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Living labs in practice: experiences of implementation across 14 European regions

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ABSTRACT

Living Labs – collaborative research environments that bring together researchers, practitioners and other stakeholders to co-design and test solutions in real-world settings – are increasingly used to address complex policy challenges across the natural and social sciences. While scholars have called for greater attention to the evaluation of Living Labs, less is known about how they are implemented and experienced in practice. This paper addresses this gap by examining the RUSTIK project, a network of 14 Living Labs across European rural regions bringing together academic and practice partners to develop data experiments supporting rural sustainability transitions. Using qualitative analysis of interviews with 27 Living Lab Coordinators and Pilot Region Partners, the paper examines how the methodology is understood, alongside the opportunities and challenges encountered during implementation. The findings highlight the value of Living Labs as spaces for learning and experimentation, while revealing challenges related to stakeholder engagement, resource demands and translating outputs into policy. Participants also identified institutional capacity, policy contexts and collaborative relationships as important influences on implementation. The paper contributes to growing debates on Living Lab evaluation by examining implementation rather than outcomes, providing insights into how Living Lab methodologies are experienced by those responsible for their implementation.

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1. Introduction

Living Labs originated as an open innovation approach, providing real-world environments in which users, researchers and industry partners collaboratively developed and tested new technologies. Over the past two decades, their application has expanded beyond technological innovation into broader areas of social innovation, where they are increasingly used to address complex societal challenges. This expansion has included growing use within rural and regional development, where Living Labs can support collaborative responses to place-based opportunities and challenges. While definitions

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remain contested, Living Labs are generally understood as collaborative environments that bring together researchers, practitioners, policymakers and other stakeholders to co-design, test and refine solutions in real-world settings.

As Living Labs have proliferated, there have been growing calls for greater attention to their evaluation, with the aim of generating both academic knowledge and actionable insights for future projects (Dekker, Geuijen, and Oliver 2021; van Geenhuizen 2018). However, much evaluation to date has focused on assessing the outcomes of experiments conducted within Living Labs – that is, whether they achieve their stated objectives. Less attention has been paid to the implementation of Living Labs themselves, including how they are understood and experienced by those responsible for their implementation. This is important because Living Labs are inherently process-oriented, relying on collaboration, co-creation, experimentation and stakeholder engagement. Understanding how Living Labs are understood and experienced by those responsible for their implementation can therefore provide valuable insights into how collaborative and place-based approaches operate in practice, while also contributing to ongoing debates regarding the evaluation of Living Labs.

This paper addresses this gap by examining the implementation of Living Labs in practice through the Horizon Europe and Innovate UK-funded RUSTIK project's network of 14 rural and regional Living Labs across Europe. Drawing on interviews with both research and practice partners, it explains how Living Labs are understood and experienced, the opportunities and challenges encountered during implementation, and how collaboration, stakeholder engagement and policy influence are experienced in practice. In doing so, it provides empirical insights into the implementation of Living Labs across a diverse European network and provides five key lessons to ensure the design of future Living Lab initiatives ensures they are well placed to create both direct and indirect impacts in the regions in which they are implemented. It also contributes to ongoing debates regarding how Living Labs should be evaluated, particularly highlighting the value of examining implementation experiences alongside outcomes and impacts.

This paper continues with a review of the literature on Living Labs, covering their origins and definitions, impacts and outcomes, challenges and critiques and approaches to evaluation, before introducing the RUSTIK Living Lab network as the case study. The methodology used to assess participants' experiences is then explained, and the findings presented. The implications for the design and implementation of Living Lab initiatives are then discussed, before the paper concludes with recommendations for future research, policy and practice.

2. Literature review

2.1. Origins and characteristics of living labs

Living Labs emerged in the early 2000s within innovation and technology research as an open innovation approach, bringing together users, researchers and industry partners to co-design and test new technologies in real-world contexts (Følstad 2008). More recently, the concept has expanded into fields such as urban governance and sustainability (Taylor 2021; von Wirth et al. 2019), and Living Labs are also increasingly used in rural and

regional development contexts (Cascone et al. 2024; Korcelli-Olejniczak and Witeska-Chmielewska 2025).

This expansion has been accompanied by considerable variation in how Living Labs are defined and operationalised across different contexts. Living Labs are referred to by a variety of terms, including 'public sector innovation labs' (Acevedo and Dassen 2016; Lewis, McGann, and Blomkamp 2020), 'transition labs' (Nevens et al. 2013), and 'city', 'urban', or 'civic' labs (Bennett 2005; Karvonen and van Heur 2014). There is no single agreed definition, and the term is used differently across disciplines and policy contexts (Scholl and Kemp 2016; Voytenko et al. 2016). Nevertheless, several core characteristics are widely recognised. Co-creation is central, bringing together policymakers, researchers, businesses, civil society organisations and citizens to jointly develop and test solutions (Galway et al. 2022; Puerari et al. 2018). Such participatory approaches reflect broader shifts in governance toward collaboration, inclusion and the co-production of policy (McGann, Wells, and Blomkamp 2021).

Another key feature of Living Labs is real-world experimentation. They are typically embedded within specific geographical and social contexts and operate through physical or virtual spaces in which stakeholders can interact, collaborate and test innovations or governance approaches (Torrens and von Wirth 2021; Voytenko et al. 2016). Experiments are often small-scale, iterative and flexible, enabling participants to trial ideas and refine solutions over time (Bulkeley et al. 2016; Leminen and Westerlund 2025). This differs from traditional policy implementation by emphasising learning and adaptation rather than delivering fixed solutions (Scholl and Kemp 2016).

