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Christian Allmer

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Ass.-Prof. i. R. Mag. Dr. Walter
Matznetter, MSc

Abstract

Urban Living Labs (ULLs) are initiatives attempting to contribute to cities' sustainability transition with an experimental and collaborative approach to urban planning. In the labs, various urban actors - citizens, public administration, private companies, and research institutions – co-create innovations in multiple fields and test them in a real-life setting. Academia showed keen interest in ULLs in recent years, and many authors took their stance on the concept's definition, possibilities, and limitations. Yet, few studies have focused on the intersection of ULLs and the established local urban planning institutions.

I seek to address this gap in the literature through an exploratory study in Vienna, focusing on three ULLs – Smarter Together, aspern.mobil Lab and thinkport Vienna. By interviewing Viennese experts who work in ULLs, public administration or research, I discovered the challenges ULLs face in collaboration with established institutions. Furthermore, I could identify that the ULLs use tactics to overcome these challenges.

In conclusion, the ULLs and Vienna's administration aim to position the labs closer to the institutional order of the city. By doing so, they expect the labs' work to be more efficient and beneficial for urban sustainability in Vienna. On the other hand, the ULLs risk forfeiting transformative potential if they further align with the established institutional order. Further research should examine which level of institutionalization is best to support sustainable outcomes.

Kurzfassung

Urban Living Labs (ULLs) sind Initiativen mit experimenteller und kollaborativer Herangehensweise an Stadtplanung, die darauf ausgelegt sind, zur Nachhaltigkeitstransformation in Städten beizutragen. In den Labs kommen verschiedenste städtische Akteure (Bewohner, Forschungseinrichtungen, sowie Einrichtungen der privaten und öffentlichen Hand) zusammen, um gemeinsam auf co-kreative Weise innovative Ideen zu entwickeln, und diese in einem realitätstreuen Umfeld zu testen. In den letzten Jahren hat die Wissenschaft reges Interesse an ULLs gezeigt, und viele Autoren haben sich mit der Definition, den Möglichkeiten und den Grenzen des Konzepts befasst. Bislang wurde jedoch der Zusammenarbeit von ULLs und etablierten Institutionen der lokalen Stadtplanung wenig Aufmerksamkeit entgegengebracht.

Mittels einer explorativen Studie in Wien, die sich auf drei lokale ULLs – Smarter Together, aspern.mobil Lab und thinkport Vienna – fokussiert, adressiere ich diese Literaturlücke, und möchte zu ihrer Schließung beitragen. Durch Interviews mit Experten die in ULLs, Forschung, oder öffentlicher Verwaltung tätig sind, konnte ich die Herausforderung mit denen die ULLs in der Zusammenarbeit mit etablierten Institutionen der Stadtplanung konfrontiert sind erkennen. Des Weiteren habe ich Taktiken der ULLs für die Bewältigung der erwähnten Herausforderungen identifiziert.

Zusammenfassend ist zu erwähnen, dass sowohl ULLs als auch die Wiener Verwaltung versuchen die Labs stärker in die institutionelle Ordnung einzubinden. Dadurch wird erwartet, dass die ULLs effizienter zur städtischen Nachhaltigkeit in Wien beitragen können. Andererseits beinhaltet diese Institutionalisierung auch das Risiko des Verlusts von Transformationspotenzial, falls die ULLs zu stark an die Wiener Verwaltung angepasst werden. Zukünftige Forschungsprojekte, sollten sich der Frage, welches Ausmaß der Institutionalisierung richtig ist, um nachhaltige Resultate zu ermöglichen, annehmen.

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1. Introduction

Many wicked global problems like climate change, greenhouse gas emissions, loss of biodiversity, energy consumption, or food and water security are *urban* at their core (Grimm et al., 2008). Additionally, the urban population is growing further, with estimations that by 2050, two-thirds of the global population will live in cities, which will aggravate the intensity of the existing problems (United Nations et al., 2019). Urban decision-makers increasingly understand that solving these problems will be less a matter of technical fixes or collecting more data (Voytenko et al., 2016). Instead, it will be decisive to create holistic approaches that include many interconnected urban actors and practices to achieve the necessary transformation towards sustainability (Wolfram et al., 2019). This study revolves around *Urban Living Labs* as a method that aims to contribute to urban sustainability and solve contemporary urban issues.

Living Labs first appeared in academic research after Finland's European Council presidency in 2006. During this six-months-period, ENoLL (European Network of Living Labs) was founded, which initiated a surge of Living Lab projects throughout the European Union (ENoLL, n.d.). Literature that specifically thematizes Urban Living Labs (ULLs) – a subgroup of Living Labs that focuses on urban sustainability - has mainly emerged after 2015. Many researchers attest to this concept the power to allow more stakeholder-inclusive urban planning. But the idea also holds risks – in many cases, experiments like ULLs only reinforce existing power structures and support the position of strong stakeholders (Karvonen et al., 2014). The literature does not sufficiently address how ULLs impact the existing hierarchy of urban planning decisions in the cities they are operating in (von Wirth et al., 2019). With my research, I want to address this existing gap in the literature by interviewing experts involved in ULLs to understand in detail which tactics ULLs use to influence urban planning institutions in the city of Vienna.

1.1 Research question

For this research, I am studying the cooperation between ULLs and the urban planning institutions in Vienna. By interviewing experts who work in ULLs, public administration or research, I intend to learn about the expectations towards ULLs, the challenges and obstacles in collaborating with public institutions, and the tactics ULLs in Vienna use to overcome those obstacles.

Research question:

How do Urban Living Labs meet challenges and overcome difficulties in the cooperation with institutions of urban planning in Vienna?

Sub–research questions for theoretical research:

- Why are cities experimenting in “Living Labs”?
- What is an Urban Living Lab?
- How are Urban Living Labs related to urban planning?

Sub–research questions for empirical research:

- Which narrative surrounds Urban Living Labs in Vienna?
- What do Vienna’s civil servants expect from the work of ULLs?
- What are specific challenges for ULLs in their cooperation with the administration of the City of Vienna?

1.2 Approach and structure

I structured this study to provide a narrative of how the work of ULLs influences established urban planning institutions in Vienna. In the initial literature review, I approach the topic from a theoretical standpoint and explain what ULLs are and how they are related to urban planning. Knowing this context is necessary for the reader to understand the relevance of this paper and its empirical part.

In the empirical part of the paper, I first introduce the situation in Vienna, the relevant ULLs, and the urban planning approach of the city. After that, I present the findings I gained through my empirical research, i.e., expectation towards ULLs, challenges for ULLs, and tactics ULLs use to overcome the challenges. In the following discussion, I relate the findings to existing literature and conclude with hindsight on the study results. Furthermore, I explain how ULLs meet challenges in cooperation with urban planning institutions in Vienna to unfold their potential effects on urban sustainability in Vienna.

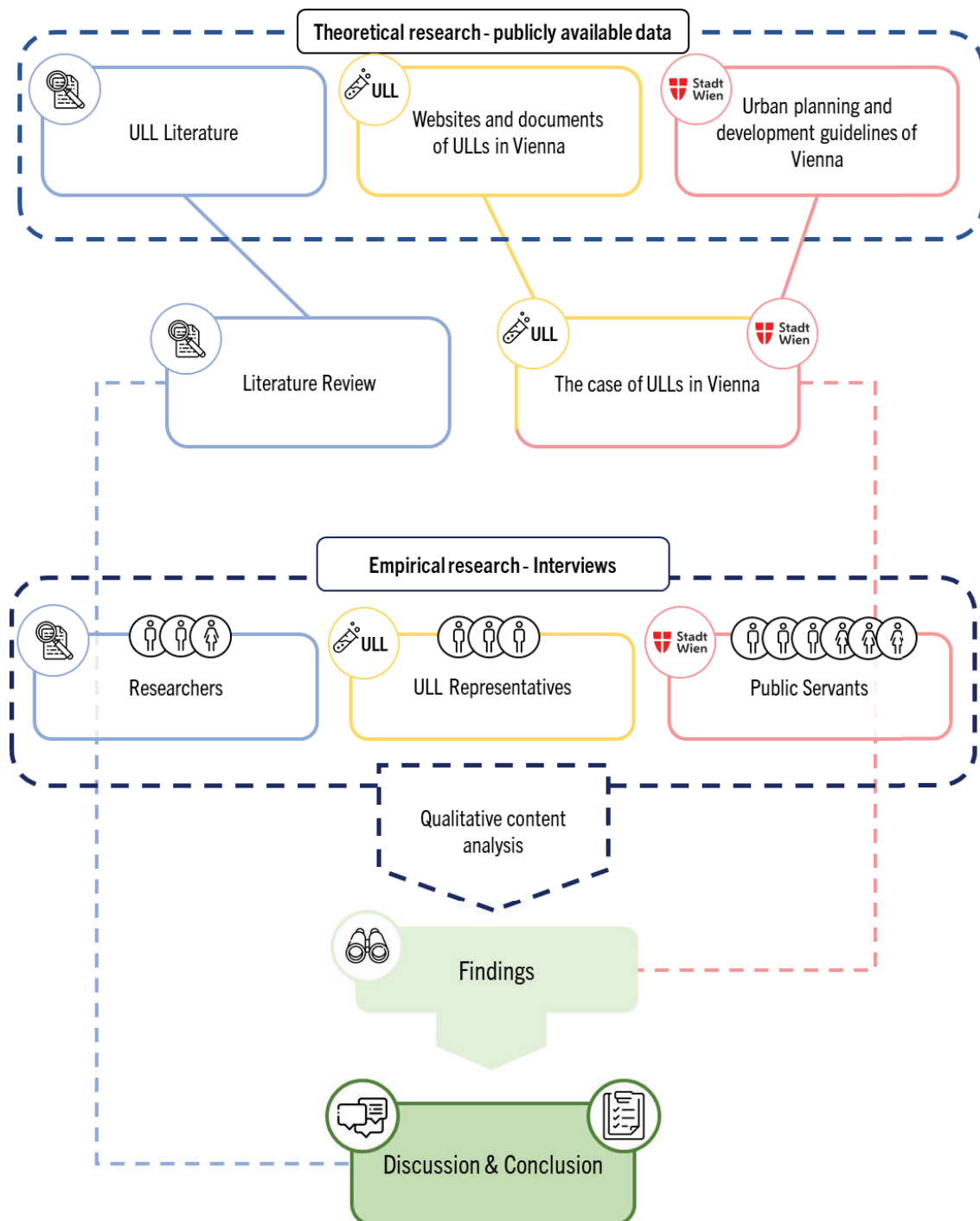


Figure 1: Flow chart of this thesis' structure (visualization by author, with icons designed by freepik and Vitaly Gorbachov from flaticon; Man and Woman icon by Jo from the Noun Project)

