2004; Ollila & Yström, 2020), yet systematic comparison remains absent. This paper addresses that gap by asking: What distinctive epistemic capabilities does the Living Lab

approach make available to researchers, and how do these differ from what established field research methods can offer?

To address this question, this paper draws on embedded experience within FOOD TRAILS, a Horizon 2020 project funded by the European Commission, which used Living Labs as its core research approach across eleven European city-regions. The author was a key member of the project team and led the Work Package responsible for the design and operation of the Living Labs. The analytical approach is methodological reflection grounded in practice (Schön, 1983; Myers, 2019): rather than treating these Living Labs as cases to be analysed through another methodology, the author's embedded experience is treated as the empirical basis for comparative analysis. Following theoretical saturation principles (Glaser and Strauss, 2017; Moore et al, 2026), four Living Labs are examined, selected for analytical richness and complementarity across the epistemic capabilities identified. A systematic comparative framework is developed to examine context origin, researcher role, stakeholder access, temporal engagement, and intervention capacity and position Living Labs against case study research, ethnography, and PAR.

The analysis yields two contributions. First, four specific epistemic capabilities that Living Labs make available are identified - extended engagement across complete implementation cycles; simultaneous access to diverse stakeholder perspectives; observation of real-time dissemination and acceptance dynamics; and tracking emergent patterns through active intervention - highlighting that no established field research method offers this combination with comparable structural depth. These capabilities are shown to operate within systematic constraints in funded research contexts, producing a theory-practice gap that is itself analytically significant. Second, the conditions under which distinctive access is enabled or constrained are examined, offering methodological guidance for scholars considering or required to adopt a Living Lab approach. Together, these contributions respond to McLoughlin et al's (2018) call to consolidate the intellectual core of Living Lab research by providing the comparative methodological framework the field has lacked.

2. Literature Review and Theoretical Framework

2.1 Living Labs: Definitions and Structural Characteristics

Living Labs emerged in the early 2000s, originating in MIT's research on technology development before gaining traction through the European Network of Living Labs (EnoLL). EnoLL defines Living Labs as "user-centred, open innovation ecosystems based on a systematic user co-creation approach, integrating research and innovation processes in real life communities and settings," reflecting three pillars: experimentation in real environments, co-creation, and user centrality (Dubé and Paré, 2003).

Living Labs have been theorised primarily through innovation frameworks - open innovation (Chesbrough, 2003; Chesbrough and Appleyard, 2007), user innovation (Von Hippel, 2007), and co-creation (Mulder and Stappers, 2009) - rather than research methodology. This theoretical grounding has left unexamined what Living Labs enable researchers to know, and why.

One structural characteristic distinguishes Living Labs from all established field research methods: the collapse of the distinction between research context and research methodology. In case study research, ethnography, or PAR, the researcher brings a methodology to an existing context; the two remain analytically separable. In a Living Lab, this separation does not hold. The constructed multi-stakeholder setting and the approach to studying it are co-constitutive: the Living Lab is simultaneously the phenomenon being shaped and the instrument through which knowledge is generated. This context-method duality means that the quality of knowledge produced cannot be assessed independently of the quality of the Living Lab itself. Despite its significance, this duality has been noted only in passing (Dubé and Paré, 2003) and has not previously grounded systematic comparative methodological analysis.

Leminen, Westerlund, and Nyström (2012) propose a typology of four Living Lab configurations, signalling that not all Living Labs offer the same structural position or embedded access. Nyström et al (2014) identify four role patterns - ambidexterity, reciprocity, temporality, and multiplicity - describing environments of constant role fluidity. This fluidity has direct implications for researcher agency: the embedded researcher cannot assume a stable, controllable position but must continuously negotiate their role as the network evolves.

