



## **Mediation roles and ecologies within resilience-focused urban living labs**

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# Mediation roles and ecologies within resilience-focused urban living labs

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## ABSTRACT

Urban living labs (ULLs) are increasingly exploring resilience and sustainability-related themes. This paper contributes to the gap in the research of ecologies of intermediation in processes of ecological transition through civic resilience. It investigates mediation roles and ecologies in four ULLs: a civic network in Bagneux, Paris, France; the *Urboteca* fellowship in Bucharest, Romania; a learning initiative at *Tensta Konsthall* in Stockholm, Sweden; and a civic activation project in Hammarkullen, Gothenburg, Sweden. The research questions address mediation's importance in supporting civic resilience, mediator roles within European living labs, and the mediation types necessary to sustain, scale up or instigate civic resilience. Mediation is understood in the Latourian sense as transformative, a capacity of both humans and non-humans. Mediation ecologies require the connection and creation of relations (when the social field is fragmented), the negotiation and balance of positions (when there are conflicts or oppositions) and catalysis (when collective initiative is missing), but that mediation can also be obstructed.

## PRACTICE RELEVANCE

Understanding mediation ecologies and the roles within them can be of use to future ULL networks, allowing them to anticipate and increase the agency of particular types of actors/relationships early on in processes of ecological transition. The study proposes mediation role categories for initiating and sustaining ULLs: catalyse and strategise; support and sustain; negotiate and balance; connect and reach out; and obstruct. Mediation needs a diverse ecosystem of actors: the roles of strategists and supporter/sustainers are key to ULL resilience; negotiators are critical to mitigate obstructions; and 'double agents' enable increased connectivity.

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# 1. INTRODUCTION

An urban living lab (ULL) is a real-world environment across fields of study where research, innovative products, or services are tested and co-developed with everyday participants in a collaborative setting, involving public, private and community stakeholders working together to address real-life challenges. In the last decade, the ULL has arisen across Europe as a key methodology of conducting research by engaging with ecological transition in the ‘experimental city’ (Bulkeley & Caston-Broto 2013; Evans et al. 2018), i.e. the practice of moving towards a more sustainable way of living, working, producing and being in the face of the climate crisis (Hopkins 2008), and being embedded in policy (Levy et al. 2022). ULLs offer the possibility of connecting researchers and citizens, engaging them in collective action to identify common needs, develop collaborative methods to respond to these needs and share methods for wider implementation (Puerari et al. 2018). They can also be read as a means of expanding the capacity of citizens to engage in processes of change and increased civic resilience (Rizzo et al. 2021; Petrescu et al. 2022), with identified typologies, design and impact as strategic, civic and organic (Belfield & Petrescu 2024; Bulkeley et al. 2019).

A need exists for renewed urgency to accelerate and scale up ecological transition, attending to governance and empowerment. ULLs can help this process to happen (Bouzarovski et al. 2023; Bouwma et al. 2022), and mediation is a key ingredient in a ULL’s capacity to create change. The urban sustainability transitions literature has drawn attention to the role of intermediation in the acceleration of sustainability transition initiatives (Hernberg & Hyysalo 2024; Kivimaa et al. 2019) as well as overlap and conflict within ecologies of intermediation (Upham et al. 2026; Soberón et al. 2022).

This paper explores these concepts in ULL research with the idea of transformative mediation in a Latourian sense (Latour 2005) in relation to civic resilience. The concept of ‘ecologies of mediation’ is further developed to identify ULLs’ specific processes and methods, showing they are effective settings for making visible mediation mechanisms and, therefore, enabling action. The term ‘mediation’ is used in this paper, rather than ‘intermediation’, as a reflection of Latour’s theory. Not much is yet known about how a ULL can create a ‘mediation ecology’ in the process of ecological transition, nor about the particularities of the mediator roles diverse stakeholders can play towards civic resilience. Understanding these roles can be of use to future ULL mediation ecologies, allowing them to anticipate and sustain the importance (and increased agency) of particular types of actors/relationships early on in processes of ecological transition.

The aim of this article is to explore how ULLs generate ecologies of mediation to work towards sustaining, scaling up or instigating civic resilience, the importance of ULL-based mediation and the different roles of mediators in doing so. Mediation ecologies and roles are investigated by examining four case studies in the European research project Collective Networks for Everyday Community Resilience and Ecological Transition (CoNECT) in Bagneux, Paris, France; in Hammarkullen, Gothenburg, and Stockholm, both Sweden; and in Bucharest, Romania. These projects all comprise local networks of researchers, grassroots organisations, individuals and municipalities. They all aim to build civic resilience networks with transformative urban potential by either initiating new or connecting and scaling up existing networks of resilience using practices of sharing, spatial knowledge and commoning (Petrescu et al. 2022).

The main research questions are as follows:

- How do ULLs generate ecologies of mediation to work towards sustaining, scaling up or instigating civic resilience networks?
- What key mediation roles do different stakeholders play?
- What tools, methods and processes can be used?

The intention is to understand the roles of mediators in these civic networks and then propose a series of mediation roles and tools for the initiation and sustenance of ULLs.

### 2.1 CIVIC RESILIENCE

Civic resilience is defined as residents' ability to resist, adapt and transform their environment amid socio-economic, political and climatic change, guided by shared values. A civic dimension to resilience discourse incorporates concepts such as 'adaptive capacity', 'transformation' and 'transition' (Brown et al. 2012; Folke et al. 2010; Walker et al. 2004), and 'resourcefulness' (MacKinnon & Derickson 2013). Civic resilience also emphasises community, citizenship and collective agency (Butterworth et al. 2022; Maharramli et al. 2021).

Resourcefulness as resilience is a concept that addresses the necessity to identify, make available and redistribute resources of space, knowledge, and power across local actors and communities to improve resilience. MacKinnon and Derickson's (2013) definition of resilience as resourcefulness—as a practice of civic resilience, in and for the urban realm—is utilised in this study. Resourcefulness implies the importance of identifying resources, stakeholders, and their relations to their localities and various communities, which are key practices of mediation, particularly in ULLs.

Civic resilience is also key in processes of ecological transition defined as:

an evolution towards a new economic and social model, a model of sustainable development that renews our ways of consuming, producing, working and living together to meet the major environmental challenges of climate change, resource scarcity, the accelerating loss of biodiversity and the multiplication of environmental health risks.

(CoNECT 2022)

Ecological transition therefore requires and includes practices of culture, education, and design as activities of resistance and a means towards civic resilience (Droubi et al. 2023; Yue 2020). ULLs can play a role in fostering civic resilience, serving as experimental environments where stakeholders, including researchers, government agencies, businesses and citizens, can co-create and test innovative solutions to urban challenges, enhancing the adaptive capacity and sustainability of cities (Bulkeley et al. 2016). Through these actions they facilitate co-experimentation and co-learning towards the development and implementation of new practices and technologies (Matschoss & Heiskanen 2017). However, as discussed by Bouwma et al. (2022), evaluation frameworks to assess the broader impacts of ULLs are lacking. Further, ULLs have been criticised as being hyperlocalised, with a need to encourage translocal experimentation and knowledge-sharing (Scholl et al. 2022).

To develop these experimental and resourceful actions, ULLs and their participants act as mediators between research and society (Petrescu et al. 2022), using a variety of methods that are often developed specifically for the projects, places and people engaged with (Belfield & Petrescu 2024). Civic resilience ULLs represent ecologies of mediation including stakeholders and resources, offering opportunities for the system and its resourcefulness to be analysed and reflected upon.