2. Theoretical framework

To approach this study of ULLs, I aim to build a theoretical framework on an existing base of knowledge in the fields of urban experimentation, the definition of the ULL concept, and its relation to urban planning. In the following literature review, I will first explain why city governments conduct urban experiments and then discuss current definitions of the ULL concept. Lastly, I aim to draw a connection between ULLs and urban planning and give an overview of the concept's limitations.

Sub-RQs for theoretical research:

- Why are cities experimenting in “Living Labs”?
- What is an Urban Living Lab?
- How are Urban Living Labs related to urban planning?

2.1 Why are cities experimenting?

Cities have become the frontlines of humanity's fight against the problems of global urbanization. Issues related to climate change, economic under-development, and social inequality are essentially *urban* – and so are their solutions. We have realized that “business as usual” can no longer be the way to move forward. That initiated a search for new ways to organize, plan, manage and live in cities (Evans et al., 2016a). One of these new ways is experimentation – and it is gaining traction in cities all over the globe as a governance model to trigger alternatives and orchestrate change (Bulkeley & Castán Broto, 2012). Government representatives, urban planners, and private actors are experimenting with starting innovation activities to find possible future alternatives for urban development, social cohesion, or environmental protection (Karvonen et al., 2014).

Urban experimentation is by no means a newly founded concept. Instead, cities have constantly been experimenting throughout history (Bulkeley & Castán Broto, 2012). The Chicago School of the 1920s represents one of the most known historical examples for experimentation in cities. Robert Park and his colleagues conceptualized Chicago as a real-life laboratory for social science research (Park, 1929). However, the proof for the existence of urban experiments goes back further. In the nineteenth century, modern urban ideals originated from various interventions such as constructing large-scale infrastructure networks for water, wastewater, electricity, and communications and local and regional government bureaucracies regulating public health economic activity. Also technologies like elevators, automobiles, and flush toilets originated at that time. All these interventions were not implemented by carefully planned and executed strategies. They were much rather part of an open-ended trial-and-error process that, in sum, lead to the contemporary city. From this perspective, Karvonen and colleagues argue that conducting urban experiments is the norm rather than the exception – how cities change and evolve (Karvonen et al., 2014).

The underlying concept of these experiments relies on the notions of innovation and creativity (individually and collectively). At the same time, experimentation allows for shifting the

emphasis on sustainability away from distant long-term goals and complex policies towards achievable and concrete actions that a variety of urban stakeholders can take. Urban experimentation can be distinguished conceptionally from conventional urban developments or policies by emphasizing learning from real-world interventions. It offers a framework to arrange instruments, materials, and people to induce change in a controlled manner and subsequently evaluate and learn from those changes (Karvonen & van Heur, 2014).

ULLs are one way to experiment in cities. It appears clear across several cases that ULLs - as suggested by Karvonen et al. - bring existing constellations of urban actors together in new ways to create more collaborative and experimental forms of urban development (Voytenko et al., 2016). By offering new possibilities for urban developments, experimentation redistributes the power structure of urban stakeholders, empowering some while weakening others and allowing new bodies of knowledge and evidence in the process (Karvonen et al., 2014). In the following section, I will explain ULLs in further detail.

2.2 Defining Urban Living Labs

The term “Urban Living Lab” has only emerged recently in the late 2000s, but the concept increasingly gains attention in academia, and various authors took a stance at defining it (Bulkeley et al., 2016, 2019; Chron  r et al., 2019; Nesti, 2018; Steen & van Bueren, 2017). In this chapter, I will give an overview of the defining characteristics of ULLs.

To understand what a ULL is, one first needs to understand what a “Living Lab” is: Professor William Mitchell at MIT¹ created the concept as a tool to observe users in a smart home – the living lab - for a certain period. Volunteers lived in the smart home for several weeks, monitored by sensors and semi-automated activity recognition. This allowed determining where the occupants were and what they were doing. The researchers used the results for the improvement of proactive health systems. European researchers evolved the method for enhancing innovation, inclusion, and usability of ICT applications in society (Bergvall-K  reborn et al., 2009). The initial intention behind Living Labs was to open the innovation process for a product or service, mainly within the corporate sector, to involve actors besides the producing company itself. The focus of these early Living Labs was on how end-users experience products and services in their daily life context. They aimed to make their design a user-centric process instead of a product-centric process that was state of the art. Living Labs emerged from a need for new methods and settings that allowed further integration of the work of some frontrunners, those that were exploring open innovation theory (Chesbrough, 2003; Puerari et al., 2018).

The essential features of Living Labs and *Urban Living Labs* strongly align. We can assume that the general characteristics of Living Labs and suggestions for their development and operation are widely applicable to ULLs. The divergence of Living Labs and Urban Living Labs lies in the explicit focus on finding solutions that positively impact urban sustainability. Including this clear goal in the statement of problems and objectives of a living lab is a specific

¹ Massachusetts Institute of Technology

feature of ULLs – a characteristic frequently referred to as the “urban” dimension. This added dimension multiplies the number of variables and relationships impacting the process and results of ULLs compared to “ordinary” Living Labs (Steen & van Bueren, 2017).

To contribute to sustainability on a local level, ULLs are embedded in geographical locations (Voytenko et al., 2016), often at a district or neighbourhood scale. Their sustainability-focused goals can be aiming towards the built-environment (Evans et al., 2016b; Evans & Karvonen, 2014), energy efficiency, ICT applications (Veeckman & van der Graaf, 2015), or mobility challenges (Joller & Varblane, 2016). The emergence of ULLs reflects a broader scientific shift towards transdisciplinarity (Karvonen & van Heur, 2014), and ULLs typically involve collaborations across multiple societal sectors (Trencher et al., 2018). The multi-actor involvement leads to a learning environment where urban stakeholders desire to develop real-world solutions to real-world problems. Public actors, private actors, users, and knowledge institutions participate in the Lab, where participants have equal decision-making power. The general aim of ULLs is to achieve innovative solutions and learnings through co-creation, developed in a real-life use context. The decision-making process should be an iterating loop with feedback rounds for every participant to communicate their ideas and concerns (Chronéer et al., 2019; JPIU Europe, 2016; Steen & van Bueren, 2017).

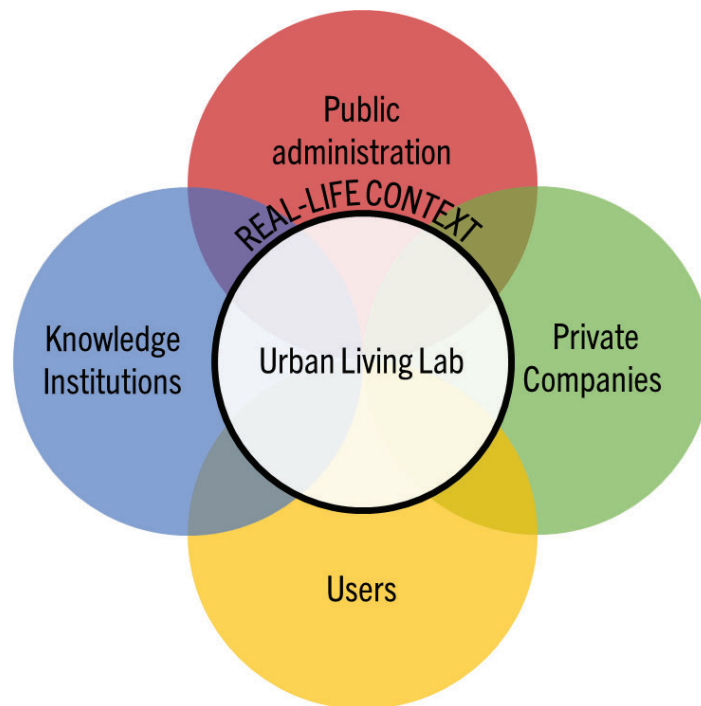


Figure 2: Key stakeholders of ULLs (graphic by author)

This kind of co-creative experimentation (i.e., trials of new technologies or social innovations) is central to ULLs (Karvonen & van Heur, 2014). The ethos of experimentation is driven by the understanding that old patterns are unsustainable and need to be replaced, that new is smarter and better, and, since no one yet knows what a sustainable urban environment looks like, much trial and error is needed to find out (Trencher et al., 2018).