2.2 Choice of Comparator Methods and Evaluation Criteria

To examine what Living Labs distinctively enable, this study positions them against methods sharing meaningful structural similarities: field research methods involving extended or embedded researcher engagement. Living Labs are compared with case study research, ethnography, and participatory action research. These three methods represent a spectrum of researcher roles and intervention levels. Case study research occupies the observational end, ethnography the immersive middle ground, and PAR the action-oriented end. Living Labs, as prescribed in the literature, sit at or beyond the PAR end in terms of intended intervention, though as the analysis demonstrates, they frequently do not reach this position in practice. These methods are also the most widely used approaches in management and organisational research involving real-world settings (Myers, 2019), offering direct guidance for scholars in this field.

Case study research (Benbasat et al, 1987; Eisenhardt and Graebner, 2007; Yin, 2009) addresses "how" and "why" questions about contemporary phenomena in context, drawing on multiple data sources within bounded, naturally occurring settings. The researcher acts as external observer and analyst, present to understand rather than intervene. Data collection is typically sequential and aggregated, limiting capacity to capture real-time dynamics and emergent patterns within active processes.

Ethnography (Geertz, 1973; Hammersley and Atkinson, 2007) involves extended immersion in naturally occurring social contexts, producing thick description of cultural life. The researcher maintains minimal intervention to avoid distorting observed phenomena. Temporal engagement is ethnography's distinctive strength, but its single-context focus and commitment to non-intervention impose limitations in multi-actor innovation settings where dynamics evolve across simultaneous parallel processes.

Participatory action research (Baskerville and Myers, 2004) shares with Living Labs commitments to real-world engagement, multi-stakeholder participation, and action-oriented knowledge production. However, PAR is typically community-driven, with research agendas emerging from collectively identified needs rather than externally designed programmes. This structural difference from funded Living Labs - where objectives, timelines, and stakeholder compositions are established in advance - creates significant tension. For researchers embedded in funded Living Labs, available agency is often more limited than PAR's framework implies (Ballon and Schuurman 2015; Dobre and Faldi, 2025; Steen and Van Bueren, 2017).

These methods have been compared and contrasted in the literature along dimensions that prove analytically productive for positioning Living Labs. Foundational methodological accounts emphasise how research contexts originate - whether naturally occurring or purpose-built (Dubé and Paré, 2003; Yin, 2009) - how researchers relate to those contexts as external observers, immersed participants, or active facilitators (Geertz, 1973; Kemmis, 2008; Nyström et al, 2014), what temporal structures shape engagement (Hammersley and Atkinson, 2007; Baskerville and Myers, 2004; Yin, 2009), and to what degree intervention is authorised or constrained (Ballon and Schuurman 2015; Steen and Van Bueren 2017; Yin, 2009). These dimensions, derived from the definitional characteristics of each approach, structure the systematic comparison developed in Table 1.

Table 1: Comparative framework of field research methodologies

Dimension	Living Labs	Case Study	Ethnography	PAR
Context origin	Purpose-built/ designated (Feurstein et al, 2008; Leminen et al, 2012)	Naturally occurring (Yin, 2009)	Naturally occurring (Hammersley & Atkinson, 2007; Hammersley, 2006)	Naturally occurring (Baskerville and Myers, 2004)
Researcher role	Embedded facilitator/ co-creator (Nyström et al, 2014)	External observer/ analyst (Yin, 2009)	Immersed participant-observer (Hammersley & Atkinson, 2007)	Action-oriented facilitator (Kemmis, 2008)
Primary aim	Innovation + knowledge generation (Leminen et al, 2012; Molinari, 2011)	Knowledge/ understanding (Stake, 1995)	Cultural understanding (Geertz, 1973; Hammersley, 2006)	Action + social change (Baskerville and Myers, 2004)
Stakeholder structure	Multi-actor by design (quadruple helix) (Leminen et al, 2012)	Depends on case (Yin, 2009)	Usually, single group or community (Hammersley & Atkinson, 2007)	Community-driven (Kemmis, 2008)
Temporal engagement	Extended across implementation cycles (Nyström et al, 2014)	Variable/snapshot (Yin, 2009)	Extended immersion (Hammersley & Atkinson, 2007)	Extended action cycles (Baskerville and Myers, 2004)