### 2.2 MEDIATION IN CIVIC RESILIENCE ULLS

Mediation is assimilated with 'intermediation' in the literature, which has proliferated over the last decade in fields relating to innovation, urban sustainability and transition. As Kanda et al. (2020) explain, intermediaries facilitate transitions by bridging multiple actors and their processes. Intermediation has also been used to describe participatory research design practice that is 'institutioning and commoning' (Teli et al. 2022); and 'systemic intermediaries' have been described as actors who are either 'niche' or 'regime' (Geels 2002) in the fields of sustainable business and management, and systems and network analysis (Ehnert et al. 2022; Kutter et al. 2022; Kivimaa & Kern 2016). Further, studies around ecologies of intermediation have explored the dynamics and particularities of overlap and conflict (Upham et al. 2026), and the synergy and complementarity of stakeholders (Soberón et al. 2022). Hernberg & Hyysalo (2024) propose an intermediation framework for local bottom-up experimentation towards transition: they identify *brokering*, *configuring*, *structural negotiating*, and *facilitating and capacitating* as modes of mediation. This research focuses on the specificities of civic resilience in ULLs, and as such it enriches transition

theory with a diverse range of humanities and social sciences literature identifying a ULL-specific mediation framework.

In ULLs, mediators are not only human actors but also non-human. Actor–Network Theory (ANT) can help to identify the connectivities between human actors as productive: ANT is used to map the human participants of the case studies and create diagrams, identifying the relations between persons as abstracted from social spaces, with a need for commoning procedures to bring individuals together to form a collective. ANT also posits that ‘non-humans’ have agency (Sayes 2014), such as spaces, tools and resources that can also ‘affect, interfere or intervene’ (Rice 2018: 239) with human actors. In ULL processes it is the design, curation, and identification of spaces and resources that have the potential to encourage agency and relationalities that are often carried out by the human mediator.

In civic resilience, mediation is a practice that connects and creates relations, e.g. when the social field is fragmented, in a context that is in crisis. Stakeholders may have their own networks and relationships that they can bring forward to enable connections and relations to form, whether grassroots or institutional actors, creating opportunities and building trust. In this paper, mediation is understood in the sociological Latourian sense, in that:

Mediators transform, translate, distort, and modify the meaning or the elements they are supposed to carry.

(Latour 2005: 39)

The research focuses both on specific transformative mediation roles and the dynamics of the overarching ecology. To understand these roles within a civic resilience ULL ecology, five mediation categories are proposed:

- Catalyse and strategise
- Support and sustain
- Negotiate and balance
- Connect and reach out
- Obstruct

## 2.3 CATALYSE AND STRATEGISE

Mediators can catalyse, or instigate, actions when collective initiative is missing. In chemistry, a catalyst is a substance that increases the rate at which a chemical reaction reaches equilibrium, without itself becoming involved, a term which has been brought into the field of architecture as ‘urban catalyst’ (Davis 2009). Innovation labs have been identified as innovation catalysts for the host organisation (Carstensen & Bason 2012), creating spaces separated from regular operation where people can work differently (Bucher & Langley 2016).

Some mediators strategise, furthering thought on action with a larger picture and longer term vision. De Certeau describes strategy as meaning to be able to see far into the distance, to predict, to ‘read a space’, to recognise in strategies knowledge, sustained and ‘determined by the power to provide oneself with one’s own place’ (de Certeau 2011: 36). Through a feminist lens and in the field of business management, strategy has also been understood as multidimensional and non-linear, coming into being as collective intellectual discussion and idea development that embraces diversity (du Toit 2006).

## 2.4 SUPPORT AND SUSTAIN

Networks of civic resilience require sustenance and support to keep momentum, to organise activities and meetings and generally coordinate a continuation of practice. Supporters might fund activities, research or networks, host activities enabling practices to take place, and provide space and resources (human or otherwise). Practices of sustenance and support can be traced back to theories of care as a political (Fisher & Tronto 1990) and spatial concept (Trogal 2017). Others design and make tools for commoning, co-designing, and co-making within the network and also further afield (Baibarac & Petrescu 2017; Antaki & Petrescu 2022). This mediation type aligns with Hernberg & Hyysalo’s (2024) ‘configuring’ in intermediation.

## 2.5 NEGOTIATE AND BALANCE

Mediators can negotiate or balance positions when there are conflicts, oppositions or a lack of cohesion in ecology relationships, and have many of the traits of ‘diplomats’ (Stengers 2005; Latour 2013). As Stengers points out, ‘The art of the diplomat requires hesitation’ (Stengers 2020: 1); in other words, taking time for reflection and careful communication. Sometimes mediators play multiple roles, e.g. researcher and organisation lead, straddling both institutional and grassroots duties. This type of mediator has been described as a ‘double agent’ in contexts of urban design projects (Hernberg & Mazé 2017). This mediation type has similarities to Hernberg & Hyysalo’s (2024) ‘structural negotiation’.

## 2.6 CONNECT AND REACH OUT

Some mediators have particular capacity to connect with groups and communities as well as individuals. Connectors invite and bring into the network, selecting, suggesting, and introducing from their existing networks and contacts those to join, engaging in what have been called practices of ‘institutioning and commoning’, in particular in relation to designers working with grassroots groups and institutions (Teli et al. 2022). Other mediators have particular potential for public outreach, the ability to share knowledge and action widely, as well as connections to harder-to-reach groups. This mediation type has similarities to Hernberg & Hyysalo’s (2024) ‘brokering’.

## 2.7 OBSTRUCT

Some actors might obstruct, sterilising the civic resilience attempts by cutting relations or closing down ecology relationships. Obstructors may use their stronger positions to emphasise, benefit, or prioritise preferred relations and actions over others (which might become more fragile, isolated and in need of support), creating unbalanced interrelations and compromising civic resilience as a co-constructed process. While Mouffe’s ‘agonistic approach’ identifies that the struggle between adversaries is reflective of democracy (Mouffe 2016), obstructors require a particular kind of mediation in the form of negotiation (‘diplomats’) to enable an agonistic pluralism. Further, at times obstructors can act as disruptors, with intentional or unintentional potential to create positive change.

Mediation roles are defined as the overarching action of each actor. A catalyst has initiated the project; a strategist thinks about the long term; a supporter sustainer works to make sure the action continues; a host welcomes the action into their space; a team player takes part; a funder supports financially; a double agent situates within more than one actor’s internal network; a negotiator attends to conflict; a connector invites new actors; and an obstructor cuts off an existing connection.

These diverse roles organise within the five mediation categories described above (Table 1). In addition to Hernberg & Hyysalo’s (2024) framework, this study has added the categories *Catalyse* and *strategise* as well as *Obstruct*, which are understood to be specific to ULLs due to the focused and short-term nature of research project timeframes. The roles can also be associated with resilience principles: *Diversity*, *Modularity*, *Connectivity*, *Social capital*, *Overlap*, and *Tight feedback loops* (Lewis & Conaty 2012). Negotiating mediators can encourage *diversity*, widening the range of future actors and activities, and thus realising a better capacity to respond to change and keep

**Table 1:** Mediation framework of the civic resilience urban living labs (ULLs).

| MEDIATION ROLES                                | MEDIATION CATEGORIES    | INTERMEDIATION FRAMEWORK (HERNBERG & HYYSALO 2024) | RESILIENCE PRINCIPLES (LEWIS & CONATY 2012) |
|------------------------------------------------|-------------------------|----------------------------------------------------|---------------------------------------------|
| Catalyst, strategist                           | Catalyse and strategise |                                                    | Tight feedback loops                        |
| Designer, supporter, host, team player, funder | Support and sustain     | Configuring, facilitating and capacitating         | Social capital, overlap, modularity         |
| Negotiator, ‘double agent’                     | Negotiate and balance   | Structural negotiating                             | Diversity                                   |
| Connector                                      | Connect and reach out   | Brokering                                          | Connectivity                                |
| Obstructor                                     | Obstruct                |                                                    |                                             |

momentum. Mediation is required to encourage *social capital* by creating trust and dense social networks; it is required for *connectivity* within the system and with other systems; and it is required to enable *tight feedback loops* to gather knowledge about a system's health and effectiveness quickly and reliably.