Finally, Living Labs are commonly characterised by a quadruple helix approach to governance, bringing together actors from government, academia, industry and civil society (Caro-Gonzalez, Vallejo, and Albala 2025; Nguyen and Marques 2022). In regional contexts, these arrangements often span multiple governance levels and stakeholder networks, reflecting the territorial nature of many policy challenges (Van Straalen and Witte 2018). As a result, Living Labs are increasingly being viewed as mechanisms for supporting collaborative governance and place-based development processes, including in rural and regional contexts. Importantly, rural Living Labs are often associated with distinctive implementation conditions, including smaller or more dispersed stakeholder networks and resource or capacity constraints (Soini et al. 2023).

2.2. Impacts and outcomes of living labs

The literature highlights varied perspectives on the impacts and outcomes of Living Labs. Some authors emphasise the intrinsic value of co-production, arguing that collaboration is important regardless of the effectiveness of outputs (McGann, Wells, and Blomkamp 2021). Others focus on impacts that extend beyond the immediate scope of Living Labs. Sengers, Turnheim, and Berkhout (2021) argue that although local initiatives are often assumed to contribute to broader change, the mechanisms through which this occurs remain under-theorised. They identify three dimensions of impact: temporal (effects that persist or emerge over time), spatial (influence beyond the immediate context) and structural (contributions to wider challenges or opportunities). In addition to tangible impacts, learning is often a key outcome, involving knowledge generation for

participants, stakeholders and researchers (Leminen, Rajahonka, and Westerlund 2017; Torrens and von Wirth 2021).

The literature identifies several factors that increase the likelihood of impactful Living Lab outcomes and broadly suggests that Living Lab impacts are shaped by the relationships, governance structures and wider contexts in which they are embedded. Impact is more likely when Labs are strategically designed and embedded within networks that support knowledge exchange across places and governance levels (Bulkeley et al. 2016). Developing shared meanings and coherent visions among participants enables more coordinated experimentation (Acevedo and Dassen 2016; Nevens et al. 2013), while clear learning goals help guide iterative processes (Scholl and Kemp 2016). In addition, engaging governance actors in co-design supports alignment with policy priorities (Mintrom et al. 2024), and careful management of scale and coordination helps ensure feasibility and meaningful outcomes (Smeds and Acuto 2018).

2.3. Challenges and critiques of living labs

Scholars note that the ability of Living Labs to achieve practical impact depends on how they are operationalised (Lewis, McGann, and Blomkamp 2020; Voytenko et al. 2016). A range of challenges has been identified. Capacity constraints may limit their ability to address governance priorities, including the time and cost of co-design (McGann, Wells, and Blomkamp 2021) and the resources needed to implement change (Von Wirth, Frantzeskaki, and Loorbach 2020). Sustainability challenges concern the durability of interventions, which may be affected by funding uncertainties (Torrens and von Wirth 2021) and shifting political priorities (McGann, Wells, and Blomkamp 2021). Impact challenges relate to the extent to which Living Labs can create meaningful change, which may be constrained by factors such as the small scale of many Living Labs (Lewis, McGann, and Blomkamp 2020), the ambition of interventions (Smeds and Acuto 2018), institutional influences such as legal agreements (Keech, Maye, and Reed 2025), and the uptake of evidence in decision-making (Huitema et al. 2018). These challenges can shape how Living Labs are implemented in practice, influencing stakeholder engagement, collaboration, resource use and the extent to which activities can be sustained and translated into impact.

While Living Labs are often celebrated for enabling innovation and localised problem-solving, the specificity of place-based experiments can limit the generalisability of lessons across different local and regional contexts (Evans 2011; Von Wirth, Frantzeskaki, and Loorbach 2020). Critics also argue that experimentation can encourage incrementalism, prioritising achievable short-term outcomes over fundamental change (Rizzo, Habibipour, and Ståhlbröst 2021). Furthermore, while learning from failure is emphasised, unsuccessful initiatives can have negative consequences, and benefits may be unevenly distributed (Huitema et al. 2018). Scholars therefore highlight the political dimensions of experimentation, including who sets agendas, whose priorities are advanced, and how decisions are made (Bulkeley and Castán Broto 2013; Savini and Bertolini 2019).

2.4. Evaluating living labs

Building on discussions of Living Labs' impacts, outcomes and challenges, there has been growing attention to their evaluation (Dekker, Geuijen, and Oliver 2021; van Geenhuizen

2018). Scholars emphasise the need to assess both implementation and outcomes, noting that many studies provide limited evidence on activities or the extent to which objectives are achieved (Paskaleva and Cooper 2021; Petrescu et al. 2022). Evaluation is important both for generating academic knowledge and for informing future projects and policy initiatives (Dekker, Geuijen, and Oliver 2021). However, assessing success remains challenging due to the dynamic nature of Living Labs and their diverse objectives (Forbat et al. 2025; Yilmaz and Ertekin 2024).

Some scholars have responded to these calls by evaluating specific Living Labs, often using methods such as interviews, surveys, or participant observation to assess whether projects meet their objectives (Forbat et al. 2025). Evaluation frameworks may also be co-created with stakeholders (Engels, Wentland, and Pfotenhauer 2019). Evaluations can be conducted throughout a project or at its conclusion, depending on objectives (Bergmann et al. 2021; Dell'Era and Landoni 2014). While such assessments support iterative refinement (Robaeyst et al. 2026), they can be complex and resource-intensive (Baccarne et al. 2014). Furthermore, these approaches vary considerably in their focus and timing, reflecting the diverse objectives and contexts of Living Labs.