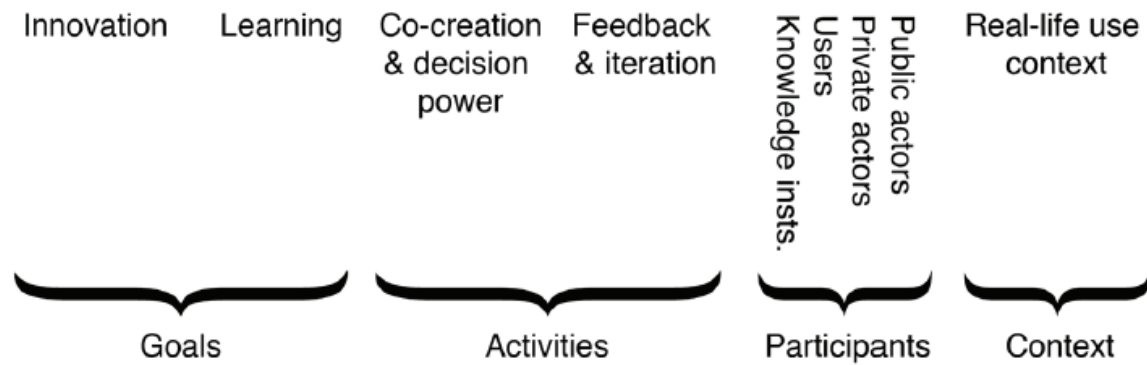


Figure 3: This table shows the nine core characteristics of ULLs, split into four dimensions (Steen & van Bueren, 2017)

Steen and van Bueren developed a list of core characteristics an initiative must fulfil to be called an “Urban Living Lab” (Figure 1). According to their study of 18 scientific papers on (Urban) Living Labs, only initiatives that show all nine characteristics can be considered a ULL. Furthermore, the authors argue that only projects that carry out development activities can be regarded as ULLs. Activities in other process phases (research, testing, implementation, and commercialization) are complementary (Rizzo et al., 2021). Therefore, in a ULL, innovation has to be developed with citizens and all relevant stakeholders (Steen & van Bueren, 2017).

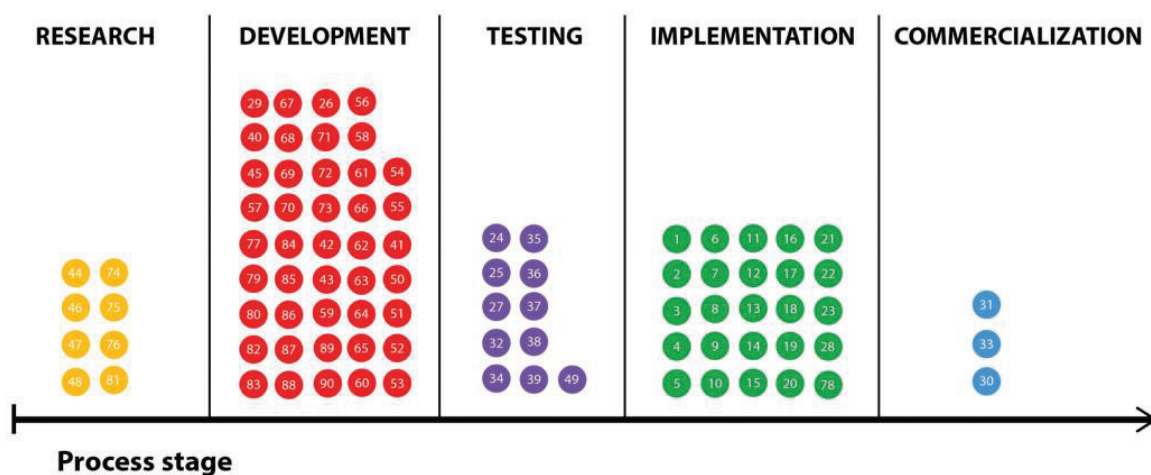


Figure 4: Classification along the process stage of 90 potential ULLs in Amsterdam (Steen & van Bueren, 2017)

2.2.1 Co-Creation in Urban Living Labs

“Co-creation” is one of the nine key characteristics of ULLs and can be generally defined as “making something together.” However, there is no joint agreement about a more detailed concept specification (de Koning et al., 2016). The definitions vary from an economic and customer-centric understanding focused on collective value production through specific interaction (Prahalad & Ramaswamy, 2004) to a focus on creating partnerships in public

service provision with citizens (Puerari et al., 2018; Voorberg et al., 2015) to relations of shared responsibility (Lelieveldt et al., 2009). For the case of ULLs, the latter direction is more fitting.

Kareborn and Stahlbrost call “co-creation of sustainable values” the aim of a Living Lab (Bergvall-Kåreborn & Ståhlbröst, 2009). They define Living Labs as a user-centric innovation environment based on everyday practices and research that eases interaction by including all relevant stakeholders in real-life situations. In this sense, co-creation is a methodology to carry out innovation and construct values shared between participants. Hence, (Urban) Living Labs are not only places where people that share the same values come together, but also a space for the co-creation of shared values (Dutilleu et al., 2010) that might foster innovation and broader systematic change (Puerari et al., 2018).

Puerari and her colleagues identify two primary purposes of co-creation which come into effect in ULLs – first *making* together – a situation where a group of people works together to achieve a goal or the output of a product, service, or process innovation. Or second, *learning* together – a situation where people collaborate to build knowledge together, learn from one another and create networks with other people in the group. Although labs often aim at both goals simultaneously, frequently, one of them prevails. When *making* is the primary purpose, a specific innovation goal or output is often sought after – this is also called “envisioned value creation.” With *learning* as the primary purpose, co-creation aims to create knowledge, innovation, and changes in the socio-technical or societal system. (Puerari et al., 2018).

2.3 Urban Living Labs and the sustainability transition

Many authors state that *urban sustainability* is the ultimate goal for ULLs, thereby contributing to realizing the sustainability transition (Bulkeley et al., 2016; Fuenfschilling et al., 2019; Voytenko et al., 2016). As the word *sustainability* appears inflationary in academia and policymaking, examining the concept is essential to understand the general narrative.

The Brundtland Report of 1987 was the initial spark for sustainability to become the concept many policies aimed for. Brundtland – the leader of the reporting commission – and her colleagues asked themselves how the global community can achieve the aspirations of a better life while harmonizing them with care for the natural environment (Kuhlman & Farrington, 2010). They found the answer in what the commission calls sustainable development: “[...] development that meets the needs of the present without compromising the ability for future generations to meet their own needs” (World Commission on Environment and Development, 1987).

Today, we see sustainability mainly as an interplay of three dimensions: social, economic, and environmental (Robert et al., 2005). Also, the United Nations adopted this definition in the 2030 Agenda for Sustainable Development: “We are committed to achieving sustainable development in its three dimensions – economic, social and environmental – in a balanced and integrated manner” (United Nations, 2015).

The split in three dimensions originated from Elkington’s Triple Bottom Line concept, which aimed for the social responsibility of business corporations. To the traditional bottom line

(profit), he added awareness for the environment (the planet) as well as good treatment of people (the social dimension) (Elkington, 1994). Yet being widely accepted, the adaption of the three-dimensional (social, economic, environmental) sustainability definition that weights all dimensions equally has faced criticism, specifically for the split of social and economic aspects as both are closely intertwined. Furthermore, socioeconomic factors are mainly related to the current generation, while environmental factors care about the future (Kuhlman & Farrington, 2010). This means the former appears twice as important as the latter in this approach, disregarding the Brundtland report requiring present-day development not to happen at the expense of future generations (Kuhlman & Farrington, 2010).

Alternatively to the triple dimension model, Pearce and colleagues (Pearce et al., 1989) proposed a different approach by defining weak (1) and strong (2) sustainability.

- (1) That the next generation should inherit a stock of wealth, comprising man-made assets and environmental assets, no less than the stock inherited by the previous generation.
- (2) That the next generation should inherit a stock of environmental assets no less than the stock inherited by the previous generation.

Furthermore, Kuhlman and Farrington (2010) explain that both weak and strong sustainability should be present in the debate. Some natural resources must fall under the requirements of strong sustainability, while others under weak, depending on their interchangeability with capital. The use of fossil fuel resources is a matter of weak sustainability, as other energy sources are provided instead. We are not necessarily obliged to leave the next generation the same stock of petroleum we inherited. On the other hand, the loss of biodiversity cannot be outweighed by capital at the current state of science and is, therefore, a matter of strong sustainability (Kuhlman & Farrington, 2010).

To achieve sustainability beyond individual efforts, holistically approaching the matter will be necessary. Academia discusses these holistic efforts as *sustainability transitions*, which Grin and colleagues (Grin et al., 2011) define as “radical transformation towards a sustainable society as a response to a number of persistent problems confronting contemporary modern societies. These persistent problems express themselves into crisis, such as food, water, mobility and health crises, as well as energy and climate crisis” (Grin et al., 2011).

ULLs are interwoven into the discussion of sustainability transitions. The concept can be applied to multiple contemporary problems and involves various urban stakeholders that are actively aware of the issues at stake. More specifically, ULLs also contribute to the 17 United Nations Sustainable Development Goals (SDGs). As the SDGs are interrelated, the work of ULLs is beneficial for multiple goals concerning the industry, innovation and infrastructure (SDG 9), Sustainable cities and communities (SDG 11), Climate Action (SDG 13), and Partnership for the goals (SDG 17) (United Nations, 2015). Compagnucci and colleagues found in their exploratory study involving multiple labs that the labs specifically promoted the SDG

targets 9.5², 11. a³, 17.16⁴, and 17.17⁵. The labs are not always framing the SDGs as their priorities, but SDG-related outcomes more often happen as side effects of the labs' activities (Compagnucci et al., 2021).