### 3. RESEARCH METHODS

The case studies are situated within the European research project Collective Networks for Everyday Community Resilience and Ecological Transition (CoNECT) (2022–25), which aimed to investigate and catalyse collective action networks in six European Union member states: Sweden, Romania, Norway, Spain, the Netherlands and France. Emphasising community resilience, the project encourages collaboration between citizens, researchers and municipalities to stimulate community organising capacity by recognising, mapping, connecting and strengthening everyday collective resilience practices.

The four living labs in question were initiated by the present authors for the duration of CoNECT. Each ULL was initiated by the research team according to their own contextually relevant resilience objectives. There is an overarching qualitative methodology that uses methods of participatory action research (PAR) and co-design across the ULL activities (Manzini & Rizzo 2011). All the ULLs use semi-structured interviews with an aligned set of questions to gather information from stakeholders.

The cases have several differences. Civic resilience is identified differently, and the four ULLs are different in scale and aim: a suburban city civic network project in Bagneux, Paris; a civic activation project in a public housing estate in Hammarkullen, a suburban neighbourhood of Gothenburg; a lifelong learning initiative with schools at *Tensta Konsthall* (Tk) in a suburb of Stockholm; and a city-wide cultural activation project involving students and cultural institutions, the *Urboteca* fellowship programme in Bucharest. Each ULL also uses and produces different tools and strategies to engage with stakeholders—and has different research questions and aims, based on the differing local and national contexts.

The case studies were chosen for comparison as the only four ULLs in the European CoNECT research. Each team of researchers reflected on their own ULL independently, then together as a research group to compare and contrast qualitative findings with a focus on mediation roles and processes. Reflection was conducted exclusively by the researchers to avoid placing additional demands on the civic actors involved in the project. Interview and workshop data and field notes were analysed and used as a basis for the case study descriptions and associated data tables.

In this paper, the ULLs are understood as ecologies of mediation. Comparison of these ecologies takes several forms: first, the ULLs are each explained using a diagram of stakeholders inspired by ANT (Latour 2005), identifying current relationships, including existing partnerships, new connections, who brought them into the network, funding and founding partnerships.

A comparative table is used to set out and compare the case studies, identifying contexts, the network, the problem that needs mediation, the mediation scope, the mediation process (and afferent methods), who are the mediators, and the mediation location—using auto-ethnographic methods (Miles et al. 2014). A further table is then used to organise and compare mediation roles and types, shared across ULLs. These roles organise into the four aforementioned categories: catalyse and strategise; support and sustain; negotiate and balance; connect and reach out; and obstruct. This table is also used to comment on mediation quality: commenting on the 'power' of each network actor according to the number of connections they have and new connections created.

A key is used in Figures 1–4 (see the case study section below) to describe the mediation ecologies, including showing the size of each actor (from more than 10 to fewer than five people), their type: whether civic (run with public funding and/or voluntary work), academic, professional (at least partially self-funded by profession) or public (government or municipal body). The connecting coloured arrows explain the relationships between actors: whether the actors already work together, who brought them into the ULL, who they are funded or founded by in the network, if they are a new partnership, and who brought them out of the ULL.



## 4. CASE STUDIES: ULLS AS MEDIATION ECOLOGIES

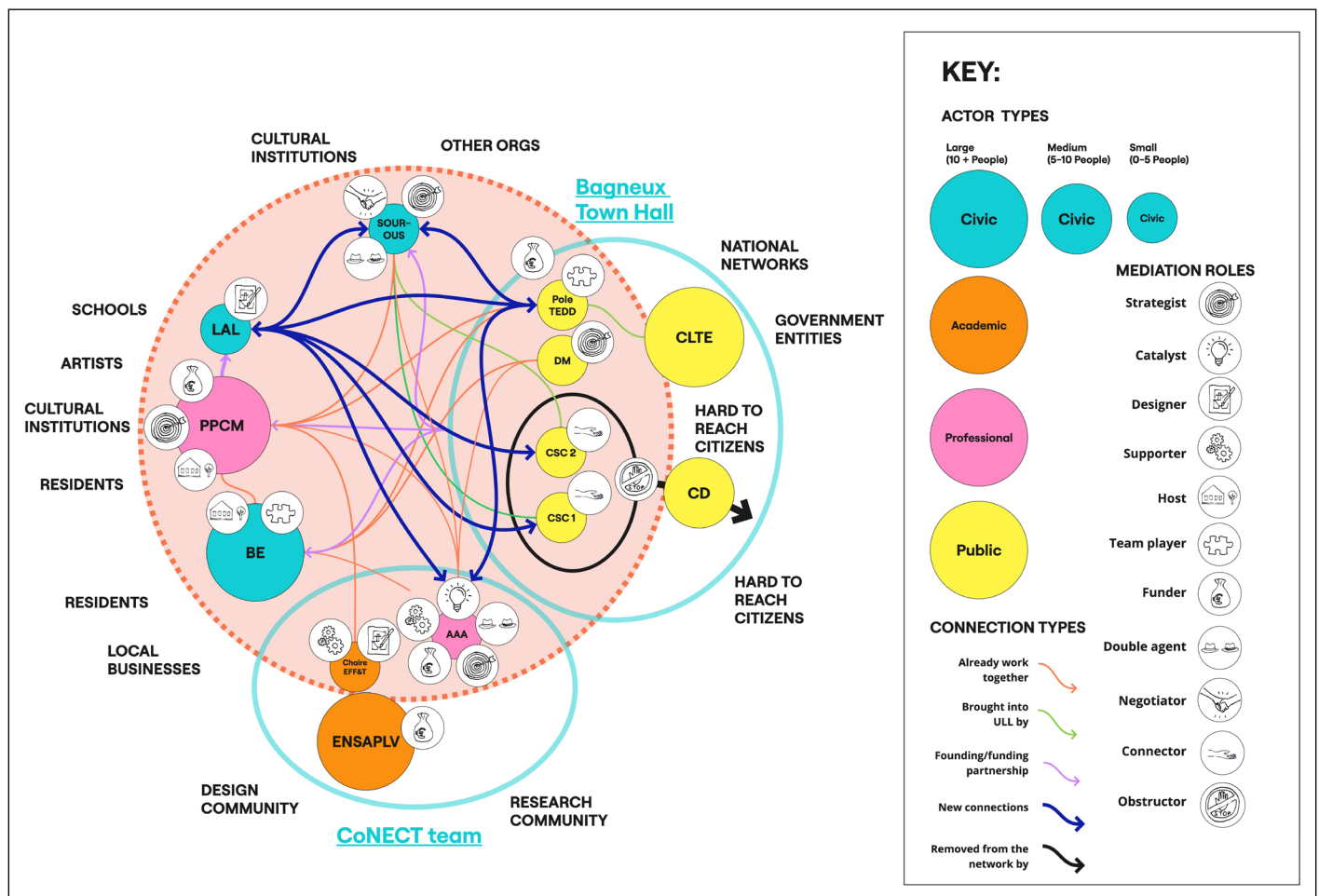
### 4.1 BAGNEUX, PARIS, FRANCE

The city of Bagneux, south of Paris, has a municipality and community active on socio-ecological issues. In Bagneux and France more broadly, civic ecological action is fragmented, with difficulties scaling up and connecting to existing resilience practices, often accompanied by dependency on and competition towards municipal resources.

This ULL, co-led by architecture practice *Atelier d'Architecture Autogérée* (AAA) and the *Chaire EFF&T* (i.e. *Expérimenter, Faire, Fabriquer et Transmettre*—Experiment, Do, Make and Transmit) research centre at the Paris La Villette Architecture School (ENSAPLV) aims to scale up and deepen connections in an existing network of Bagneux stakeholders, exploring how the town's resilience capacity can be increased through a civic resilience network. The ULL co-creates *Réseau Terreau* ('compost' network), a platform and network for collaboration bringing people and information together to share resources, improving Bagneux's civic ecosystem so ecological practices can thrive. Mediation activity aims to build trust, enable co-creation of the platform, and widens the network to include the public and other organisations, while better understanding existing and potential network members' needs.