Beyond project-specific evaluations, systematic frameworks have been developed to guide broader assessments. van Geenhuizen (2018) proposes a framework examining how Living Labs foster innovation and engage stakeholders. More recent work suggests harmonised approaches using criteria and key performance indicators to enable comparison across Living Labs (Vervoort et al. 2024). Yilmaz and Ertekin (2024) offer a comprehensive framework for urban Living Labs, identifying seven evaluation dimensions: co-creation and collaboration, innovation and solution development, impact and effectiveness, user engagement and satisfaction, transferability and scalability, knowledge creation and dissemination and policymaking and governance. Building on these developments, Robaeyst et al. (2026) propose a 'Living Lab Assessment Method' integrating participatory evaluation, a value framework and a Theory of Change to support more systematic assessment of impact.

Despite this increasing attention, the Living Lab evaluation literature has largely focused on outcomes and the extent to which Living Labs achieve their objectives. Less attention has been paid to the implementation of Living Labs themselves, including how the methodology is understood and experienced by those involved in its delivery. This is significant, as Living Labs are inherently process-oriented, relying on collaboration, co-design, stakeholder engagement and experimentation (Puerari et al. 2018). Examining implementation experiences can therefore complement outcome-based evaluations and provide a fuller understanding of how Living Labs operate in practice. Such insights can contribute to both Living Lab scholarship and wider debates on collaborative and place-based approaches to innovation and development. This leads to the paper's objective of examining how Living Labs are implemented and experienced in practice. The study addresses this objective through a case study of the RUSTIK network of 14 rural and regional Living Labs across Europe, as detailed in the following section.

3. Case study: the RUSTIK living lab network

RUSTIK is an EU- and UK-funded transdisciplinary project involving partners from 12 European countries, running from September 2022 to December 2026. Its aim is to

support stakeholders and policymakers in designing strategies and policies that foster sustainability transitions in rural areas of Europe. Furthermore, it aims to improve understanding of rural characteristics, functions and future scenarios. RUSTIK focuses on three key transitions affecting rural areas: socio-economic and demographic change, climate and environmental challenges and digitalisation. These transitions are increasingly recognised as central challenges for European regions. For example, climate change is requiring adaptation across rural areas (Kythreotis, Jonas, and Howarth 2020), while digitalisation is creating both opportunities and challenges for rural development and innovation (Fazio, Maioli, and Rujimora 2025). RUSTIK was designed to support Pilot Region actors in understanding and responding to these interconnected transitions and Living Labs served as collaborative spaces where actors could identify relevant challenges and design and implement data experiments to help them respond.

RUSTIK established a network of 14 Living Labs located in Pilot Regions across 10 countries in Europe. The Pilot Regions spanned a diverse range of rural contexts, reflecting the varied socio-economic structures, environmental conditions and governance arrangements in regions across Europe. A map of the Pilot Regions within the partner countries is shown in Figure 1. Each Living Lab was jointly led by a Living Lab Coordinator (LLC) and a Pilot Region Partner (PRP). LLCs, typically research organisations, were responsible for operationalising the methodology, documenting progress and facilitating the process. PRPs – practice-based organisations such as local authorities, development agencies, Local Action Groups, NGOs and business associations – contributed local knowledge and networks, with both partners jointly defining the Living Lab's



Figure 1. Partner countries and pilot regions participating in RUSTIK living labs.

focus and transition challenge. Table 1 provides an overview of the LLC and PRP organisations leading each Living Lab.

Each Living Lab also involved a range of local and regional stakeholder organisations in various ways, including designing the Living Lab's focus, providing access to participants, and acting as dissemination partners. Stakeholder participation varied across Living Labs and activities, with different organisations and individuals engaging at different stages and in different capacities. The Living Labs therefore differed in their organisational structures, stakeholder composition and geographical and institutional contexts, while following a common overarching methodology.

Following initial preparation, the operational period of the Living Labs was structured into three main activity cycles. An overview of these cycles is shown in Figure 2. Cycle 1 focused on planning and scoping, during which each Living Lab identified a sustainability transition challenge and defined its focus. Cycle 2 involved the co-design and implementation of data experiments to generate knowledge relevant to this challenge. Cycle 3 focused on policy and practice learning, reflecting on the outcomes of the experiments and broader Living Lab activities. At the end of Cycles 1 and 2, LLC and PRP organisations submitted co-authored reports documenting activities and progress.

While RUSTIK's Living Labs were designed to generate data and policy-relevant insights, the objective of this paper is to examine how the Living Lab methodology was implemented and experienced by project partners. Other publications focus more specifically on the effects of RUSTIK's Living Labs on rural development, such as

Table 1. RUSTIK living lab coordinators and pilot region partners.

Country	Pilot region	Living lab coordinator (LLC)	Pilot region partner (PRP)
Austria	Nockregion-Oberkärnten	Federal Institute of Agricultural Economics, Rural and Mountain Research	Regionalverband Nockregion-Oberkärnten
Bulgaria	Troyan–Apriltsi–Ugarchin (TAU)	Sofia University St. Kliment Ohridski	Local Action Group Troyan-Apriltsi-Ugarchin
Finland	North Karelia	University of Eastern Finland	Regional Council of North Karelia
Germany	Rhein-Hunsrück	Institute for Rural Development Research	Regionalrat Wirtschaft Rhein-Hunsrück eV
Italy	Garfagnana	Council for Agricultural Research and Economics	Local Action Group Montagnappennino
Italy	Parma, Piacenza and Ferrara	Council for Agricultural Research and Economics	OI Pomodoro da Industria Nord Italia
Poland	Mazowieckie Voivodeship	Institute of Geography and Spatial Organisation, Polish Academy of Science	Foundation for the Development of Polish Agriculture
Poland	Świętokrzyskie Voivodeship	Institute of Geography and Spatial Organisation, Polish Academy of Science	Jan Kochanowski University in Kielce
Serbia	Zaječar District	Faculty of Agriculture, University of Belgrade	Regional Development Agency Eastern Serbia
Slovenia	Osrednjeslovenska Region	Biotechnical Faculty, University of Ljubljana	Allium
Spain	Galicia	University of Santiago de Compostela	Galician Agency for Rural Development
Spain	Osona	Ersilia Foundation	Sant Miquel de Balenya Municipal Entity
United Kingdom	Gloucestershire	Countryside and Community Research Institute, University of Gloucestershire	Gloucestershire Rural Community Council
United Kingdom	Monmouthshire	Countryside and Community Research Institute, University of Gloucestershire	Monmouthshire County Council