Dimension	Living Labs	Case Study	Ethnography	PAR
Intervention capacity	High (co-creation) - diverges in practice (Ballon & Schuurman, 2015; Steen & Van Bueren, 2017)	Low (observation) (Yin, 2009)	Minimal (participation without directing) (Geertz, 1973)	High (community-driven action) (Kemmis, 2008)

The comparative framework reveals two analytically significant patterns. First, no single comparator captures all characteristics Living Labs combine: case study offers analytical rigour through external observation; ethnography provides deep immersion within single contexts; PAR enables facilitated action but is community-driven rather than programme-structured. The combination of embedded positioning, simultaneous multi-actor access, extended engagement across implementation cycles, and active intervention is, at the framework level, distinctive. Second, Living Labs share most characteristics with PAR but diverge on intervention capacity - the dimension that funded programme contexts constrain most severely. This divergence between prescription and practice is a structural feature of Living Labs as actually practised, raising fundamental questions about conditions under which distinctive epistemic advantages are realised.

3. Research Methodology

3.1 Methodological Framing

This paper employs methodological reflection, a practice-grounded approach in which researchers systematically draw upon embedded experience to develop analytical frameworks (Schön, 1983; Myers, 2019). This approach has an established tradition in interpretive, qualitative (Myers, 2019), and management research (Van Maanen, 2011). It requires the systematic application of independently derived analytical frameworks to empirical experience, with explicit attention to generalisation conditions.

This framing was deliberately chosen over a formal case study design. Employing a case study methodology to assert the distinctive value of Living Labs would introduce circularity, subordinating Living Lab experience to the framework it seeks to interrogate. Consequently, the unit of analysis is the Living Lab as a methodological process, rather than the city-regions in which it operates, and embedded experience serves as the evidential basis for examining that process.

3.2 Empirical Base

The empirical base is FOOD TRAILS, a four-year Horizon 2020 initiative (2021 - 2025) coordinated by the City of Milan, establishing Living Labs in eleven European city-regions: Bergamo, Birmingham, Bordeaux, Copenhagen, Funchal, Grenoble, Groningen, Milan, Thessaloniki, Tirana, and Warsaw. Each Living Lab comprised at least thirty representatives from local authorities, civil society, private sector, and research bodies, following the quadruple helix model.

For this analysis, four Living Labs were selected following theoretical saturation principles (Glaser and Strauss, 2017; Moore et al, 2026): Milan, Warsaw, Bordeaux, and Birmingham. Selection criteria were analytical richness (dense empirical material including interviews with Living Lab managers, food policy documentation, and communication materials) and complementarity (spanning the full spectrum of food policy maturity, from Milan's decade-long institutionalised governance to Warsaw's nascent policy development, with each anchoring a different epistemic capability most distinctly). This selective approach follows purpose-based sampling logic (Myers, 2019). The unit of analysis is not the city-regions themselves, but rather the Living Lab as a methodological process. Milan, Warsaw, Bordeaux, and Birmingham function as empirical instances through which specific epistemic capabilities are made visible, rather than as bounded cases in the Yin (2009) sense.

3.3 Analytical Procedure and Limitations

Analysis proceeded in two stages. First, the comparative framework was developed from existing methodological literature, independently of empirical experience. Second, embedded experience was systematically reflected upon in relation to each framework dimension, drawing on semi-structured interviews with Living Lab managers, twenty-three structured policy mapping documents capturing objectives, actors, and activities across Living Labs, structured meeting records, comparative observations across cities, and analytical notes. Together, these sources provide structured, independently documented evidence of the Living Lab

process, reducing reliance on retrospective interpretation and grounding analytical claims in contemporaneous records.