Stakeholders were already known to the research team from former collaborations; relationships deepened, forming a core group of six, including AAA and *Chaire EFF&T* researchers and four organisations: a cultural-civic circus (*Plus Petit Cirque du Monde*—PPCM), an educational organisation (*Le Lycée avant le Lycée*—LAL); a theatre company (*Cie Sourous*), and a sustainability-focused civic organisation (*Bagneux Environnement*—BE). Several town hall departments are also involved: an ecological transition hub (*Pôle Transition Ecologique Développement Durable*—TEDD), two social and cultural centres (CSCs), and a participatory deliberative structure organised by the city as a 'citizen assembly' (*Conseil Local de Transition Ecologique*—CLTE). The actors brought each other into the *Terreau* network, based on previous relationships. New collaborations emerged through these connections over the course of the two years the ULL ran (Figure 1).

**Figure 1:** Bagneux *Terreau* urban living lab (ULL) mediation ecology diagram.





## 4.2 BUCHAREST, ROMANIA

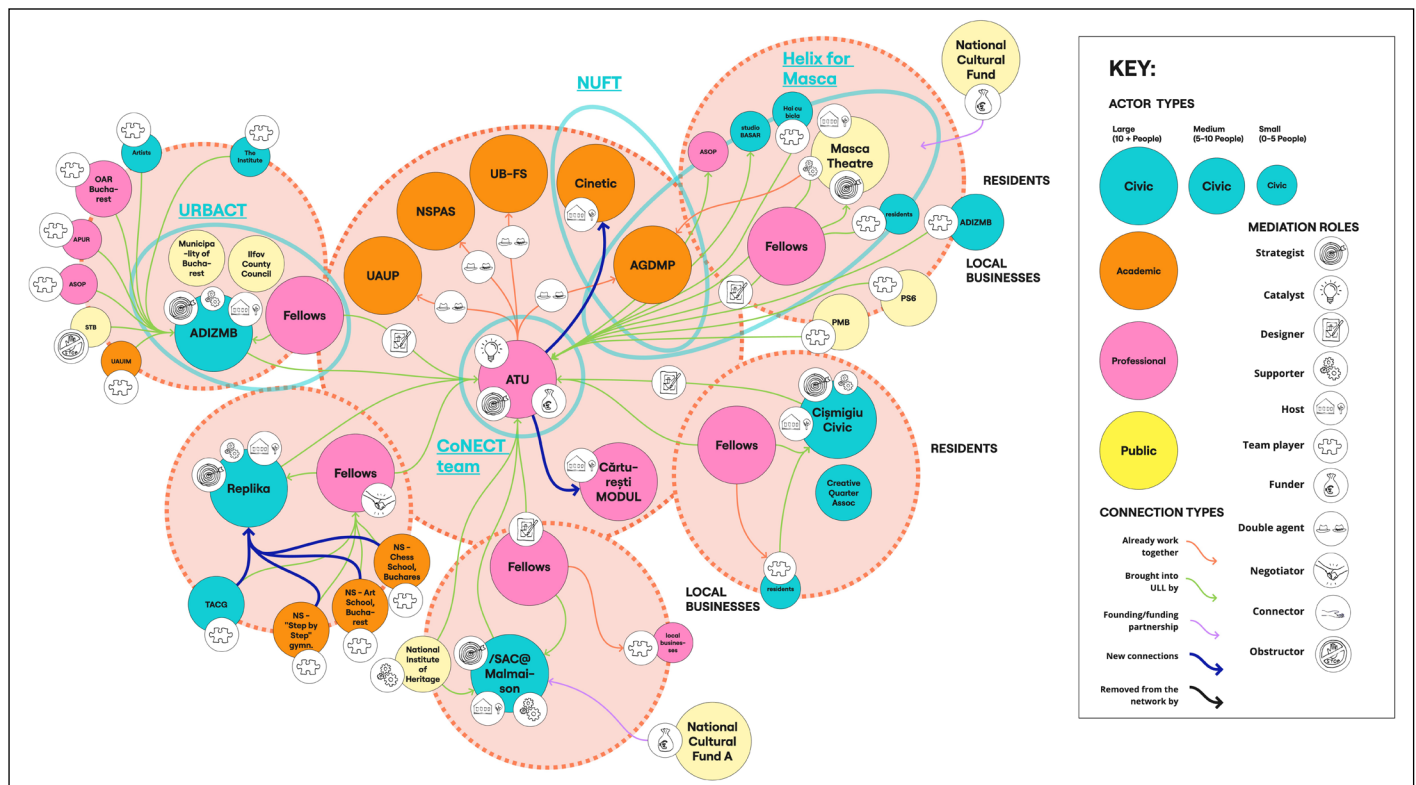
In the Romanian case, civic resilience is about bridging community needs with institutional support. Informal groups lead ecological, social and spatial initiatives, but funding is scarce and collaboration with universities and professional bodies remains limited. The disappearance of public cultural centres widens the gap between urban needs and public resource allocation for neighbourhood-level resilience. In Bucharest, decision-making is skewed toward private interests and top-down approaches, leaving grassroots efforts and professional-academic connections weak.

The *Asociația pentru Tranziție Urbană* (ATU) initiated the Romanian ULL to connect informal initiatives with structured support, to shape public spaces according to community needs and civic interests through cultural engagement and collaboration among professionals, residents and students. The ULL identifies neighbourhood-scale issues through participatory public-space diagnosis and brings community priorities to authorities and policymakers to inform more equitable public resource distribution.

To do this the 'Urboteca fellowship' catalysed a new community of practice composed of: fellows—future professionals drawn from architecture, anthropology and the arts (recruited through invitation and open call); hosts—art and socio-cultural initiatives; and inhabitants from the hosts' local areas. The goal is to adopt it as a permanent participatory tool. The fellowship operated for three months in five different art and cultural spaces as 'third space' cases: a public theatre; an independent theatre; a historical garden area, local initiative group and creative industries association; a group of visual artists working in a historic building with a problematic history; and a depot needing modernisation with land available for project use.

The fellowship demonstrates the facilitation of participatory diagnosis for community resilience in relation to these 'third spaces' through a programme of plenary sessions, presentations, discussions (training) and fieldwork within teams allocated to the five cases (Figure 2).

**Figure 2:** Urboteca urban living lab (ULL) mediation ecology diagram.



## 4.3 TENSTA, STOCKHOLM, SWEDEN

Tensta is a late modernist suburb, a multicultural neighbourhood in the north of Stockholm marked by strong community organising and solidarity among residents and social institutions. In Sweden, problematic social framing persists around racism and the marginalisation of communities in late modernist suburbs. There is also a gap in spatial ecological knowledge within secondary teaching, particularly in deprived areas, and a need for cultural institutions to adapt to increasing social fragmentation.