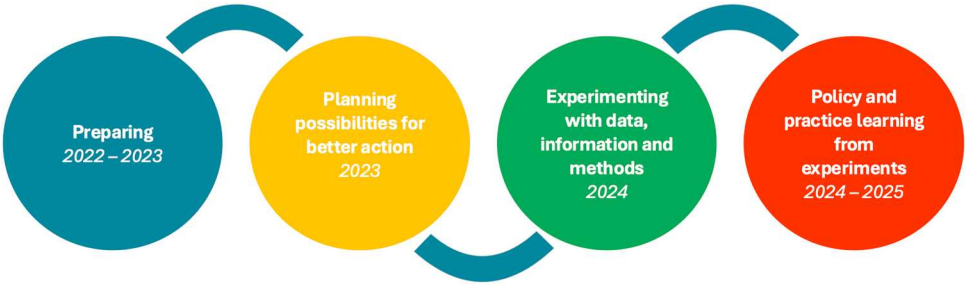


Figure 2. RUSTIK living lab activity cycles.

Korcelli-Olejniczak and Witeska-Chmielewska (2025). Furthermore, rather than assessing the quality or technical robustness of individual Living Labs, this evaluation sought to generate transferable insights into how the methodology functioned across diverse rural contexts and what lessons may inform future initiatives. To achieve this, qualitative interviews were conducted with LLCs and PRPs, supplemented by analysis of reports from the first two Living Lab cycles. The following section outlines the methodology used to collect and analyse these data.

4. Methodology

Towards the end of Cycle 3 (September–October 2025), semi-structured interviews were conducted with LLCs and PRPs from across the Living Lab network. The aim was to interview one LLC and one PRP from each of the 14 Living Labs (see Table 1), capturing perspectives from both partner types. Participants were recruited via email using a purposive sampling approach, with one representative from each of the Living Lab partner organisations invited to participate. This target was largely achieved, with only one partner unable to take part. Most interviews were conducted individually to allow candid reflection, while three were joint interviews involving both LLC and PRP representatives. In total, 27 interviewees participated across 24 interviews.

This approach enabled in-depth insights into respondents' experiences and engagement with the Living Lab methodology. Interview topics covered understandings of the approach, its suitability across projects and regional contexts, co-design and collaboration dynamics, operational challenges and perceived outcomes, added value and impact pathways, as well as broader reflections and lessons learned. Its breadth ensured the analysis captured how Living Labs were understood and experienced by those responsible for their implementation, alongside respondents' reflections on the outcomes and value generated through the process. Questions were adapted flexibly in response to interviewee input.

Interviews lasted between 30 and 80 min and were conducted online via Microsoft Teams by a neutral researcher previously unaffiliated with the project. Participants provided informed verbal or written consent for their anonymised data to be used in reporting. Accordingly, no specific Living Labs are identified, and anonymised quotes are used throughout the paper. Interviews were transcribed using Microsoft Teams' automatic transcription.

To complement the interviews, the Living Lab reports submitted at the end of Cycles 1 and 2 were also reviewed and analysed. As noted above, these reports were jointly

authored by Living Lab partners and reflected on activities and progress within each Living Lab. They were used as a supplementary data source, providing additional insights into participants' experiences and capturing perspectives that may not have emerged in interviews, particularly from earlier stages of the Living Labs.

The interview transcripts and relevant excerpts from the Living Lab reports were reviewed iteratively and coded using thematic analysis. Initial codes were developed inductively through repeated readings of the transcripts and reports. Related codes were then grouped into broader themes reflecting respondents' understandings, experiences, challenges and reflections on Living Lab implementation. Evidence from the reports was considered alongside the interview data, allowing themes to be compared across data sources as well as across participants. This enabled the identification of common patterns and divergent perspectives, including differences between partners. The themes were subsequently reviewed and refined iteratively throughout the analysis. The resulting themes structure the presentation of findings in Section 5.

Ethical approval for this study was obtained from the University of Gloucestershire's ethics committee. Data were stored securely and handled in accordance with GDPR requirements.

5. Findings

5.1. Understandings of the living lab approach

Respondents reported varied levels of prior experience with Living Labs and similar participatory approaches. Only four had previously worked directly within Living Labs, while ten had experience with related methods; for the remainder, this was their first project of this kind. Those with prior Living Lab experience were mostly LLCs.