2.4 The roles of different actors in Urban Living Labs

2.4.1 Roles of municipalities

The leading public actors interacting in ULLs are the local municipalities and their departments. The municipality often has a specific and more influential role than other actors because of the democratic legitimacy as a decision-making body (Kronsell & Mukhtar-Landgren, 2018). That fact gives municipalities both input-legitimacy (because of democratic accountability) and output-legitimacy (because of the capacity to implement) (Kronsell, 2013).

The municipality is not a unitary actor; it usually consists of several sub-divisions with diverging interests, resources, and priorities. Therefore, the municipalities may take different roles, and their roles might shift over time. Kronsell and Mukhtar-Landgren defined three general roles municipalities take in ULLs, based on a study of 50 case studies: (1) promoter, (2) enabler, (3) partner, and (4) non-role (Kronsell & Mukhtar-Landgren, 2018).

- (1) The *promoter role* varies from leading the lab to initiating it by seeking financial funding and other actors to implement new policies. The municipality enacting leadership by using its legal authority to govern the collaboration, including leadership only at the initiation phase, indicates the role of *promoter*. When the municipality acts as a *promoter*, the ULLs are often closely related to core municipal operations like urban planning or development projects in which the municipality owns the involved sites. Urban re-development, in general, is central to most ULLs where the municipality takes the promoter role, which does not mean that it orchestrates every step of the process but instead gives space for innovative ways to implement ideas.
- (2) At this point, the role of promoter and enabler can overlap. The enabler role indicates that the municipality helps to create conditions or physical space by facilitating collaboration or support. This role varies from creating autonomy for actors (for example, via funding or access to facilities/infrastructure of the municipality) to creating networks (by connecting actors to each other) or facilitating collaborations that might be helpful for the Labs. An example is the "Malmö Innovation Platform",

² Target 9.5 Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending

³ Target 11.a Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning

⁴ Target 17.6 Enhance the global partnership for sustainable development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the sustainable development goals in all countries, in particular developing countries

⁵ Target 17.17 Encourage and promote effective public, public-private and civil society partnerships, building on the experiences and resourcing strategies of partnerships (United Nations, 2015)

where the City of Malmö took the enabler role by encouraging the involved stakeholders to collaborate in new and innovative ways.

- (3) The *partner role* is characterized by shared leadership and participation on equal terms, where all collaborating partners – including the municipality – have a dedicated function. In other words, as a partner, the municipality takes the same role as most other “partners”. The partner stakeholders can express their role in varying nuances of strong or silent partners. Strong partners include actors of joint leadership, while silent partners are included in the process but not actively participating in activities.
- (4) Municipalities can also take the so-called *non-role*. As the name indicates, it is also possible for municipalities not to have any role in a ULL. If strong non-governmental actors (including citizen organizations or business ventures) or other governmental actors (federal, regional) exist in the lab, the municipality usually has the non-role. In this case, the municipality is rather a recipient than a participant in the lab's activities.

2.4.2 Roles of users

User involvement is a critical element in the operation and success of ULLs. The literature often pictures users as co-creators who shape the outcomes of ULLs with their knowledge and local experience. The transformative potential for sustainability is interconnected with user participation (Menny et al., 2018).

Menny and colleagues analyzed the roles of users based on four ULL case studies. They defined four categories of user involvement: (1) co-creation, (2) consultation, (3) information, (4) no participation (Menny et al., 2018). These roles are related to Arnstein’s ladder of citizen participation (Arnstein, 1969) (Figure 2).

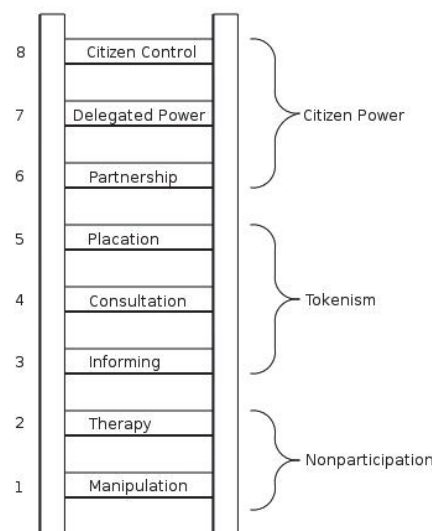


Figure 5: The ladder shows eight possible levels of citizen participation (Arnstein, 1969)

- (1) The *co-creation role* refers to the ability of citizens to actively engage in decision-making processes with at least equal power to influence these processes compared to other decision-making bodies. It is the highest level of user involvement in ULLs. Still,

I have to note that co-creation should not be the only level of user involvement. Instead, the labs should aim for a combination of different participation levels, which fit the Lab's goals. The co-creation role relates to level six (partnership) or level seven (delegated power) on the Arnstein ladder.

- (2) In the *consultation role*, communication with the citizens happens in a limited two-way communication flow. Users provide feedback to suggestions from other participants of the ULL. They may also actively give ideas and inputs, which the other participants might or might not consider for the final result. The consultation role relates to level four (consultation) on the Arnstein ladder.
- (3) In the *information role*, citizens receive easily accessible and objective information about the work of the ULL in a one-way information flow. Citizens cannot engage actively or give input to the project, which relates to level three (informing) on the Arnstein ladder and represents a form of tokenism.
- (4) In case of *no participation*, users are either excluded from processes happening in the Lab, or fake-included without having significant power. *No participation* relates to the two bottom levels (manipulation, therapy) of the Arnstein ladder and counters the essential ULL feature of “co-creation.”

2.5 Limitations of Urban Living Labs

Although ULLs are generally met with positivity by academia and practitioners, some authors raise doubts about social inclusiveness, equal distribution of benefits, the generally unquestioned acceptance of development paradigms with a sustainable façade (Karvonen & van Heur, 2014; von Wirth et al., 2019). Authors also warn of creating a scattered landscape of unrelated urban projects, leading to what Cugurullo called “Frankenstein urbanism” (Cugurullo, 2018). In the same vein, Concilio and Rizzo (2016) raise the awareness of what Warner (2011) calls the “Swiss cheese effect.” Warner refers to a system of services that government-supported clubs carry out. This system works well for those in the club, while for outsiders, the public sector may start to look like a Swiss cheese in which the clubs represent the holes, and the rest of the public sector represents the connective cheese that holds the system together. In this world of fragmented government initiatives, the connecting tissue might become thinner than ever. The local government is at risk of becoming dry Swiss cheese around the edges of the (club) holes. Certainly, ULLs are by no means “holes” in the local government system. Still, each innovation or experiment they introduce can be a microfracture and change how public services work in a city. If these initiatives grow in number and diversity, they may end up undermining and weakening the whole city by fragmenting its governance system (Concilio & Rizzo, 2016).

Von Wirth and colleagues also warn to stay conscious that, despite the promise of ULLs to leverage participation and inclusive decision-making through the collaboration of various urban stakeholders, there is at the same time the risk of “organized irresponsibility” (Beck, 2009; von Wirth et al., 2019). They argue that the collaboration and co-existence of multiple stakeholders in a project without a clear last instance of decision-making can waste resources because none of the stakeholders feels accountable for the initiative's outcome.

Besides the diversity of stakeholders, the ULL scale has a crucial influence on the outcomes. ULLs are primarily conducted on a neighbourhood scale rather than at the wide city scale. Rizzo and others identify this fact as a root for misinterpreting the real scale of issues (Rizzo et al., 2021). Furthermore, ULLs face difficulties in scaling up their results found on a smaller scale. As Ersoy and Van Buren show in their study of three ULLs in Amsterdam, the transition labs have to go through to move from small-scale pilots to a broader embedding of their work is a fragile process. A formal framework does not support the process. This lack of a framework might lead to a contradiction between the scale and the context of the experiment, such as innovation that is only practical on a small scale (Ersoy & Van Bueren, 2020).

An extensive study of four European ULLs, conducted by researchers of the Joint Programming Initiative (JPI) Urban Europe, focused on the constraint of upscaling the results. The study found that the ULLs studied mainly focused on small-scale performance testing and the interaction between technology and user, ignoring the social-institutional context of the situation. This bears the risk that broader implementation outside the lab, which is required for the full innovative effect, turns out to be more difficult than anticipated. The root of this problem is that mainly “smart citizens” with the cognitive and material resources to consume smart services participate in the labs. The consequence can be a poorer or less intuitive design, and therefore socially excluding since citizens without “smart” skills or resources cannot use the new services. Therefore, addressing shortcomings in the social inclusiveness of a ULL is a precondition to effective upscaling and broader implementation of the results (Dijk et al., 2019).

2.6 Relating Urban Living Labs to Urban Planning

Present-day developments in the field of urban planning and design, both in academia and practice, have heavily highlighted the relevance of “user involvement” and active interaction with various urban stakeholders (von Wirth et al., 2019). Facing the wicked challenges of the contemporary urban age and global urbanization, planning theorists like Gleeson (2012) proposed that planning found “new aspirations and rationales.” In the same Carroli (2018) suggested multiple possibilities by which urban planning engages with ongoing transitions. Raynor and colleagues note that planning processes have to be more responsive, adaptable and participatory, but can be characterized by different methodologies, priorities, goals, and attitudes towards agreements or experimentation (Raynor et al., 2017). It seems that these parallel discussions have been left unnoticed by the literature concerning ULLs, but require increased visibility and acknowledgement to improve the understanding of the role of ULLs in leading urban sustainability transitions “beyond the experiment,” as von Wirth et al. (2019) argue.