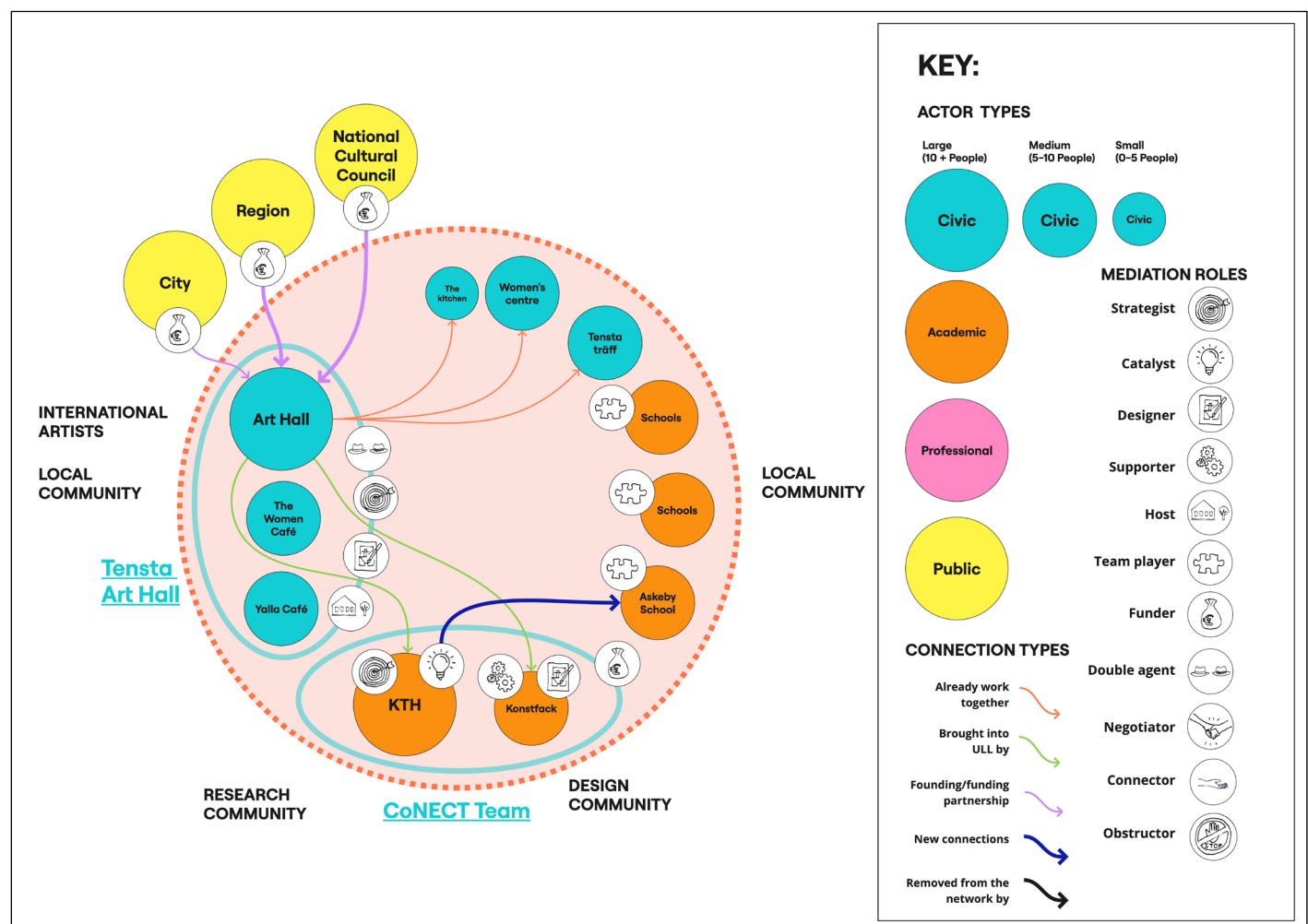
The ULL was initiated by KTH Architecture School and hosted at *Tensta konsthall* (Tk—Tensta Art Centre), a self-initiated art space since 1998 showing international contemporary art while acting as an informal community centre. Tk offers neighbours a non-commercial meeting place in an under-served area and plays a central role as a mediator among local organisations supporting residents' everyday lives. The ULL collaboration built on researchers' previous joint work with the art centre.

The aim of the ULL was to build alliances between local and academic entities, raise local interest in the study of eco-spatial practices, and mobilise local knowledge within urban planning and design education at KTH towards sustaining civic resilience. The ULL also responds to the lack of students from marginalised suburban areas in architectural education.

ULL methods included pedagogical workshops, witness seminars, multi-actor conversations and developing a curriculum within university teaching. The ULL is grounded in a core alliance between the university and the art centre as an on-the-ground hub for knowledge exchange across generations and sectors—children from the neighbourhood and local schools, teachers and parents, staff, curators and technicians, students, researchers, and spatial practitioners. While the art centre has an international reputation and strong ties to local organisations and civil society, it remains dependent on constant applications for public, private and European funding.

A newly established course within KTH's lifelong-learning curriculum, running each spring, aims to safeguard the continuity of the lab and strengthen it as a permanent infrastructure mediating between the university and local neighbourhood organisations (Figure 3).

**Figure 3:** Tensta urban living lab (ULL) mediation ecology diagram.



#### 4.4 HAMMARKULLEN, GOTHENBURG, SWEDEN

The Hammarkullen neighbourhood in north-east Gothenburg is home to communities that are active in processes of civic resilience such as networking, cultural activities, governance, education and circularity. The ULL has been prefaced by over a decade of research engagement by Chalmers

University which has operated pedagogical design studios in the area, renting spaces for education, involving citizen participation and social inclusion.

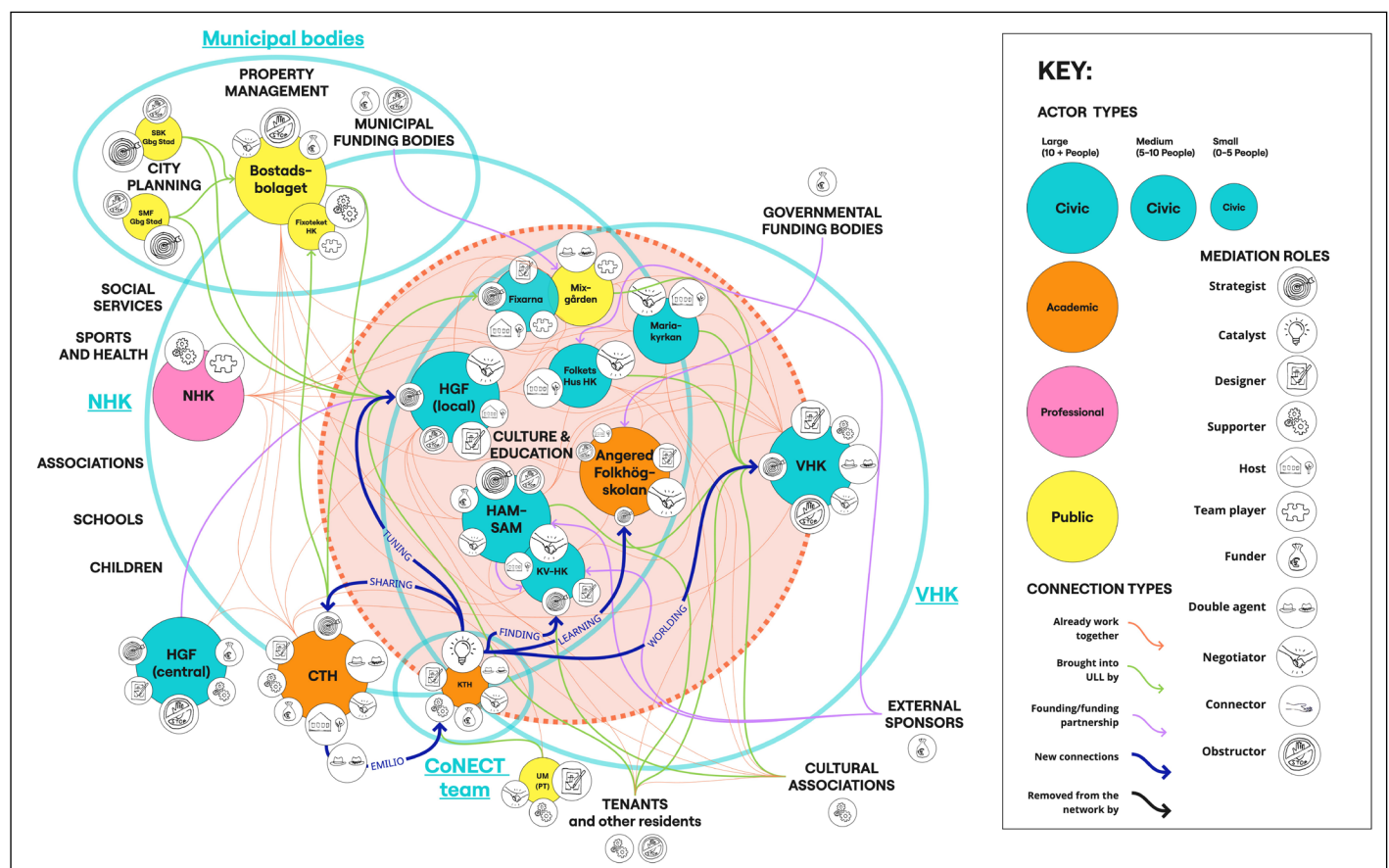
The Hammarkullen ULL engages with two networks: network 1, *Nätverk Hammarkullen* (NHK); and network 2, *Vårt Hammarkullen* (VHK). Network 1 comprises local organisations, educational institutions, public services, municipal administrations, etc., facilitating information-sharing but lacking decision-making power—connecting institutions. Network 2 is a regenerative network, resident-focused, supporting self-initiatives and excluding public service organisations, prioritising trust and grassroots action. The researcher has been a member of Network 1 for many years, and joined Network 2 within this project's framework.