Fifteen respondents described initial uncertainty about what the methodology would involve, how the Living Labs would be organised, and their role within the process. Five LLCs were unsure how the Living Lab approach differed from other participatory methodologies they had previously used. RUSTIK work package leads were therefore seen as important in clarifying expectations and providing guidance, particularly through online meetings and discussions. Both LLCs and PRPs highlighted the value of working in teams with prior Living Lab experience, which helped build confidence and understanding in the early stages. As one explained:

> I had a lot of support from colleagues (…) who've had a lot of experience with working with Living Labs, which was really important. I did then feel informed going into the process. (Respondent 16, LLC)

By the end of Cycle 3, respondents' understanding of the Living Lab approach had become more concrete and consistent. When asked how they understood the methodology, participants emphasised collaboration with stakeholders, co-producing meaningful outcomes rather than academic outputs alone, close cooperation between partners, place-based working and iterative, flexible processes shaped by regional contexts. As one described:

> I guess maybe a good analogy would be that you're taking the research out of the Petri dish (…) it becomes more hands-on, more practical, hopefully more grounded in reality. (Respondent 15, LLC)

Another emphasised the collaborative nature of the approach:

> Doing a Living Lab is an equal collaboration between various partners from different backgrounds. For me, it is the scientific partner working with the regional partner and the stakeholders, and the aim of the Living Lab is to develop something jointly. (Respondent 5, LLC)

Overall, participants' understanding of the Living Lab approach developed through practice. Initial uncertainty about the methodology was common, but experiences of implementation led to the development of a shared understanding centred on collaboration and experimentation.

5.2. Suitability of the living lab approach

Most respondents regarded the Living Lab approach as broadly appropriate and effective within their Pilot Region. Reported benefits included deepening understanding of regional dynamics (mentioned by four participants), encouraging new perspectives on key challenges (five) and engaging stakeholders who might not have been reached through conventional approaches (six). They also noted that the approach fostered collaboration and a sense of local ownership.

Five also highlighted the value of working at the regional scale, particularly PRPs who noted that regional-level data and analysis were often lacking in their work. As one PRP explained:

> It was a good possibility for us to have scientists in our team and to have them look at our region and find out more about our region (…) We don't have the data as a background for these projects, so it was really good to get the data. (Respondent 3, PRP)

However, three respondents felt that a smaller spatial scale might have been more effective, as the regional scope introduced complexity and coordination challenges. They were also asked to reflect on the suitability of the Living Lab approach for addressing their region's identified transition challenge. Four PRPs mentioned that the approach was valuable for connecting stakeholders across governance levels, and three stated that it had helped them to create learning opportunities within specific sectors or themes. However, some LLCs suggested the approach was highly adaptable. They believed that it was not uniquely suited to their specific challenge and could have been applied to many different topics. One said:

> It's hard to say if it was especially good for our theme (…) It's more about the trial-and-error approach, and I think it would have worked well with all the themes. (Respondent 8, PRP)

Views on the preparation activities undertaken in Cycle 1 were mixed. Four respondents valued the process of defining transition challenges and identifying overlooked issues, while three felt it was time-consuming and delayed research or policy engagement. Two also noted that the diversity of transition challenges limited opportunities for peer learning between Living Labs.

Overall, participants generally regarded the Living Lab approach as a flexible and adaptable framework for addressing the transition challenges they had identified. However, views on its suitability often depended less on the nature of the transition challenge itself and more on practical considerations such as scale and the time needed to establish and implement activities.

5.3. Co-design and collaboration dynamics

Participants were asked to reflect on the working relationship with their partner organisation within their Living Lab. Most described the co-leadership relationship as positive despite minor challenges; most commonly, these related to working relationships and communication. Eight reported no significant issues.

Seven respondents described tensions arising from differences in working approaches. PRPs were cited as typically focused on practical outcomes and implementation, while LLCs were more likely to emphasise research processes and methodological considerations. However, most noted that over time they developed shared approaches and workable compromises. Five also highlighted mutual learning, with PRPs frequently describing gaining research knowledge and analytical skills, while LLCs emphasised learning from PRPs' practical experience and local knowledge. As one explained:

> We both learned from the other (…) the research approach that [the LLC] had is not always based on the practical situation (…) What we had is insights from the field that maybe helped the whole process be more based on reality. (Respondent 20, PRP)

A small number of Living Labs experienced structural challenges. In two cases, issues arose due to limited PRP capacity or perceived conflicts of interest. Two Living Labs also reported difficulties with secondment arrangements, as secondees did not feel fully embedded within the host organisation.

Challenges also emerged around uneven responsibilities. Six LLCs felt their PRP counterpart had been insufficiently engaged in certain tasks. Four participants mentioned feeling overburdened, particularly in relation to data collection or report writing. In contrast, partners who did not report such issues highlighted clearly defined responsibilities, regular meetings, shared project management tools, and upfront planning as key strengths. As one explained:

> It has been really easy (…) we established that once a week we will meet (…) then we had a sort of dashboard where we put everything, the deadlines, the milestones (…) So everything was really clear. (Respondent 22, LLC)

Finally, pre-existing relationships between partner organisations emerged as a key advantage, reducing the time needed to build trust and establish effective working relationships. Those in these partnerships reported smoother collaboration and fewer conflicts. In some cases, respondents suggested that prior experience of working together helped partners navigate differences in priorities more effectively, enabling them to focus more quickly on Living Lab activities.

Overall, collaboration between Living Lab partners was described as largely positive, despite occasional tensions and challenges. The findings suggest that effective collaboration often depended on clear roles and responsibilities, regular communication and the quality of relationships between partners.

5.4. Operational challenges and constraints

Participants identified a range of operational challenges in implementing the Living Labs. Many related to stakeholder engagement. Difficulties engaging and sustaining stakeholder participation were discussed more frequently by PRPs, who were often

responsible for facilitating engagement activities. Common issues included time and funding constraints, the time required to build trust and maintaining stakeholder interest. As one explained:

> The issues were mostly related to the involvement of the stakeholders. It was very challenging (…) Along the process, the engagement weakened (…) It was hard to keep them interested. (Respondent 18, LLC)

Respondents frequently noted that where PRPs were embedded within established stakeholder networks, stakeholder engagement was more straightforward. Access to established stakeholder communities appeared to reduce recruitment challenges and facilitate ongoing participation. In contrast, those operating in contexts characterised by weaker networks more frequently described spending additional time building relationships and sustaining engagement throughout the project.