The researcher's embedded position simultaneously provides empirical authority and introduces potential analytical bias. This is addressed by deriving the comparative framework from independent literature before applying it to personal experience, and by foregrounding divergences and constraints rather than constructing an advocacy account. The Living Labs examined operated within a single EU-funded programme structure with shared objectives, governance requirements, and reporting frameworks. Therefore, the analytical claims apply most directly to Living Labs within similar funded research programme contexts.

4. Results: Distinctive Epistemic Capabilities and Systemic Constraints

The following analysis draws on embedded experience across FOOD TRAILS Living Labs. Four epistemic capabilities identified through comparative analysis are presented, followed by the theory-practice gap as a fifth empirical finding.

4.1 Extended Engagement Across Complete Policy Implementation Cycles

The structured, multi-year embedding of researchers within innovation processes enables access to knowledge that point-in-time field methods cannot readily capture. This temporal depth proved analytically productive because cities entered the programme at different stages of food policy development, creating natural comparative architecture from mature institutionalisation to policy genesis.

Milan represents deeply institutionalised food policy being actively deepened. The city's food policy architecture dates to the 2015 International Expo; by FOOD TRAILS' start, Milan had nearly a decade of accumulated governance infrastructure. What the Living Lab enabled was not infrastructure creation but critical interrogation and extension. Sustained engagement with Milano Ristorazione revealed that the last systematic measurement of food waste in school canteens dated to 2012 - a diagnostic gap invisible without sustained institutional access. As The city Food Policy Officer reflected: "*We didn't follow the food policy like a Bible. Instead, we started from what was already happening in the city, listening to the needs and requests of local organisations.*" This iterative attentiveness across full project duration is what extended temporal engagement makes possible.

Warsaw presents the complementary case as the city lacked a defined food policy and constructed one from the ground up. The process required navigating pre-existing fragmentation - two parallel food-related processes ran in separate municipal silos with limited coordination. The Living Lab Manager explained the challenge: "*This transversal approach, holistic approach, is needed within the city. We are working on it with a bottom-up approach, but it's not the top-down approach, and it makes things harder.*" The university advisor, who supported the design of the food policy, noted the methodological significance. He highlighted that the Warsaw Food Lab represented "*for the first time a thematic living lab within the city, a method that the Economic Development Department wants to spread within the municipality.*" Extended engagement made it possible to observe not only policy design but organisational conditions under which adoption remained contested.

What distinguishes this access from what established field methods can offer is not simply duration but structural positioning across the complete cycle. Case study research typically captures phenomena at single points in time; even longitudinal case studies reconstruct change through retrospective accounts rather than real-time observation. Ethnography provides extended engagement but within naturally occurring contexts where the researcher does not influence temporal pacing. PAR offers extended action cycles but driven by community rather than programme timelines. The Living Lab's structured, multi-year presence from design through implementation to outcomes differs qualitatively from all three, precisely because the researcher is embedded inside the process rather than observing or reconstructing it from outside.

4.2 Simultaneous Access to Diverse Stakeholder Perspectives

The Living Lab's quadruple helix architecture structures participation from municipal government, researchers, civil society, and private sector, functioning as a built-in multi-actor data environment difficult to replicate through conventional field research. *Bordeaux Métropole* illustrates this most compellingly. Its Food Policy Council brought together nearly 100 stakeholders per meeting across 28 municipalities - policymakers, food producers, processors, retailers, NGOs, and social service organisations. The city Vice Mayor described the epistemic consequence: "*The ambitious food policy that we have today is thanks to the Food Policy Council. If we hadn't involved the stakeholders, we might have made different decisions.*" Simultaneous presence revealed

structural interdependencies no single stakeholder group would surface independently. The social grocery store manager and co-president of the Council, articulated this: *"Sometimes people might think that a subject is not relevant to them... but what we do for farmers will have an impact on food aid and so on. In a way, we are all interconnected."*