The ULL aimed to reveal the spatial knowledge of communities by re-centring stories and resilient practices in the narratives of the area (currently dominated by 'negative' voices), to support local democratic governance and contribute to ongoing planning and transformation processes for Hammarkullen.

The ULL is composed of five projects, with local actors: (1) 'Worlding', with a civic network 2; (2) 'Finding', with a carnival committee; (3) 'Tuning', with a tenants' union; (4) 'Sharing', with a circularity community facility; and (5) 'Learning', with a local folk high school. The five projects reframe local stories from communities' perspectives (projects 1 and 2) and support skill-building, learning, and the practice and dissemination of community resilience (projects 3–5).

The ULL takes place in the Chalmers University neighbourhood premises during term time and in a network of places and spaces that sustain mediation: shared bookable venues, the tenants' union facilities, the local folk high school and public spaces (Figure 4).

**Figure 4:** Hammarkullen urban living lab (ULL) mediation ecology diagram.



## 5. DISCUSSION: COMPARISON OF ECOLOGIES OF MEDIATION

Table 2 provides a framework of mediation conditions across the four case studies, identifying: the problems that need mediation, the process, the scope, the mediators, the places and temporalities, and the barriers and challenges.

**Table 2:** Comparative framework of the mediation conditions across the four urban living lab (ULL) case studies.

| ULL CASE STUDY     | PROBLEM THAT NEEDS MEDIATION                                                                                                                                                                                                                          | MEDIATION PROCESS                                                                                                                                                                                                                                                                                                                           | MEDIATION SCOPE (AIM)                                                                                                                                                                                                                                                                                                   | MEDIATORS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | MEDIATION PLACES AND TEMPORALITIES                                                                                                                                                                                                                                                           | BARRIERS AND CHALLENGES                                                                                                                                                                                                                                                                                                                                  |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bagneux, France    | <ul style="list-style-type: none"> <li>Fragmentation of civic ecological action; competition on influence and resources</li> <li>Need to scale up and connect existing resilience practices</li> <li>Dependency on municipal resources</li> </ul>     | <ul style="list-style-type: none"> <li>Co-creation of tools to support the development and sustainability of the platform</li> <li>Workshops = 13</li> <li>Interviews = 12</li> <li>Paper co-design templates</li> <li>Shared calendar</li> <li>Website</li> <li>Conversation map</li> <li>Charter</li> <li>'Terreau' events = 4</li> </ul> | <ul style="list-style-type: none"> <li>Build trust and co-create a collaborative platform (<i>Terreau</i>) (and a community of practices)</li> <li>Widen the network</li> <li>Involve both the public and more organisations</li> </ul>                                                                                 | <ul style="list-style-type: none"> <li>Researchers: <i>Atelier d'Architecture Autogérée</i> (AAA) professional practitioner and Paris La Villette Architecture School (ENSAPLV) at the university</li> <li>Professional: <i>Plus Petit Cirque du Monde</i> (PPCM)</li> <li>Civic: <i>Le Lycée avant le Lycée</i> (LAL) experimental pedagogy, <i>Sourous</i> theatre company, <i>Bagneux Environnement</i> (BE) environmental organisation</li> <li>Public: <i>Pôle Transition Ecologique Développement Durable</i> (TEDD), two social cultural centres (CSC), local environmental citizen's assembly (<i>Conseil Local de Transition Ecologique—CLTE</i>)</li> </ul> | <ul style="list-style-type: none"> <li>Lab moving in different local organisation spaces in Bagneux</li> <li>LAL, BE (Agrocité, Recyclab), PPCM and online</li> <li>Monthly, 2023–25</li> <li>Builds on previous ProShare research project (<a href="#">Petrescu et al. 2022</a>)</li> </ul> | <ul style="list-style-type: none"> <li>Municipality's lack of coordination across hierarchies</li> <li>Threats/competition between organisations</li> <li>Continual need to legitimise research work in front of the municipal services</li> <li>Sustainability: mediators needed to keep momentum</li> <li>Municipal partners as obstructors</li> </ul> |
| Bucharest, Romania | <ul style="list-style-type: none"> <li>Imbalance of power dominated by the top down</li> <li>Lack of dialogue for defining public resources allocation</li> <li>Weak connections among professionals and universities to civic initiatives</li> </ul> | <ul style="list-style-type: none"> <li>Fellowship programme to train and experiment facilitating participatory diagnosis</li> <li>Plenary sessions = 7</li> <li>Storytelling and stakeholder mapping</li> <li>Collaboration between professionals, cultural initiatives and inhabitants</li> <li>Interviews = 14</li> </ul>                 | <ul style="list-style-type: none"> <li>Create a community of practice</li> <li>Fellows from three different fields: architecture, anthropology, arts</li> <li>Hosts: art and cultural organisations</li> <li>Communities of an area and/or of interests</li> <li>Convince policymakers to allocate resources</li> </ul> | <ul style="list-style-type: none"> <li>Researchers: <i>Asociația pentru Tranziție Urbană</i> (ATU)</li> <li>Professional: <i>Masca Theatre</i>; <i>Repлика Theatre</i></li> <li>Civic: <i>Cismigiu Garden</i>, community and creative industries association; <i>Malmaison</i>: arts space; <i>Depoul Victoria</i>: depot</li> <li>Academic: university fellows and students from architecture and urbanism: 'Ion Mincu' University of Architecture and Urban Planning (IAUIM); performative arts: National University of Theatre and Film (UNATC); and Anthropology Faculty of Bucharest</li> <li>Public: city of Bucharest</li> </ul>                               | <ul style="list-style-type: none"> <li>Lab functioning in different art and cultural spaces</li> <li>Weekly for six months, February–July 2024</li> <li>Built on existing relationships with stakeholders</li> </ul>                                                                         | <ul style="list-style-type: none"> <li>Insufficient time for engagement processes</li> <li>Recognition of fellowship within the different universities</li> <li>Lab seen as a short-term experiment</li> </ul>                                                                                                                                           |

(Contd.)