However, one can argue that the ULL concept fits in the field of communicative planning (Healey, 1992; Scholl & Kemp, 2016). I will elaborate on that claim in the following section.

2.6.1 Communicative and collaborative planning theory

In her early nineteen-nineties essay on the communicative turn in urban planning, Patsy Healey describes how the contemporary idea of urban planning is rooted in the enlightenment tradition of modernity. This liberated people from the intellectual chains of religious faith and the political tyranny of despots. Healey believed that free individuals who live in these modern and democratic societies could combine their strengths to manage their collective affairs. This way of acting would allow for a better world with increased human happiness and welfare (Healey, 1992). This modern idea of planning is closely connected to democratic concepts and progression. It focuses on finding ways in which citizens can manage their collective concerns through acting together (Friedmann, 1987). Healey defines communicative planning as a respectful, argumentative, and new form of *planning through debate* appropriated to the failing concept of “pure reason,” celebrated by modernist planners (Healey, 1992). Only a few years later, she builds her theory further and suggests introducing “collaborative planning” to the urban planning practices in the United Kingdom. She describes collaborative planning as a more effective approach to planning in the current multi-stakeholder society. Her approach includes, among other processes, building up horizontal networks and partnerships between actors; finding ways to involve stakeholders; and creating “arenas” for open debate on strategic issues (Healey, 1998) – ideas which ULLs creators later picked up.

Elaborating on Healey’s concept, Booher and Innes present the “Network Power Concept” as a theory in the field of collaborative planning. Network power is created through actors (or agents) who collaborate to adapt their environment advantageously and emerges from the communication and collaboration of individuals, public and private agencies, and businesses in society. It grows as these actors identify their relations and interdependencies to unlock new potential. In this process, innovations and unique responses to environmental issues can emerge through network power. To identify systems that can create network power, the authors defined the DIAD (Diversity, interdependence, and authentic dialogue) network dynamics. If a network shows all three characteristics, network power is the resulting life force of patterned action, learning, adaptation, and reproduction (Figure 3) (Booher & Innes, 2002).

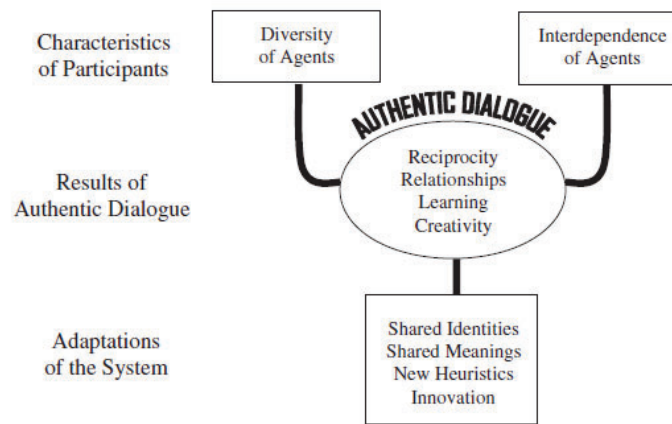


Figure 6: Diversity, Interdependence, Authentic Dialogue - the DIAD network dynamics (Booher & Innes, 2002); Many segments of the concept resemble key characteristics of ULLs.

Collaborative forms of planning align with innovation processes as they happen in ULLs. No single actor is in complete control of the process, and actions are carried out based on learnings-oriented dialogue between the different actors. Innovations for urban projects differ from innovations for consumers to the effect that the public interest needs to be safeguarded. Therefore, the government often takes a participating and overlooking role in urban innovation projects (Scholl & Kemp, 2016).

ULLs do not yet have a unified definition and have not clearly been associated with an area of urban planning theory. However, the concept widely aligns with the general idea of collaborative and communicative planning and represents the DIAD network dynamics. ULLs include a diversity of stakeholders (D) that interdepend (I) on each other in the urban context. Through the real-life setting and (ideally) equal decision-making power in the Lab, the different actors can have an authentic dialogue (AD) about the urban challenges to be discussed. By learning, networking, and co-creating together, the participants can create innovative solutions that can be applied in the city. Therefore ULLs can be categorized as a collaborative/communicative form of planning and ideally represents DIAD network dynamics (Scholl & Kemp, 2016).

2.7 Concluding thoughts on the literature review

In the previous section, I discovered why cities conduct experiments and what the ULL concept represents. Furthermore, I linked the concept to urban planning theory from the 1990s and early 2000s, showing that the general idea of the ULL concept is by no means new or standing alone. In the following paragraphs, I will reflect on the concept's potential and explain the base for my empirical research.

According to Puerari and colleagues, ULLs prove themselves to be potentially effective tools to bring different stakeholders together in experiments on new solutions around specific urban issues and challenges. Thereby, they can provide a platform for municipalities to establish new

services or skills by collaborating with local actors in an exploratory and co-creative way and for citizens to be empowered and take on a more prominent role in the urban decision-making process. However, although the innovation process in ULLs is designed for a particular purpose, it might not have any influence on the change in the existing structures (Puerari et al., 2018). The produced services or social connections need to be carried further than just between the direct participants of the lab to achieve broader systemic change (Nevens et al., 2013). Therefore, there exists considerable potential for co-creation across the borders of different labs. So far, ULLs are often isolated local initiatives, while embedding them in a broader system could help lift their potentials. Puerari and colleagues (2018) suggest that creating a city-wide portfolio of ULLs could increase the impact and visibility of every lab and lead to better knowledge development and learning across Labs (Puerari et al., 2018). Evans et al. (2021) confirm this suggestion in the paper “How cities learn”. Accordingly, their interviewees stated the importance of sharing knowledge and experiences between cities throughout the Lab-cycle – before, during, and after projects. Rather than each lab in every city trying to figure out the right way to conduct ULLs, they could rely on the existing resource pool and expertise (Evans et al., 2021).

Furthermore, Evans and colleagues identified a tension around the effectiveness of ULLs: The ultimate goal of urban innovation is to stimulate transitions for a better urban future, but little attention is paid to how innovation can change the institutions business-as-usual. The authors argue for a greater role of the municipalities in ULLs. They believe that the funding bodies have underestimated the importance of institutional transformation and simply assumed that organizations would change with the innovations that ULLs produce. Twenty years of investment into urban innovation shows evidence that they do not change (Evans et al., 2021).

ULLs can only realize their transformative potential when their lessons are applied across sectors, actors, and even geographical boundaries (von Wirth et al., 2019). With my research, I am addressing this issue by identifying tactics ULLs use to influence local urban planning actors to unlock transformative potential and initiate institutional change.

3. Methodology

Though with this thesis, I do not endeavour to represent relations between city authorities and ULLs in general, I claim that the case of Vienna is a practical example to showcase how ULLs and more established institutions of urban planning cooperate. The Labs already exist for around five years and are well known by other institutions of urban planning, and still, their bonds and relations are not entirely settled.

Secondly, Vienna is notoriously collecting titles for the quality of life it provides for its citizens and is a best practice example for smart city strategies. This fact makes Vienna relevant as a case to research a relatively new concept like ULLs.

Another reason why I chose Vienna as my case study was the responsiveness of relevant actors. While it was difficult to get a response from lab employees, let alone civil servants in other cities like Copenhagen, the Viennese actors were very responsive and approachable. Therefore, I could interview high-ranked civil servants of the City of Vienna, leading representatives of the most relevant ULLs in the city and experienced researchers. This range of interviewees allowed me to reach an understanding, which would not be possible with a less diverse group of interviewees.

Lastly, I choose Vienna for my case study because my mother tongue is German, and I was born and raised in Austria. The cultural and linguistic proximity to my case helped me approach experts and analyze and understand the data.

3.1 Selection of the ULLs

The choice of ULLs that I included in this study was essential for its outcome. Through a simple online research, I identified initiatives in Vienna that might fit the ULL characteristics defined by Steen and van Bueren (2017).

	Goals		Activities		Participants				Context	Process stage
	Innovation	Learning	Co-creation & decision power	Feedback & iteration	Public actors	Private actors	Users	Knowledge institutions	Real-life context	development
Smarter Together	●●	●●	●●	●●●	●●●	●●	●●●	●	●●●	●
Thinkport VIENNA	●●●	●●	●●	●●●	●●	●●	●	●●●	●●●	●●●
Aspern.mobil Lab	●●●	●●	●●●	●●●	●	●●	●●●	●●●	●●●	●●●

●●● strongly applicable

●● moderately applicable

● slightly applicable

Table 1: Applicability of ULL characteristics for the three chosen initiatives in Vienna, based on Steen and van Bueren (2017); table by author

In the next step, I examined the applicability of Steen and van Bueren's characteristics for each project based on information from websites and reports of the initiatives. My examination (table 1) shows that all three initiatives can be categorized as ULL, as they meet all characteristics to various but sufficient extent. As this study's focus is not to analyze the quality of different lab characteristics, I will not further elaborate on this matter.

3.2 Expert interviews and selection of interviewees

Conducting expert interviews represents my primary method of empirical data collection. My aim for the interviews was to collect answers from a wide range of experts. Although I could not talk to all my desired experts, the group of interviewees gave me deep insight into the current state of the collaboration between ULLs and the established urban planning institutions in Vienna. Furthermore, I was aiming for *saturation* of my empirical data. Following Guest, Bunce, and Johnson, saturation marks the point when "no new information or themes are observed in the data." The authors suggest that twelve interviews are sufficient for most research to understand common perceptions and experiences among a relatively homogenous group (Guest et al., 2006). Therefore, I interviewed twelve experts in eleven interviews (I. Homeier and C. Kichmair gave a joint interview), listed on the following table.