What Living Labs reveal is not simply that more stakeholders were present, but that their simultaneous co-location within a designed process made relational dynamics observable in ways that established methods cannot structurally replicate. Case study research constructs multi-stakeholder perspectives sequentially through interviews and documents, capturing what actors say about their relationships rather than those relationships as they unfold in real time. Ethnography typically focuses on single communities or groups, and its commitment to naturally occurring contexts means it cannot systematically bring together actors from across the full institutional landscape. PAR facilitates multi-stakeholder engagement but does not guarantee systematic coverage: participation is defined by community membership rather than by designed structural position, meaning that actors from government, the private sector, or research may be absent if they do not identify with the community in question. The Living Lab's deliberate quadruple helix architecture ensures the systematic presence of actors who would not otherwise share space, and it is precisely this engineered co-presence that makes the interdependencies between them - the frictions, solidarities, and mutual discoveries - available as research data.

4.3 Observation of Real-Time Dissemination and Acceptance Dynamics

Conventional field methods are generally better equipped to study innovation origins than subsequent fate. The Living Lab's extended, embedded format provides structurally different vantage points: researchers remain inside the process as innovations move from design into attempted implementation, gaining direct observational access to mechanisms through which ideas spread, are resisted, adapted, or abandoned.

Birmingham provides vivid illustration. The High Rise Harvest pilot - converting a multi-storey car park rooftop into urban farm and community garden - generated real-time institutional resistance that became precisely the data conventional study could not produce. The Programme Development Manager described navigating planning permissions triggering structural engineering surveys, energy generation questions, drainage challenges, and repeated legal scrutiny: *"There's loads and loads and loads of comments we had from the planning process, and that went through the whole Birmingham City Council system."* A petition submitted by local jewellers opposing the conversion was framed analytically: *"This is exactly what we were expecting. It really is a part of the culture change that is happening as we speak."* The ability to frame institutional resistance as real-time evidence of cultural conditions, rather than project obstacle, is characteristic of embedded researcher positioning.

What the Living Lab makes visible is a category of knowledge that conventional field methods are structurally positioned to miss: the moment when an innovation meets institutional and cultural reality, observed as it unfolds rather than reconstructed after the fact. Case study research captures implementation dynamics retrospectively through interviews and documents, and in doing so loses precisely the candour, contingency, and real-time framing that make those dynamics analytically revealing. Ethnography can observe real-time dynamics but within naturally occurring contexts where the researcher does not participate in shaping the innovation being received - the ethnographer watches what happens, but is not inside the process that is happening. PAR involves real-time action but typically within communities where acceptance is negotiated among participants rather than encountered as external institutional resistance from planning systems, legal frameworks, or organised opposition. The Living Lab's embedded positioning places the researcher at the exact point where these forces converge, making the reception moment - when an innovation meets the institutional and cultural conditions it must overcome - available as primary data rather than retrospective account.

4.4 Tracking Emergent Patterns Through Active Intervention

Knowledge generated through participation in, rather than observation of, innovation process emerged across Living Labs in patterns no single-city study could surface. In *Milan*, convening functions produced structurally unanticipated outcomes: *"Convening actors working on the same issues and creating spaces for exchange eventually led to innovations like the food aid hubs. We started with four hubs, and now we have eight, all linked and equipped with tools to monitor their impact, something that nobody would have imagined just five years ago"* (Food Policy Officer). In *Warsaw*, the Living Lab connected the team with food law experts and food banks to identify a case for changing national food donation regulations - an outcome extending beyond city to national

legislative level. In *Birmingham*, the composting pilot unexpectedly drew a local school into growing microgreens after a chef challenged children's definition of salad, while High Rise Harvest feasibility work generated research on urban growing technologies now informing city-wide rooftop greening strategy.