| ULL CASE STUDY       | PROBLEM THAT NEEDS MEDIATION                                                                                                                                                                                                                                                                          | MEDIATION PROCESS                                                                                                                                                                                                                                                                                                                                                                                                                        | MEDIATION SCOPE (AIM)                                                                                                                                                                                                                                                                                                                               | MEDIATORS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | MEDIATION PLACES AND TEMPORALITIES                                                                                                                                                                                                                                                                                                        | BARRIERS AND CHALLENGES                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Stockholm, Sweden    | <ul style="list-style-type: none"> <li>Gap in spatial knowledge within secondary teaching (in deprived areas)</li> <li>Racism/marginalised communities in late modernist suburbs</li> <li>Problematic social framing (specific to Sweden)</li> <li>Transformation of cultural institutions</li> </ul> | <ul style="list-style-type: none"> <li>Intergenerational pedagogy and knowledge exchange</li> <li>Pedagogical workshops = 3</li> <li>Witness seminars = 2</li> <li>Multi-actor conversations = 2</li> <li>Curriculum in education (university) = 1</li> <li>Intergenerational learning, podcasting, oral history and art-based methods to engage the young people in planning, designing and transforming their neighbourhood</li> </ul> | <ul style="list-style-type: none"> <li>Expand knowledge and education, advocacy and outreach on architecture/city planning</li> <li>Scaling deep, out and up</li> <li>Socially reproduce knowledge, dissemination, outreach</li> <li>Change the curriculum</li> </ul>                                                                               | <ul style="list-style-type: none"> <li>Researchers: KTH University</li> <li>Professional: <i>Tensta konsthall</i> (Tk—Tensta Art Centre), technicians and curators, Konstfack, and The Women's Café</li> <li>Civic: teachers, students and parents</li> <li>Public: Askeby schoolchildren aged 11–13; Tk children and young people of various backgrounds, aged 8–15</li> </ul>                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>Lab in the neighbourhood embedded in Tk</li> <li>Roaming for events in community/art centres in Stockholm</li> <li>During school holidays</li> <li>Builds on the previous project</li> </ul>                                                                                                       | <ul style="list-style-type: none"> <li>Sustainability: discontinuities with the work which only happens 'en bloc' during school holidays</li> <li>Lack of funding for proper employment</li> </ul>                                                                                                                                                                                                                |
| Hammarkullen, Sweden | <ul style="list-style-type: none"> <li>Invisible local community spatial knowledge and resilience practices</li> <li>Support local democratic governance with community knowledge</li> <li>Foreground stories and spatial knowledge in planning processes</li> </ul>                                  | <ul style="list-style-type: none"> <li>Collaborative workshops with community pedagogies, cultural heritage, governance, sharing and solidarity practices = 8</li> <li>Story-work as a framework and methodology</li> <li>Interviews = 8</li> <li>Co-design projects in collaboration with architecture students = 3</li> <li>Participatory films = 3</li> <li>Community courses = 2</li> </ul>                                          | <ul style="list-style-type: none"> <li>Co-create collective tools for learning among communities for popular education</li> <li>Attend to the curriculum at local educational institutions</li> <li>Training and hand over of story-work mediation to community networks</li> <li>Establish continuity within a ULL run by the community</li> </ul> | <ul style="list-style-type: none"> <li>Researchers: KTH and Chalmers University of Technology (CTH)</li> <li>Civic: <i>Hammarkullens föreningsråd</i> (HAM-SAM) Carnival committee</li> <li><i>Nätverk Hammarkullen</i> (NHK) and <i>Vårt Hammarkullen</i> (VHK) community networks</li> <li><i>Hyresgästföreningen</i> (HGF) tenants' union</li> <li><i>Mixgården</i> youth centre</li> <li><i>Angered Folkhögskolan</i> local folk high school</li> <li><i>Fixoteket</i> and <i>Fixarna</i> circularity space</li> <li>Professional and public: <i>Nätverk Hammarkullen</i> (NHK)</li> </ul> | <ul style="list-style-type: none"> <li>CTH premises</li> <li>Shared bookable venues (<i>Folkets Hus</i>, <i>Aktivitetshus</i>), tenants' meeting spaces; public space (the carnival path, park for events)</li> <li>Existing engagement through architecture pedagogy since 2008</li> <li>Weekly indoors; 6–10 yearly outdoors</li> </ul> | <ul style="list-style-type: none"> <li>Existing stigma and racism</li> <li>Top-down management</li> <li>Political resistance against community organising</li> <li>Community burnout</li> <li>Trust breaks: local authorities often change staff and structures</li> <li>Dependence on the Collective Networks for Everyday Community Resilience and Ecological Transition (CoNECT) project: resources</li> </ul> |



The four case studies address top-down disconnection by creating processes that make grassroots resilience visible to municipal and governmental actors, forming ecologies of mediation. In Bagneux, this means scaling an existing civic resilience network; in Bucharest, linking community needs with institutions through fellowships; in Stockholm, enabling youth to shape their environment through design; and in Hammarkullen, making local knowledge and stories legible to authorities. These mediation practices help networks withstand political tensions, scarce resources and structural obstacles.

## 5.1 MEDIATION PROCESSES

Each ULL used co-design to enable collective ideation. In France, researchers employed co-design tools: paper templates, joint charter writing, event design and interviews as network-building. In Bucharest, fellows learned participatory diagnostics using storytelling and stakeholder mapping. In Stockholm, youth worked with architecture students, fieldwork and model-making. In Hammarkullen, participatory observation used storytelling and audio-visual methods.

## 5.2 SCOPE

Capacity-building was central: Paris shared co-design and facilitation skills; Bucharest fellows gained public engagement and diagnostic abilities; Stockholm exchanged built-environment skills between university students and youth; and Hammarkullen strengthened community storytelling techniques.

## 5.3 MEDIATORS

All ULLs grew from pre-existing relationships and aim to continue beyond project timelines, functioning as ‘civic-organic’ infrastructures (Belfield & Petrescu 2024) that rely on long-term trust between communities and academic partners. Building aligned ways of working is slow, implying the need for longer term approaches to deepen research and scaling.

## 5.4 BARRIERS AND CHALLENGES

Common challenges include sustaining networks, coordinating institutions, securing resources and managing fragile participation. Continuity is threatened by a reliance on individual mediators, unstable funding and interruptions tied to school years or political cycles. Fragmented institutional structures and unclear roles limit the integration of local knowledge. Resource shortages overstretch partners, participation weakens under apathy, stigma or staff turnover, and parallel initiatives sometimes compete. High expectations without clear long-term pathways further expose the fragility of community infrastructures.

Figures 1–4 show in detail each ULL ecology of mediation: actor numbers and types (civic, academic, professional, public), sizes (small, medium, large) and associated mediation roles. Table 3 summarises the mediation ecologies represented in Figures 1–4.

## 5.5 ECOLOGIES OF MEDIATION

### 5.5.1 Catalyse and strategise

Each ULL began with one or two catalysts who expanded existing networks by ‘scaling up’ or ‘scaling deep’ (Moore *et al.* 2015). Catalysts included municipal and professional actors (PPCM, deputy mayor, AAA) in Bagneux; civic organisations hosting fellows in Bucharest (ATU and five large host non-governmental organisations); academic-cultural institutions in Stockholm (KTH, Tk); and a university researcher working with community strategists in Hammarkullen. Catalysts commonly acted as negotiators or ‘double agents’ (Hernberg & Mazé 2017), operating across multiple initiatives.

Strategists looked beyond immediate research contexts (de Certeau 2011). In Bucharest, fellowship hosts developed new funding applications grounded in the *Urboteca* ULL. Across cases,



| ECOLOGIES OF MEDIATION                  | BAGNEUX                                                                                                                                                           | BUCHAREST                                                                                                       | STOCKHOLM                                                                                                                                    | HAMMARKULLEN                                                                                               |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| Catalyse and strategise                 | One small professional catalyst and strategist; one large professional and one large academic strategist                                                          | One small professional catalyst and strategist; five civic strategists                                          | One large academic catalyst and strategist; one large civic strategist                                                                       | One large academic catalyst; seven civic (mixed size) strategists                                          |
| Support and sustain                     | One small professional designer and sustainer; one small civic designer and host; one large civic host; one large professional host; one large academic sustainer | One small professional designer; three civic and two professional hosts and sustainers; one large public funder | One medium academic designer, sustainer and funder; one large academic funder; one large civic designer and host; three large public funders | One large civic designer; one large academic host; five civic hosts (various sizes)                        |
| Negotiate and balance                   | One small professional and one small civic 'double agent'                                                                                                         | One small professional (negotiator and 'double agent')                                                          | One large academic and one large civic 'double agent'                                                                                        | Two large academic, one large civic, one small public 'double agent'; many negotiators                     |
| Connect and reach out                   | Two public and one civic connectors                                                                                                                               | None                                                                                                            | Three medium academic connectors                                                                                                             | Six civic, three academic and two public connectors                                                        |
| Obstruct                                | One large public obstructor                                                                                                                                       | None                                                                                                            | None                                                                                                                                         | Two small public, three large civic, one large public obstructor                                           |
| Power and empowerment (new connections) | 7                                                                                                                                                                 | 5                                                                                                               | 1                                                                                                                                            | 6                                                                                                          |
| Enhanced network resilience             | Scaling up by widening the network and giving agency to smaller actors                                                                                            | Instigating by training fellows to become mediators to instigate and sustain future civic resilience projects   | Instigating and sustaining by setting up a network-related university architecture curriculum                                                | Sustaining and deepening by empowering and making visible community practices through existing connections |

strategic work embraced diversity rather than predefined plans (du Toit 2006), and required a mix of strategist types (Lewis & Conaty 2012), as seen in Bagneux where *Terreau* links culture, architecture, circus and ecology. Broadly hybrid catalyst-strategists mobilise diverse networks, work across institutional boundaries and maintain long-term visions.