Political dynamics within Pilot Regions also influenced experiences of Living Lab implementation. Changes in local or regional government sometimes affected the relevance of activities or disrupted established relationships, while shifting policy priorities limited opportunities for engagement and impact in some cases.

The flexible and iterative nature of the approach was seen as beneficial but also created practical challenges. The process was described as time- and resource-intensive by three interviewees and in seven Living Lab reports, particularly involving stakeholders in defining the Living Lab's focus and activities. In some cases, stakeholders found it difficult to identify data needs or define challenges where knowledge gaps were not immediately apparent.

Practical operational challenges affecting implementation were also reported. These included staff changes within partner organisations, which sometimes caused delays or disrupted working relationships; geographical distance between partners and Pilot Regions; difficulties coordinating schedules across partners and stakeholders; and, in some cases, insufficient digital skills to engage with project tasks. As one respondent reflected:

> Another challenge for us was the issue of location (…) [the Pilot Region] was a commute of at least five to six hours by train (…) We tried to be there quite often (…) so it was very time-consuming. (Respondent 5, LLC)

These findings suggest that while the Living Lab approach was generally viewed positively, it also introduced additional complexity, particularly in relation to stakeholder engagement and coordination. Respondent accounts further suggest that factors such as political dynamics shaped how implementation was experienced and managed.

5.5. Outcomes, added value, and impact pathways

Fourteen participants felt the Living Lab approach enabled deeper collaboration between partners than in more conventional research. PRPs in particular frequently contrasted the approach with previous research projects, where they had played a more consultative role. LLCs often highlighted access to regional stakeholders, while PRPs emphasised access to research expertise and wider project networks, including within and across regional contexts.

Respondents further emphasised that Living Lab work was more hands-on and oriented towards real-world application than previous projects. They highlighted

opportunities to test ideas, experiment with methods, learn from failure and adapt timescales and focus. Three explicitly described the Living Lab as providing a space for experimentation and iterative learning to support their regions' response to their transition challenges.

When asked about short-term outcomes, most emphasised outputs from their data experiments, including models, tools, survey instruments and datasets. Ten participants reported gaining new knowledge on specific topics, sectors, methods or digital technologies. Nine also described developing new relationships with stakeholders and other Living Labs. There was general agreement that collaboration and stakeholder engagement had enhanced the social acceptance and legitimacy of their results. One participant reported:

> Acceptance in the society or in the region is probably much higher for the entire project, the methods and the outcomes [because] it doesn't have this top-down approach. (Respondent 5, LLC)

Beyond these immediate outputs and learning outcomes, respondents also reflected on how Living Lab activities might influence policy and practice. Nine noted that outputs were expected to be incorporated into regional strategies or development plans. Four reported that tools or findings they had developed were already being used within partner organisations, while four others indicated that their work had contributed, or was expected to contribute, to policy discussions or strategies at regional or national levels.

Eight participants emphasised that policy impacts often take time to materialise and that, in many cases, it was still too early to identify concrete long-term outcomes. Several described policy translation as one of the more challenging aspects of the Living Lab approach. Reported barriers included limited access to key decision-makers, low external awareness of results, concerns around data sharing and confidentiality, and initial scepticism from policymakers toward new data or methods. Despite these challenges, some felt the approach had improved communication with policymakers and made outputs more relevant to policy needs.

Participants also reflected on how data and outputs might be used beyond the project's lifetime. Many noted that data would remain accessible through project platforms for future research or policymaking. Four suggested that surveys or similar methods could be replicated in other contexts. However, reported barriers to long-term use included limited time and organisational capacity, data becoming outdated, staff turnover, changing political priorities and the localised nature of some datasets.

Overall, participants described outcomes extending beyond tangible project outputs to include learning, relationship-building and enhanced legitimacy. While policy impacts were often viewed as uncertain or longer-term, many participants considered these process-related outcomes to be valuable achievements in their own right.

5.6. Participants' reflections on implementation

Participants were asked what they would change if setting up their Living Lab again. While five reported that they would make no significant changes, most identified aspects that they would approach differently. Common reflections included setting clearer goals around outcomes or policy influence and refining stakeholder engagement approaches. Furthermore,

several participants suggested that a more focused scope from the beginning would have made the process more efficient and easier to manage, for example:

> I would make the scope more narrow from the beginning (…) just choose one [transition challenge]. (Respondent 8, PRP)

Others felt expectations around policy influence should be managed more carefully, as priorities can shift and are often beyond the control of project partners, especially within changing regional policy environments. Some also suggested investing more time in building stakeholder relationships at the start of the project.

Another reflection concerned the limited opportunities for exchange between Living Labs, with five respondents suggesting that more structured opportunities for comparison and cross-regional learning would have been beneficial. Several felt that opportunities to compare experiences across regions facing similar challenges would have reduced duplication of effort and supported more effective adaptation of the methodology to local circumstances. As one noted:

> It would have been very useful for us to compare experiences with other Living Labs. (Respondent 26, PRP)

All respondents expressed a willingness to use the Living Lab approach again, and most considered it valuable, particularly for projects involving stakeholder engagement and place-based challenges. However, some caveats were raised. While PRPs tended to question the practical feasibility of implementing Living Labs outside externally funded projects, scepticism among some LLCs focused more on whether the methodology offered substantial advantages over existing participatory approaches. One suggested that the full methodology may not always be necessary, and that selected elements could be adopted where appropriate.

Overall, participants remained broadly positive about the Living Lab approach while also recognising its limitations and practical challenges. Their reflections suggest that future Living Labs may benefit from clearer objectives, realistic expectations around policy influence, stronger opportunities for cross-Living Lab learning and greater attention to stakeholder engagement from the outset.