What the examples from Milan, Warsaw, and Birmingham share is a common structural feature: the emergent findings did not exist as possibilities at the point of project design, and they became visible only because the researcher was actively inside the process that generated them. Case study research can document emergent outcomes, but it encounters them as findings to be explained rather than as methodological products of the researcher's own facilitation. Ethnography explicitly avoids the kind of intervention that would generate emergent patterns, seeking instead to observe what would occur in the researcher's absence - emergence, in ethnographic terms, is something to be witnessed rather than catalysed. PAR generates emergent outcomes through intervention, but these are community-defined and arise from the community's own agenda rather than from the interaction between programme structure and researcher facilitation. The Living Lab occupies a distinctive position in this landscape: the researcher actively facilitates within a structured programme architecture while remaining alert to what that facilitation unexpectedly produces, making emergence itself an epistemic product rather than a by-product or a surprise.

4.5 The Theory-Practice Gap: Constraints on Epistemic Access

The four capabilities described above represent what Living Labs can distinctively enable. The empirical record reveals consistent constraints limiting their realisation in funded research programme contexts, a fifth empirical finding that is analytically significant in its own right.

The most pervasive constraint concerns intervention capacity. In Warsaw, the embedded position revealed two parallel municipal food processes running in separate departmental silos that the project design had not anticipated and that the researcher's role definition did not authorise bridging directly. As the LL Manager acknowledged, the tradition of working in silos created structural resistance that a more agentic facilitation role could not easily overcome: *"This transversal approach, holistic approach, is needed within the city. We are working on it with a bottom-up approach, but it's not the top-down approach, and it makes things harder."* In Birmingham, institutional planning procedures, legal review cycles, and organised local opposition constrained the High Rise Harvest pilot in ways independent of researcher facilitation capacity. In Bordeaux, the difficulty of engaging concession-managed canteens outside the Métropole's direct procurement authority illustrated how institutional boundaries limit the embedded researcher's capacity to shape the conditions they are simultaneously studying.

A second constraint concerns the temporal mismatch between programme timelines and the pace of institutional change. Several of the most analytically significant dynamics observed, including Warsaw's legislative reform pathway, Birmingham's planning permission process, and Bordeaux's governance formalisation, were either incomplete at the time of analysis or extended beyond the project's reporting horizon. The programme's deliverable structure created pressure to document outcomes at fixed points, whereas institutional change, stakeholder trust-building, and emergent collaboration operate on longer and less predictable cycles.

The third constraint, co-option risk, is the most analytically significant and the least visible. The researcher's dual role as project deliverable author and analytical observer creates structural pressure to frame observations in ways that serve programme reporting rather than the research agenda. In Birmingham, the Food Systems Officer described the composting pilot's decision to document reductions in antisocial behaviour alongside food waste data, on the grounds that the former would prove more persuasive to future funders. This candid real-time observation illustrates the risk precisely: the embedded researcher may find themselves facilitating strategic evidence framing rather than subjecting it to analytical scrutiny. These three constraints are structural features of Living Labs embedded within EU-funded research, not incidental difficulties of a specific programme.

Table 2 organises the four capabilities alongside the empirical instances where each was most clearly observable. The city-regions appear here not as units of analysis but as the settings in which specific aspects of the Living Lab process became most visible. Each cell documents where a particular capability emerged most distinctly across the project.

Table 2: Epistemic capabilities and illustrative empirical instances.

Capability	Milan	Warsaw	Bordeaux	Birmingham
1. Extended engagement	Revealed food waste data gap dating to 2012	Observed full arc from zero policy to first Food Strategy	Observed Food Policy Council evolution from advisory to executive	Traced arc from Food Conversation (2019) to Strategy launch (2022)
2. Simultan. stakeholder access	Cross-hub data transparency gap spanning multiple actors	Accessed 57 food banks, two city departments, legal experts simultaneously	100+ stakeholders per meeting across 28 municipalities; structural interdependencies	Connected public health, urban planning, place development with no prior collaboration
3. Real-time dynamics	Biodigester startup credibility at stake surfaced mid-process	Tender law bureaucratic friction causing cascade delays	Data collection framed as tool to prove value to vice mayor	Jewellers' petition documented as real-time cultural resistance
4. Emergent patterns through intervention	Food hub network grew from 4 to 8 unanticipated	Pathway to national legislative reform on food donation	Food Policy Council transformed from advisory to executive through co-creation	Local school drawn into growing microgreens; urban growing research informing city strategy