	Interviewee	Organization	Position
	Homeier Ina	City of Vienna (MA 18)	Head of Smart City Vienna project office
	Häusler Dieter	City of Vienna (MA 18)	Mobility strategy officer
	Kirchmair Christina	City of Vienna (MA 18)	Smart city strategy officer
	Madreiter Thomas	City of Vienna	Director of urban planning
	Reiser Lena	Vienna Business Agency	Agent for technology services
	Thell Gerrit	City of Vienna (MA 23)	Project manager Vienna 2030
	Kirchberger Christoph	aspermobil LAB	Project coordinator
	Rojko Peter	thinkport VIENNA	Development & Network
	Schnabl Bojan	City of Vienna (MA 25) – Smarter Together	Smarter Together Communication manager
	Riegler Johannes	JPI Urban Europe	Stakeholder Involvement Officer
	Suitner Johannes	TU Vienna	Postdoc researcher spatial planning
	Tiefenthaler Brigitte	Technopolis Group	Principle consultant

Table 2: List of interviewees and their position in the respective organization

I conducted the interviews with a semi-structured approach, following a short catalogue of questions. Depending on the interviewees' position and relation to ULLs, I slightly altered and fitted the questions to maximize the interviews' effectiveness. Furthermore, I conducted all interviews in German. Therefore, all quotes from interviewees listed in Figure 6 in this study were translated from German to English⁶.

Structure of interview questions:

⁶ To see the original German transcript, please contact me via christian.allmer95@gmail.com

- Would you please describe your work and how it relates to Urban Living Labs?
- How would you describe the collaboration between Urban Living Labs and urban planning institutions in Vienna?
 - o Where do you see the biggest challenges in the collaboration between Urban Living Labs and urban planning institutions in Vienna?
- Do you think that the work of Urban Living Labs influences urban planning decisions in Vienna? If yes, why?
- What were the most significant achievements of Urban Living Labs in Vienna so far, in your opinion?
- How will the situation of Urban Living Labs develop in the future, in your opinion?

3.3 Qualitative Content Analysis

I used the qualitative content analysis following Mayring's (2010) model to standardize the content analysis of the interview data that I collected. Creating categories is a central and sensitive process for further work to structure data for qualitative content analysis. One could define the categories deductive, basing them on theoretical considerations or the current state of research in the field. An inductive category formation (Mayring, 2010, p.83-85) fits the cause better for the study at hand, as the categories are directly derived from the collected data. Following, I describe the process of defining categories in which I sorted my material.

- (1) *Defining the material and goal of the analysis:* My material consisted of the transcripts of my interviews with twelve experts. The goal of my analysis was to answer my research questions.
 - (2) *Defining the selection criteria and level of abstraction:* The selection criteria, in my case, was finding relation to my research questions in a sentence. Then I abstracted the sentences to an understandable short phrase, for example, "Institutionalization of the collaboration."
 - (3) *Material processing; category formation; subsumption of categories:* In this step, one reads through the material at hand to create a list of categories. The author suggests interrupting that process at 10-50% of the total material to revise the categories and to adjust and or merge redundant categories.
 - (4) *Final material processing.* After adjusting the categories, I read through my whole data to categorize all of it. I ended up with 26 categories in which the most important answers of the interviewees ideally reflected.
 - (5) *Interpretation, Analysis:* I represent this step in my discussion section (chapter 6.).
- *NOTE: Coding in NVivo 12:* To effectively digitalize the coding process, I used NVIVO 12. Besides many other features, it allows creating an extensive structure of related categories and sub-categories directly linked to the data sources. This structure helped keep an overview of the whole material to avoid getting lost in the extensive raw data.

By organizing my data with this process, I created a fruitful base for presenting my findings in chapter 5, where I explain the essential statements of my interviewees.

4. The Case of Vienna

In 2019 Vienna was awarded the title “most liveable city in the world” by the Mercer consulting agency for the 10th time in a row (Stadt Wien, 2019). An essential base for the general development of Vienna is the constancy of political leadership in the city. Vienna shows significant political stability and has a long history of social democratic mayors. Since the creation of the Austrian First Republic after World War I in 1919, the social democratic leadership was only interrupted from 1934 until 1945, first by the Austro-Fascist regime and directly afterwards by the Nazi regime during World War II. After the formation of the second republic in 1945, all Viennese mayors were members of the social democratic party. Therefore, the political leadership had constant values for decades that supported and expanded the social welfare services in the city, which are rooted in the accomplishments of “Red Vienna”⁷ – e.g., the extensive social housing stock - in the interwar period. Still today, the high quality of life in the city is linked to the achievements of this time (City of Vienna, n.d.; Kadi & Suitner, 2019).

Although the title “World’s most liveable city” was lost in 2021, mainly due to the effects of the Covid 19 crisis, Vienna offers many benefits to its population. Qualities that make the city liveable are the large green and recreational areas like the River Danube, affordable public housing, and other public services like the highly developed and affordable public transport system (annual ticket: 365€). Urban planning and its methods and instruments crucially contribute to preserving and improving the quality of life (Soepper-Quendler, 2019). ULLs were added to this equation in recent years. In the following chapters, I will explain the urban planning system in Vienna and the most relevant ULLs in the city.

4.1 Urban Planning in Vienna

In Vienna, the municipal department 18 for urban planning and development (MA 18) exercises urban planning. The department creates high-level strategies and concepts for spatial planning and mobility, which represent the base for the most relevant political decisions in the field of urban development in Vienna (Stadt Wien, n.d.).

The year 2000 marks the approximate beginning of Vienna's current urban planning approach, namely *strategic management*. While comprehensive planning “for all” dominated the previous period after 1972, the new millennium changed that paradigm (Suitner, 2020). Newly implemented policies on the EU level helped establish strategic planning for opportunity and image as standard practice. The European Spatial Development Perspective of 1999 and the Lisbon Strategy of 2000 profoundly impacted urban planning, focusing on sustainable but competitive territorial development that creates “dynamic, attractive and competitive cities” (ESDP - European Spatial Development Perspective). The creation of the Strategy Plans of 2000 and 2004 initially highlighted Vienna in the global competition for human investment capital (Suitner, 2020).

⁷ The 16-year period from 1918 to 1934 colloquially called “Red Vienna” was marked by a Social Democratic government in that brought many progressive policies was (Kadi & Suitner, 2019)

Furthermore, the definition of target areas of urban development (“Zielgebiete der Stadtentwicklung”) in the urban development plan 2005, along with appointing managers for each target area, pointed to the shift towards a strategic management approach in urban planning. This managerial planning mode was accompanied by the surge of Public-Private Partnerships (PPPs) as development models and intermediaries, like the Vienna Tourism Agency, gaining force in shaping the urban planning discourse. Besides that, planning discourses increasingly involved non-spatial matters, including digitalization, new participation practices, and diversity as the intended social model (City of Vienna et al., 2019; Novy, 2011; Novy & Hammer, 2007). This discourse is specifically visible in the city development plan 2025 (STEP 2025) and the Smart City Framework Strategy 2019-2050, which I both will explain in more detail in the following chapter 4.2.

Since the change of the millennium, Vienna's urban planning has resulted in flexible urban governance that manages urban development with a strategic approach under urban growth and multiple crises (Suitner, 2020). ULLs became part of this shift, with the city's smart city framework strategy mentioning “Living Lab” as an implementation tool for innovation (City of Vienna et al., 2019). In the following, I will explain the most relevant strategy documents for urban planning in Vienna and how they relate to ULLs.

4.2 Most important urban planning guidelines in Vienna

4.2.1 Urban development plan Vienna - STEP 2025

The STEP 2025 is Vienna's leading document regarding the future built environment of the city. The document represents a binding guideline for the city's policymakers and a strategic orientation for the municipal companies. The aim is to continue building a liveable, socially- and gender-equitable city, educating, cosmopolitan, prosperous, ecological, and representing an integrated city region. The STEP 2025 does not provide information regarding ULLs, because it was published in 2014, thus before ULLs became known to a broader public. Yet, what the document calls “co-operation” is congruent with the idea of “co-creation”, which is central to ULLs:

“...Vienna is aware that contemporary urban development is no longer the sole task of public regulatory authorities [...]. Governance also means understanding public institutions and private enterprises, landowners and investors, organized civil society and individual citizens as stakeholders who have vested interests in determining future developments and are willing to influence these developments through their commitment” (Municipal Department 18 (MA 18) - Urban Development and Planning, 2014, p.29).

4.2.2 Smart city framework strategy 2019-2050

In 2014, the Vienna City Council initially adopted the Smart City Strategy and updated it to the current one in 2019. With the subtitle “Vienna's Strategy for Sustainable Development”, the Smart City Wien Framework Strategy aims to solve Vienna's problems for the next 30 years

and is based on the 17 Sustainable Development Goals (SDGs) set out in the UN 2030 Agenda. Vienna's definition of "smart" means:

"[...] amalgamating innovations and new technological and digital capabilities, climate actions and resource conservation, high social standards and opportunities for participation into an overall vision that inspires people and prompts the desire for change" (City of Vienna et al., 2019).

The strategy's overarching goal is to combine maximum conservation of resources with social and technical innovation to ensure Vienna's high quality of life. The document also presents "Living Labs" and "Urban Labs" as part of the strategy and mentions "Living Labs" as an existing strength Vienna will build on, on its path to becoming a digitalization capital, as well as a tool for implementation to test innovation on a small scale. Urban labs are introduced as part of Vienna's vision for the future and as the place to pilot technical and social innovation to tackle major societal issues.