6. Discussion

6.1. Understanding the value and limitations of the living lab approach

Drawing on experiences across 14 Living Labs, the findings provide insights into how Living Lab methodologies are understood and experienced by those responsible for their implementation. Collectively, these findings demonstrate the value of examining implementation experiences directly, as they reveal dimensions of Living Labs that are not always visible through outcome-focused evaluations.

Participants consistently described Living Labs as collaborative and experimental spaces that supported learning, relationship-building, stakeholder engagement and the co-production of knowledge. These findings reinforce the characterisation of Living Labs in the literature as collaborative and experimental approaches rather than purely outcome-driven methods (McGann, Wells, and Blomkamp 2021; Scholl and Kemp 2016; Voytenko et al. 2016). They also support existing work identifying co-creation

and iterative learning as central features of Living Labs (Galway et al. 2022; Puerari et al. 2018), while also illustrating how such outcomes are experienced by those responsible for implementing Living Labs in practice. Importantly, participants frequently described aspects such as learning, experimentation, reflection and the development of new relationships as valuable outcomes. This suggests that evaluations focused primarily on tangible outputs and impacts may overlook important forms of value generated through Living Lab processes.

At the same time, participants highlighted a range of challenges associated with implementation. Living Labs were widely perceived as resource- and time-intensive, reflecting existing literature on the capacity demands associated with co-creation and experimentation (McGann, Wells, and Blomkamp 2021; Von Wirth, Frantzeskaki, and Loorbach 2020). While flexibility and iteration were widely viewed as strengths of the methodology, they also introduced additional complexity and uncertainty compared to more conventional project approaches, particularly surrounding stakeholder engagement. The findings therefore suggest that the benefits of Living Labs may come with practical trade-offs and that Living Labs may require significant investment in facilitation and relationship-building.

Translating Living Lab activities into policy influence emerged as a particularly significant challenge. While participants reported generating new knowledge, tools, data and collaborative relationships, translating these outcomes into concrete policy change was often perceived as difficult or beyond the timescales of the project itself. This supports critiques suggesting that experimental and participatory approaches do not necessarily lead directly to structural change (Lewis, McGann, and Blomkamp 2020). More broadly, the findings highlight a potential mismatch between project timescales and policy processes. While learning, experimentation and network-building often occurred during the lifetime of the Living Labs, policy impacts were frequently viewed as longer-term and uncertain. Consequently, evaluations focusing solely on short-term outcomes may underestimate the longer-term contributions of Living Labs. This also supports arguments that Living Lab impacts unfold across wider temporal, spatial and structural dimensions (Sengers, Turnheim, and Berkhout 2021).

6.2. Contextual influences on living lab implementation

Across the interviews, participants frequently explained both successful and challenging aspects of Living Lab implementation with reference to contextual conditions. While this study was not designed as a formal comparison of regional contexts, participants repeatedly highlighted these factors as important influences on implementation experiences. In particular, they frequently linked their experiences to broader institutional conditions, connections with policy processes and the quality of collaborative relationships.

First, participants frequently connected their experiences to the institutional environments within which Living Labs were implemented. Those working in regions with established development initiatives and stakeholder networks frequently perceived implementation to be more straightforward and beneficial than those operating in contexts where such structures were less developed. Existing organisational capacity appeared to support activities such as stakeholder engagement and experimentation. Conversely, some Living Lab experiences supported previous arguments (McGann, Wells, and Blomkamp 2021; Von Wirth, Frantzeskaki, and Loorbach 2020) regarding

the operational challenges posed by limited capacity or networks. Participants' accounts, therefore, suggest that Living Labs are implemented within pre-existing institutional contexts that may enable or constrain particular activities and forms of engagement.

Second, participants often reflected on the importance of connections between Living Lab activities and wider policy processes. Living Labs were frequently described as most useful when linked to existing policy priorities or regional strategies. Such alignment was perceived to increase the relevance of activities and create opportunities for engagement with policymakers. At the same time, participants also highlighted the challenges of influencing policy, particularly within changing political environments and where access to decision-makers was limited. These findings support those of previous studies (such as Bulkeley et al. 2016), showing that policy relevance depends not only on the specific activities undertaken within a Living Lab, but also on how those activities connect with wider governance agendas and institutions.

Third, collaborative relationships were central to participants' experiences of implementation. Clearly defined roles and responsibilities reduced friction and supported joint problem-solving between partners. Pre-existing trust and working relationships were frequently described as facilitating collaboration, while PRPs' embeddedness within local stakeholder networks was important for engaging participants, sustaining involvement and enhancing the legitimacy and relevance of Living Lab activities. Participants also highlighted the value of learning between Living Labs, suggesting that greater exchange between regions could strengthen future initiatives. Such exchanges may be particularly valuable in helping regions facing similar transition challenges learn from one another while adapting approaches to their own institutional and territorial contexts.

Overall, the findings suggest that Living Labs should not be understood as a methodology that operates independently of context. Participants' experiences indicate that implementation is closely intertwined with the institutional settings, policy processes and collaborative relationships within which Living Labs are embedded. Understanding these contextual influences is therefore important for interpreting Living Lab experiences, informing future applications of the approach and contributing to wider discussions of collaborative governance and place-based development.

6.3. Key lessons for future living labs

The findings and discussion suggest five key lessons for the design and implementation of future Living Labs. While these lessons are most directly relevant to regionally embedded Living Labs due to the focus of the RUSTIK project, they highlight broader considerations regarding the design, implementation and evaluation of Living Labs and may have applicability across different governance scales.