5. Discussion and Conclusion

5.1 Theoretical Contributions

This paper explores the distinctive epistemic capabilities of Living Labs and how they differ from established field research methods. The study identifies four capabilities and a systematic theory-practice gap, making two connected contributions to the research methods literature.

The first contribution is a comparative framework that positions Living Labs as a distinct field research methodology, rather than as a variant of action research or an organisational arrangement for innovation. Prior literature has often treated Living Labs as platforms for co-creation and innovation delivery, leaving their epistemic function undertheorised. For instance, Nyström et al (2014) and Leminen et al (2012) described structural features without systematically deriving the methodological implications for knowledge generation. By comparing Living Labs against case study research, ethnography, and Participatory Action Research (PAR) across six dimensions, this paper establishes that Living Labs occupy a distinctive methodological position that none of the comparators can adequately capture.

Living Labs differ from all three comparators in one fundamental respect: the research context and research methodology are co-constitutive. The Living Lab is not merely a setting for research but simultaneously the instrument through which knowledge is generated. This context-method duality has not previously underpinned systematic comparative analysis (Dubé and Paré, 2003). Connecting this duality to practical questions of what researchers can produce directly responds to McLoughlin et al's (2018) call to consolidate the intellectual core of Living Lab research.

The empirical findings presented in Table 2 underscore the framework dimensions established in Table 1, with three dimensions proving particularly revealing. Firstly, regarding intervention capacity, the entrenched municipal silos in Warsaw and planning resistance in Birmingham demonstrate that the gap between prescribed and actual researcher agency is structural rather than incidental. This systematically narrows the space between Living Labs and PAR, as identified by the framework. Secondly, concerning stakeholder structure, Bordeaux's Food Policy Council illustrates that the quadruple helix architecture not only broadens participation but also makes observable structural interdependencies that no single stakeholder group would independently uncover. Finally, in terms of temporal engagement, both Warsaw's legislative reform pathway and Birmingham's planning process extended beyond programme reporting horizons. This reveals a mismatch between institutional change cycles and programme timelines, a dynamic only incompletely captured by the theoretical framework.

The second contribution concerns the theory-practice gap. Our empirical analysis reveals that this gap is not a methodological failure or the result of poor implementation, but rather a structural feature of Living Labs embedded within large-scale funded research programmes. Programme-determined objectives, governance hierarchies, constrained timelines, and fragmented institutional authority systematically reduce researcher intervention capacity below what the Living Lab literature prescribes. This extends an emerging body of empirical work on researcher constraints in Living Labs, including Dobre and Faldi (2025), whose findings from

Brussels-based Living Labs are consistent with our own but confined to single-context observations. The present study suggests these constraints are structural rather than context-specific. Consistent with Schön's (1983) reflective practitioner, this constraint is analytically productive: the gap between what the methodology prescribes and what funded programmes permit is itself a source of important knowledge about the institutional conditions under which innovation can and cannot occur.