Figure 7: Visualization showing the focus topics of the Smart City Wien

4.2.3 Vienna 2030 – Economy & Innovation

Vienna 2030 is closely related to Vienna's other existing strategies. While the Smart City Wien Framework Strategy plays an overarching role and focuses on quality of life for all inhabitants and conservation of resources, Vienna 2030 has a particularly strong focus on the economy, labour, science, and research.

Vienna promotes spaces and organizational prerequisites as one strategic action area to provide an "innovative milieu". Part of this are two objectives that point towards the use of ULLs, and co-creative models in general. Firstly, Vienna positions itself as a start-up hub that brings together enterprises and the municipal administration through co-creation models and aims to build the local community with citizens by offering space for experimentation. Secondly, wherever possible, municipal infrastructures (public space, traffic areas, networks, and data) are provided as living labs for innovation (City of Vienna, 2019).

4.2.4 Master plan for participation

The master plan aims to improve communication between citizens, public administration, politics, and urban planning projects' implementers. At the same time, the planning status of urban development projects should be presented transparently and at an early stage, and the framework and scope for the parties involved should be defined. In this way, the master plan intends to make the development of urban planning projects comprehensible for all interested

city residents. Furthermore, the plan should function not only as a rulebook for the administration but also as an orientation for all citizens (Municipal Department 21 - district planning and land use, 2017)

4.3 The Urban Living Labs in Vienna

4.3.1 Smarter together

“Smarter together” is an EU-funded initiative, existing from 2016 to 2021 in multiple European cities. In Vienna, the city administration took the promoter role described in chapter 4.2.1, as they were the initiators, seek for funding, and enacted leadership. The project was focused on an area in Vienna’s 11th district and was managed by the MA 25 – responsible for technological urban renewal – who describes the project on its website as follows:

“Smarter together is an urban renewal initiative which is funded by the EU within the Horizon 2020 project and was implemented in Vienna, Lyon, and Munich. Together with the local residents and numerous companies, the City of Vienna developed smart city solutions for an area in the district Simmering. The focus of the project was on building renovations, energy, mobility, and logistics, as well as information and communication technology. Thereby the project was supposed to create an impulse for positive social dynamics and sustainable urban development. The ultimate goal was to shape an innovative, liveable, and environmentally friendly Simmering and Vienna of the future” (MA 25 / Stadt Wien, 2020).

As noticeable in the statement, the initiative is not positioned as a ULL. Yet, it included a project called “Sim Mobil Lab”, which specifically targeted citizen and stakeholder engagement and was categorized as ULL. Exploring the work and ambitions of Smarter Together, one can argue that the whole initiative can be labelled ULL, as also Bojan Schnabel, communication manager of the lab, commented: “At the end of the day, I think that Smarter Together is one big Urban Living Lab. We always highlighted co-creation and participation throughout our whole discourse” (B. Schnabl, personal communication, 20 November 2020). Furthermore, despite not initially being labelled ULL, the project developed over time, and the final report states the project became a ULL:

“Originally, the project proposal, submitted within the framework of the EU Horizon 2020 Smart Cities and Communities funding programme, was based on the idea of implementing the Smart City Vienna Framework Strategy through the project in a real-life context on site, together with citizens and stakeholder. Equally, the project provided the opportunity to test the potential of the Smart City Vienna Framework Strategy, the opportunities it offered and its suitability for everyday use. Thus, Smarter Together became a future-oriented urban living lab (ULL) – a participatory platform for urban innovation processes, and one which, moreover, was remarkable on an international scale” (City of Vienna, 2021)

The project had four central objectives, called “refurbishment with a mission,” “participation,” “smart mobility in Simmering,” and “smart infrastructure.” The energetic optimization and renovation of two social housing complexes with 1.500 tenants are examples of refurbishment with a mission. These renovations also represent the starting point for many other activities realized through Smarter together in the area, including the construction of four zero-energy sports halls for a school and E-car sharing offers for tenants of the social housing complexes (MA 25 / Stadt Wien, 2020).

In Smarter Together, the role of users depended on the particular topic. For the refurbishment of the local school at Enkplatz, the project asked children to participate directly and take the co-creation role in the process. They stood in to include a bouldering wall in the newly built gymnasium. Smarter Together assigned the users the same role in planning the e-car sharing scheme at the social housing complex Hauffgasse. They were involved in the process's conception, implementation, and further development. In the Hauffgasse complex refurbishment, the residents had a role somewhere between *consultation* and *information*. The purpose of user involvement, in this case, was rather to get the locals on board than give them decision power in the planning process, as the city had already decided that a thermic refurbishment of the residential building was necessary.

Smarter together is considered a very successful project within the Viennese city administration, leading to multiple follow-up projects. The city government coalition, elected in fall 2020, picked up the project's name for their political program and named the city development plan 2035 “Smarter Together 3.0” (SPÖ Wien & NEOS Wien, 2020). Furthermore, Vienna’s mayor and deputy mayor state in the final project report that Smarter Together “...shows the potential of a co-creative process, in which high technology, business, innovative city administration and citizen participation complement each other”, and that they hope, that reading the report “inspires many more joint projects” (City of Vienna, 2021). This statement shows how strongly the decision-makers support this project.

4.3.2 Urban Mobility Labs (UMLs) – an initiative by the Austrian federal ministry for climate action, environment, energy, mobility, innovation and technology (BMK)

In 2016 the Austrian BMK launched an initiative that funded five urban mobility labs, of which two are in Vienna. The initiative aims at the implantation of mobility innovations on a local level in Austria. The first funding period was limited to four years and ended in 2021, and the labs applied for funding from national pots for the next five years of funding.

External auditors from Technopolis Austria published an impact analysis of the initiative. Based on this analysis, the researchers strongly suggest continuing funding for the urban mobility labs, granting financial security to resume their activities (Technopolis Austria et al., 2020). Brigitte Tiefenthaler of the audit team explains one of the reasons for the recommendation:

“The UMLs supported many research consortiums in parts of their research processes. And these projects have a specific time frame, which usually cannot be shortened. Imagine that you are in your third of four years of UML funding and plan to support the new research project application. You have to be lucky to still work on this research within the funding period. That said, this initiative should be conceptualized for longer than four years. It simply was a budget-related necessity back when this was decided (B. Tiefenthaler, personal communication, 28 January 2021).

This suggestion and their city-wide acknowledged success in creating networks for innovation led to reapplication for national funding.

The following short subchapters describe the two UMLs – aspern.mobil LAB and Thinkport Vienna - in the Austrian capital.

4.3.2.1 aspern.mobil LAB

The aspern.mobil LAB is located in Aspern Seestadt, a new urban development in Vienna’s East and the Technical University of Vienna (TU Wien) manages the lab. On its website, the lab appears as a co-creative innovation space that focuses on mobility in the neighbourhood:

“The aspern.mobil LAB creates a space for innovation in the aspern Seestadt, where science, administration, and companies, together with residents, contribute to the development of sustainable urban mobility. The aspern.mobil LAB aims to establish and support a new culture of mobility and innovation in this extraordinary development area. Lakeside townspeople, local stakeholders, politicians and actors from research, development, and business think, develop and act here on an equal footing. Innovative mobility solutions focus on active mobility, shared mobility as a service, first/last-mile logistics and the investigation of their spatial, economic, ecological and social benefit” (aspern.mobil LAB, n.d.-b).

Furthermore, the lab is “a neighbourhood mobility lab, where shifting mobility and sustainability are core objectives” (aspern.mobil LAB, 2021)—analyzed through the nine characteristics of Steen and van Bueren (chapter 2.2), the aspern.mobil Lab fulfils all criteria to classify as ULL.

One of the projects the lab initiated and designed is the so-called Mobility Panel. It aims to measure the mobility patterns of Seestadt dwellers. A smartphone application the residents install on their device monitors how often they use different modes of transportation, how many daily trips they make on average, or how long it takes them to cover these distances. In the first phase of the Mobility Panel, which started in 2019, the lab worked with a randomly selected group of residents. In the current stage, all residents of aspern Seestadt are welcome to participate. With the data collected in the Mobility Panel, the aspern.mobil LAB created an online story map that visualizes the mobility behaviour of the residents, as shown in the following figure.



Figure 8: Mobility patterns of Seestadt residents, visualized in the "Story Map" (aspermobil LAB, n.d.-a)

The users take the co-creation role in the lab, as the lab includes them throughout the whole process of the various project of the lab. Together with the resident, the lab aims to lay the groundwork for ideal mobility solutions for the neighbourhood. The users are involved in testing innovative solutions and providing data for the lab, for example, in the "Story Map" project. Furthermore, the residents provide feedback for implementing solutions as their expertise on local circumstances is highly valuable for the projects.

The City of Vienna is not an official partner in the lab consortium and therefore takes a non-role towards the lab. But as the lab's project manager Christoph Kirchberger told me, there is an ongoing collaboration with the city administration. Still, the lab seeks to strengthen this collaboration in the future, as I will elaborate in later chapters.

4.3.2.2 Thinkport Vienna

The Hafen Wien GmbH hosts thinkport Vienna on its company premises, managing the lab with the university for natural resources and life sciences BOKU. The city presents itself as an *enabler* for the lab since a city company owns the location. The lab's focus lies on urban logistics concepts, as stated on the website:

"Thinkport Vienna is an open mobility laboratory which confronts the challenges of urban logistics and develops comprehensive, long-term solutions.

Through the commitment of our principal, we provide real test environments to take theory and concepts through to try and test applications. On the one hand, we aim to create an open environment for innovation and co-creation; on the other, offer a real-life test environment

for the systematic development of urban logistics concepts” (thinkport Vienna, n.d.).