First, for policy-focused work, Living Lab activities should be aligned with policy priorities from the outset. The findings suggest that policy influence is most likely when Living Lab activities are embedded within existing policy frameworks, governance agendas and decision-making structures from an early stage. Such alignment increases the relevance of outputs to decision-makers and improves opportunities for uptake within ongoing policy processes.

Furthermore, investing time in establishing roles, responsibilities and project coordination structures within Living Labs is valuable. Clearly defined roles and coordination

mechanisms are essential for effective collaboration. Regular meetings and shared project management tools can reduce confusion and support joint problem-solving. This may be particularly important in projects involving multiple organisations with diverse objectives, where relationship building can facilitate coordination throughout the project lifecycle.

Where possible, Living Labs should also build on pre-existing relationships and stakeholder networks. In the collaborative and co-design relationships central to Living Labs, pre-existing relationships can facilitate trust and communication. Similarly, established stakeholder networks can support stakeholder engagement processes, which were perceived as a key challenge within RUSTIK, particularly among participants who lacked access to such networks. Where these relationships and networks are absent, additional time and resources may be required to build trust and sustain engagement.

In addition, Living Lab partners should have realistic expectations about impact and project timescales, as policy-related impacts may extend beyond the duration of projects. Furthermore, outcomes such as learning, capacity-building and relationship development may represent important forms of impact in their own right. Expectations and evaluation frameworks should therefore recognise that policy influence can occur indirectly. Additionally, they may unfold over longer periods and be achieved through mechanisms that are not fully captured by objective- or outcome-based approaches. These findings also highlight the value of supporting continuity beyond individual projects, where resources permit, to sustain partnerships and create opportunities for longer-term policy influence.

Finally, structured exchange between Living Labs can support shared learning and help address common implementation challenges. Cross-Living Lab learning may also strengthen methodological development and enhance overall project impact. This may be particularly valuable in projects such as RUSTIK that span a diverse range of regional and national contexts. Such opportunities can facilitate the transfer of experiences and lessons learned while still allowing approaches to be adapted to local contexts.

Table 2 summarises these five key lessons and their implications for future Living Lab initiatives.

Table 2. Key lessons learned and their implications for future living labs.

Key lesson	Implication for future Living Labs
1. Align activities with policy priorities from the outset	Embed Living Lab activities within existing policy frameworks, governance agendas and decision-making structures to increase opportunities for policy uptake.
2. Establish clear roles and coordination structures	Invest time in defining roles, responsibilities and coordination mechanisms, particularly where multiple organisations with diverse objectives are involved.
3. Build on existing relationships and stakeholder networks	Where possible, draw on established relationships and networks to support trust, communication and stakeholder engagement; where these are absent, allow additional time and resources for relationship building.
4. Allow realistic timescales and recognise indirect impacts	Recognise that policy influence may occur indirectly and beyond the project period, while learning, capacity-building and relationship development can represent important forms of impact.
5. Facilitate exchange and learning between living labs	Provide opportunities for Living Labs to share experiences and address common challenges while allowing approaches to be adapted to local contexts.

Together, these lessons highlight the importance of designing Living Labs that are context-sensitive, ambitious but realistic, and have the potential to create both direct and indirect impacts.

7. Conclusion

This paper has examined the implementation of Living Labs through a qualitative study of the RUSTIK network. Drawing on interviews with research and practice partners across 14 Living Labs in Europe, it has explored how participants experienced and understood opportunities, challenges and lessons associated with co-design, collaboration, stakeholder engagement and policy translation. In doing so, it has addressed a gap in the literature and fulfilled its objective by providing empirical insights into how Living Lab methodologies are understood and experienced by those involved in their implementation. The findings contribute to growing understanding of how Living Labs are implemented in practice, extending existing evaluation research that has primarily focused on outcomes and impacts.

The findings suggest that Living Labs create value through processes of collaboration, experimentation, relationship-building and iterative learning. At the same time, Living Labs were perceived as resource- and time-intensive, with challenges relating to stakeholder engagement, coordination and translating outputs into policy and practice. Participants also frequently linked their experiences of implementation to factors including broader institutional conditions, connections with policy processes, and the quality of collaborative relationships. Together, these findings suggest that participants' experiences of Living Lab implementation were shaped not only by methodological design but also by the regional contexts within which Living Labs were embedded.

Participants' reflections on implementation also point to several considerations for practitioners and policymakers designing future Living Labs. In this paper, we have proposed five key implementation lessons which may be used to guide the design of future initiatives. Activities should be aligned with policy priorities and governance structures from the outset to enhance relevance and long-term impact. Clear roles and responsibilities are essential for effective collaboration. Building on pre-existing partnerships and stakeholder networks can strengthen engagement. Expectations around policy impact should remain realistic, recognising that impacts are often indirect and long-term rather than immediate. Finally, structured opportunities for learning across Living Labs can help to support shared learning.

Future research could build on this study in several ways. First, there is a need for longitudinal evaluation that follows Living Labs beyond funded project lifetimes to better understand how impacts evolve and whether anticipated policy and practice changes are realised across different regional contexts. Second, further work should explore the perspectives of a wider range of stakeholders, particularly policymakers and community participants, whose experiences of implementation may differ from those of the primary project partners. Comparative research across different regional governance settings or organisational contexts may also help identify additional contextual factors that shape Living Lab experiences. More broadly, further attention to implementation processes in Living Lab evaluation may help develop a richer

understanding of how Living Labs operate across different contexts and why they generate different experiences and outcomes.

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Author contributions

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The authors declare that ChatGPT (GPT-5.5, OpenAI) was used to assist with reducing the word count of the paper. The authors reviewed and edited all text and take full responsibility for the final content of the paper.

Data availability

Data will be made available upon reasonable request.

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