**Table 3:** Comparative ecologies of mediation across the four case studies.

### 5.5.2 Support and sustain

Sustaining civic resilience—understood as ‘resourcefulness’ (Mackinnon & Derickson 2013)—required creativity in producing spaces, tools and objects, consistent with boundary commoning and the role of non-human actors (Latour 2005). All ULLs co-designed processes to collect and create knowledge. In Bagneux, sustainers provided meeting spaces and co-design tools (charters, events, online documents, paper templates). In Stockholm, schools, children, teachers, parents, artists and curators supported ULL activities. In Hammarkullen, tools such as large maps, cameras and sound recorders shaped co-designed events. Spatial adaptability was common: itinerant activities in Hammarkullen, rotating sub-labs in Bucharest and alternating partner venues in France. Resilience relies on distributed infrastructures (people, places, tools) that keep initiatives alive despite institutional or spatial instability.

### 5.5.3 Negotiate and balance

Negotiation and balancing relied on ‘double agents’ (Hernberg & Mazé 2017) who worked across institutions. In Bucharest, ATU members simultaneously belonged to museums, universities and supranational bodies. Academic actors in Hammarkullen and AAA in Paris functioned similarly. These mediators acted as ‘diplomats’, mitigating obstructions. In Bagneux, municipal disconnections were addressed through reflective pauses and bridge-building meetings, following Stengers’s (2020) notion of hesitation. Strategists with strong institutional ties (PPCM, AAA) proved especially capable of restoring balance. ULLs depend on continuous diplomatic work: slowing down, mediating conflicts, clarifying roles and navigating unequal power relations.

#### 5.5.4 Connect and reach out

To work within fragmented social fields, ULLs engaged diverse publics. In Hammarkullen, residents' stories mediated between stakeholders using decolonial methodologies and loud-reading practices. In Bucharest, fellows acted as connectors, articulating shared goals, supporting knowledge exchange between civic and artistic practitioners, and introducing participatory methods. In Stockholm, catalysts reached out through exhibitions, school collaborations and lifelong learning courses. This shows that ULLs expand through outreach and translation, connecting groups that rarely meet and enabling knowledge to circulate across scales.

#### 5.5.5 Obstruct

All cases faced obstructions. These included competing or parallel projects (Bagneux, Hammarkullen), 'negative catalysts' (Davis 2009) (Stockholm, Bucharest), and top-down actors prioritising their own narratives. Such tensions forced mediator-researchers into diplomatic roles (Stengers 2020). Examples include: key social centre (CSC) actors removed from the Bagneux network by the town hall; difficulties formalising institutional commitments in Bucharest; dormant public funding for broadening recruitment in Stockholm; and narrative dominance of powerful actors in Hammarkullen. Yet conflict could become productive, as in Hammarkullen's agonistic environment (Mouffe 2016). Obstruction emerges from competition, institutional inertia and power imbalances, but can also catalyse resilience and collective agency.

The analysis of the case study mediation diagrams (Figures 1–4) resulted in the identification of a new category, 'Power and empowerment', reflected in Table 3, and relating to the number of existing connections (power) and new connections (empowerment) made in the ULL.

#### 5.5.6 Power and empowerment

The research finds that civic resilience ULLs have the capacity to empower smaller initiatives by creating new connections: in Bagneux, new roles for the *Lycée avant le Lycée* (LAL) and others are created; in Bucharest, the *Urboteca* fellows are connected to cultural actors and trained; in Hammarkullen, the residents are connected enabling agency; and in Stockholm, Tensta's youth are empowered through new connections to spatial design. These new roles enable urban resilience practices to increase.

Actors with few connections and a low capacity for decision-making and change can be encouraged and empowered through strong connections with institutions. Power is not necessarily related to influence in implementing change: A stakeholder's power can be demonstrated by how well it is anchored through its connections and its resilience. Mediation power can manifest as endurance or resistance, enabling small initiatives to have a high mediation impact. In Bagneux, connections to the town hall and a large cultural institution (PPCM) support longer term action; in Bucharest, students associated with the university enabled engagement in the fellowship programme; in Hammarkullen, although most ULL actors already share short-term connections, the ULL emphasises long-term development.

#### 5.5.7 Enhanced network resilience

Lastly, small-scale actors enhance network resilience. In Bagneux, smaller actors show more consistent involvement and create more connections, demonstrating greater agility than established actors. In Bucharest, individual students are key to mediation with cultural organisations; in Stockholm, the new school partner enables longer term collaboration making the network more resilient; and in Hammarkullen, the empowered community enables continued pressure on dominant voices.

## 6. CONCLUSIONS

Mediation was found to be central in the urban living lab (ULL) case studies, which aim at achieving civic resilience and resourcefulness through collaborative settings, involving public, private and community stakeholders. The contribution lies in identifying the types of mediation roles required

to sustain these ULL ecologies, and in demonstrating that mediators are essential for maintaining momentum, negotiating barriers and creating opportunities for collective action. Building on Hernberg & Hyysalo (2024), the present study proposes an extended framework for the initiation and sustenance of ULLs with—catalyse and strategise; support and sustain; negotiate and balance; connect and reach out; and obstruct—as core dimensions of mediation within a civic resilience living lab.

Across the four case studies, different mediators strengthened civic resilience by curating diversity, building social capital, creating connectivity and enabling tight feedback loops (Lewis & Conaty 2012). They scaled up and scaled deep an existing civic network in Bagneux; established a new city-wide network linking local organisations, individuals and institutions through a pedagogical programme in Bucharest; deepened a life-long learning ecosystem between schools, families, students and a cultural institution in Stockholm; and expanded a civic activation process within a public housing neighbourhood in Gothenburg. In each context, mediators bridged institutional gaps, nurtured fragile relationships and made visible local knowledge that is often absent from formal planning or policy processes.

The analysis also highlights how ULLs can incubate new mediators. Through capacity-building, shared research methods and exposure to mediation tools, ULLs can empower actors to take on mediating roles beyond the project itself. Diverse ecologies of mediation emerge as essential: strategists and supporter/sustainers provide long-term stability; small civic organisations contribute agility and situated knowledge contributing essentially to enhancing network resilience; negotiators manage obstructions and institutional friction; and ‘double agents’ connect civic and institutional spheres while mitigating risks within the network. These elements collectively enable ULLs to reinforce civic resilience not as a fixed outcome but as an ongoing, relational and situated practice, despite the lack of support and recognition from public actors.

Taken together, the findings show that resilient ecologies of mediation are important for sustaining ULLs agency in the face of fragmented institutional environments, precarious resources and fluctuating participation. For policymakers, municipal actors, civic organisations, professionals and researchers, the proposed framework offers guidance for designing, supporting and governing ULLs that can endure beyond project cycles and contribute meaningfully to more adaptive, inclusive and resilient urban futures.

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## DATA ACCESSIBILITY

The data supporting the findings of this study consist of qualitative materials (interviews, field notes, workshop documentation and internal project records) that contain sensitive information about community participants. To protect anonymity and comply with ethical requirements, these data cannot be publicly shared. Non-identifiable excerpts or aggregated materials are available from the authors upon reasonable request.

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