5.2 Engagement with Comparator Methodologies

The comparative framework developed in the study invites three methodological objections that are worth addressing directly, since each points to a nuance in the comparator traditions that sharpens rather than undermines the paper's claims. Yin (2009) describes embedded case studies in which researchers examine multiple sub-units within a single case, a design that might appear to approximate the Living Lab's multi-actor positioning. The difference is fundamental but structural. In embedded case studies, the researcher analytically distinguishes sub-units within a pre-existing context, and the research design remains separable from the setting. In a Living Lab, the researcher actively constitutes the multi-actor setting through facilitation, and the intervention is not an analytical choice but a methodological condition: the constructed setting and the approach to studying it are inseparable. Marcus (2009) develops multi-sited ethnography as an approach that traces phenomena across dispersed locations, which might seem to address the multi-actor limitation identified in conventional ethnography. However, multi-sited ethnography maintains the ethnographic commitment to non-intervention, as the researcher follows connections rather than forging them. The Living Lab's distinctiveness lies not in spanning multiple locations but in deliberately engineering the co-presence of actors who would not otherwise share space, a structural condition that the Bordeaux findings illustrate most directly.

PAR encompasses internal debate about the balance between researcher direction and community ownership (Kemmis, 2008), and Living Labs occupy an ambiguous position within this spectrum. They are formally programme-structured rather than community-driven, yet they require community participation for legitimacy. It is precisely this ambiguity that generates the intervention capacity constraints documented in Section 4.5. Living Labs are neither academic-led enough for full researcher control nor community-driven enough for full participant ownership, and it is this structural tension, more than any individual programme decision, that accounts for the theory-practice gap this paper documents.

5.3 Practical Contributions

This paper has practical implications for policy researchers, public sector managers, and research programme designers. The four epistemic capabilities represent genuine advantages over established field methods for studying innovation implementation, multi-stakeholder governance, and policy change. When research programmes need to understand not only whether interventions worked, but why they encountered specific acceptance dynamics, how otherwise disconnected stakeholders collaborated, and what institutional conditions enabled or blocked change, Living Labs provide access that case study research, ethnography, and PAR cannot fully replicate. The Bordeaux case illustrates this directly. The Vice Mayor's reflection that the food policy would have been different without structured multi-stakeholder engagement is precisely the kind of counterfactual insight that only sustained embedded positioning makes available.

At the same time, Living Labs are resource-intensive, temporally demanding, and politically complex. Programme designers should address three practical issues explicitly at the design stage. First, timeline mismatches: programme reporting periods rarely align with the pace of institutional change, and sufficient flexibility should be built in to follow processes wherever they lead. Second, intervention boundaries: researcher authority to bridge institutional silos or facilitate across governance levels should be clarified in advance rather than negotiated under pressure. Third, co-option risk: structural separation between project reporting and analytical observation functions, for instance through independent evaluation mandates, reduces the pressure on researchers to frame findings in ways that serve delivery rather than knowledge.

For researchers embedded in funded Living Labs, the framework suggests three practical orientations. Unexpected findings, institutional resistance, and process failures should be treated as primary data rather than obstacles. The theory-practice gap should be documented systematically, since it is itself a source of knowledge about institutional conditions. And a comparative orientation should be maintained throughout: asking continuously what would be visible or invisible through case study, ethnography, or PAR lenses helps the embedded researcher retain analytical distance from the process they are simultaneously facilitating.

5.4 Limitations and Future Research

Several limitations warrant acknowledgement. The empirical base is confined to a single EU-funded research programme focused on urban food policy, and whether the four capabilities manifest with equal clarity in corporate, healthcare, or technology innovation Living Labs remains an open question. The methodological framing of reflection grounded in practice enables candid, process-level analysis that formal case study designs often suppress, but the analytical claims rest on the embedded researcher's interpretive judgement rather than independently verifiable data. Two directions for future research follow from these limitations. First, applying the comparative framework developed here to Living Lab contexts studied by researchers external to the process would enable more systematic triangulation of the capabilities claimed. Second, and perhaps more importantly, an equally significant agenda concerns the conditions under which Living Labs fail, where the theory-practice gap becomes so wide that the distinctive epistemic advantages are extinguished entirely and Living Labs become expensive, under-analysed delivery mechanisms rather than genuine research environments.

Ethics Declaration

Ethical clearance was not required for the research presented in this study.

AI Declaration

AI was not used for the creation of the present paper, EditGPT was used for text proofreading.

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