Peter Rojko, head of innovation in the lab, formulated the mission statement in fewer words: “To develop, test and implement innovations for freight logistics in Vienna. That is the central point of our mission” (P. Rojko, personal communication, 25 May 2021).

One of the projects of Thinkport Vienna that fully implemented the mission statement was “HUBert city logistic.” HUBert city logistic is a last-mile delivery service for shops and businesses in Vienna, with a central warehouse on the premises of the Hafen Wien. A shop owner can choose HUBert as the central logistic hub for his business. All the goods and materials the business orders will arrive at the central warehouse, and HUBert will collectively deliver the goods to the shop on a chosen day of the week. This system is resource-efficient, as only one vehicle drives directly to the shop every week to deliver goods. Advantages that result from that delivery approach are less occupied parking space in front of the shop, traffic and noise reduction, and a decrease in CO₂ emissions (HUBERT, 2021).

In 2018, the “Agile Team City Hub,” which was substantially involved in creating HUBert, was awarded a price for the best “collaboration for our city” by the city. The agile team was a collaboration between the thinkport Vienna, Hafen Wien, Vienna business agency, and three municipal departments. At this time, the project was one of the first with this multi-stakeholder approach. The head of innovation of thinkport Vienna is proud of the achievements in this project, as he told in the interview: “Of course I find it great, that we created HUBert, received the price of the city, and were nominated for the state award. The project was one of our highlights so far” (P. Rojko, personal communication, 25 May 2021).

As thinkport Vienna focuses on the logistics of goods, the involvement of locals is not always part of their process but is still a relevant aspect of the lab in general.

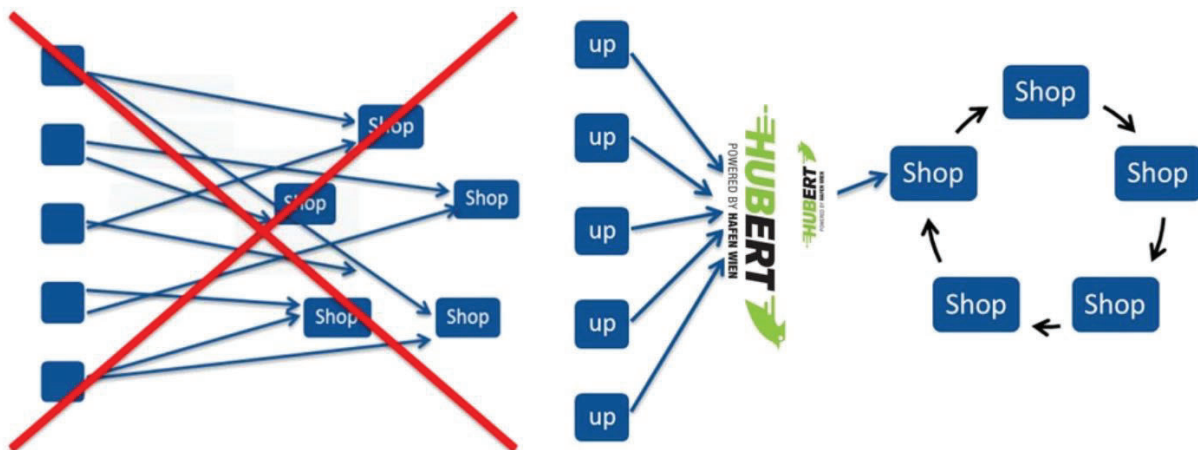


Figure 9: The graphic explains how HUBert makes the deliveries more efficient (HUBERT, 2021)

5. Findings

After discovering in the theoretical framework why cities are experimenting, what ULLs are, and how they are related to Urban Planning, I introduced the ULL-related specifics of Vienna in chapter 4. I explained Vienna's approach to urban planning and outlined the local ULLs which are most relevant to this study.

In this section, I will present the situation of ULLs in Vienna at the moment, including an overview of the expectations the administration has towards the labs and the obstacles their collaboration brings along. Furthermore, I will demystify the tactics ULLs use to overcome these challenges, improve collaboration, and meet public authorities' expectations.

5.1 What do civil servants expect of ULLs?

5.1.1 Creation of networks and participation practice

The most mentioned benefit, employees of Vienna, expect from the work of ULLs is the creation of networks between individuals and organizations who have never or only rarely collaborated in the past. The interviewees anticipate that the increased communication through the networks is beneficial for the urban planning process. Dieter Häusler from Vienna's urban planning department points out the importance of the labs as a connection between practitioners and planners. Through the help of the labs, plans can become more realizable, and topics that were neglected are now increasingly taken into account.

"I see the labs as a connector between us planners and the practitioners. Connecting helps both sides understand each other better. The planning institutions can provide plans that will not be rejected due to unrealistic content that the practitioners cannot implement. Furthermore, we started considering topics that used to be ignored in mobility planning but are now being highlighted by the labs - for example, transport logistics, which is a focus of thinkport Vienna. Also, the supply logistics of water, gas, and electricity and waste management came to the fore. I think these are achievements of the Urban Living Labs" (D. Häusler, personal communication, 6 February 2021).

Gerrit Thell relates his thoughts on the topic to Vienna's innovation strategy (Vienna 2030), of which he is the project manager. He believes that collaboration and the creation of networks between organizations is an intrinsic aspect of innovation. He sees ULLs as valuable for this matter and criticizes stagnation in the current way of working:

"Those who tick the way they have always ticked will create little that is new. In our innovation strategy, we consequently have the philosophy: Innovation emerges between organizations. Living Labs are supporting exactly this process. That is why I think they are becoming more and more popular" (G. Thell, personal communication, 6 August 2021).

Brigitte Tiefenthaler shared her take on the importance of network knowledge, the labs built up and can rely on. She describes how the labs recognize problems that are invisible for the organizations they occur in:

“By maintaining manifold relations to multiple stakeholders, the labs can see issues, to which someone inside the organizations is blind. With their overarching perspective, the labs see possibilities and are in the position to pick up the topic and work towards a solution” (B. Tiefenthaler, personal communication, 28 January 2021).

Although most of the interviewees relate *networks* to institutional actors, one must not underestimate the relevance of ULLs for the collaboration of urban practitioners and the citizens. Christina Kirchmair (Smart City Vienna) shares her understanding of ULLs, and tells me that the Smart City department is currently preparing projects that focus on co-creation and citizen participation:

“ULLs have great potential because they give space for experimentation in the city. This allows citizen empowerment and creates out-of-the-box ideas, which are necessary for urban transformation processes. We are currently working on projects with a strong co-creation approach to try out new forms of public participation – I would call them Urban Living Labs” (C. Kirchmair, personal communication, 8 April 2021).

Similarly, Dieter Häusler (MA 18) underlines the gravity of functional cooperation between planners and citizens. He provides insight at past participation practices and how the labs changed this process for the better and gives a future outlook:

“Years ago, we were planning a road infrastructure project, which we presented to the public after planning was complete. All 300 people in the room were against our plan after they saw it. If I were a resident in that neighbourhood, I also would have been against a project that tenfolds traffic volume in the area. We learn how to include the citizens much earlier and with a low threshold to create win-win situations with the labs. That is why I think the labs will be a natural part of our work in the future. [...] We will discontinue internally creating studies, which we hope will be picked up and implemented by someone. Instead, we will work with all the actors from the beginning” (D. Häusler, personal communication, 6 February 2021).

Dieter Häusler speaks for all of the interviewees with this future outlook, as they all agree that ULLs are here to stay.

5.1.2 Breaking hierarchies and new ways of working

Many interviewees believe that ULLs change how the institutions process information and that the labs allow for a new way of working. Gerrit Thell from the MA 23 sees potential in how ULLs can gather information and data on specific topics, which previously used to be much less accessible:

” I think the labs have a strong influence on the way we work here [in the municipal department]. They offer a dialogue platform through which we quickly understand what happens in a particular field and whether there is any potential for us or not. Transport logistics would be an example. We no longer depend on official statistics but know what is going on and which aspects it connects. So these networks [of knowledge] are incredibly enriched through the labs“ (G. Thell, personal communication, 6 August 2021).

Leading the group of urban planning experts in Vienna, who have high expectations in ULLs, the planning director Thomas Madreiter shares his future outlook for the application of ULLs and their benefit for Vienna as a sustainable and resilient city:

” The critical train of thought, why I like Living Labs, is the following: The expected changes on the urban level, in the next 20 to 30 years go much further than urban development. We are working on decarbonization, demographic change, and so on. That means we cannot just pass on traditional methods to the next generation. [...] Instead, we must find completely new approaches, what usually works best in lab situations. I am profoundly convinced – the broader we are set up, the more sustainable the results that could come out of it will be” (T. Madreiter, personal communication, 14 June 2021).

Following Thomas Madreiter's conviction, Dieter Häusler from MA 18 pointed out that the labs have the advantage of working outside of the organizational constraints of the public administration. This freedom gives space for approaches apart from business-as-usual.” The labs allow us to go a new way, and to try things without being stuck in our hierarchies where it is sometimes difficult to reach decisions.” He continues with a glance through the many years he has worked in the municipal department:” I remember measures in the mobility masterplan from 2003, that still only exist on paper. With new methods like ULLs, we are much quicker with realizing the plans”. Finally, he adds why he thinks the labs are essential to becoming more resilient to contemporary challenges as a city:

” It is too late to tackle climate change by writing technical concepts that have to find their way through municipal hierarchies. We must get together with acting stakeholders and decision-makers right from the start. The labs allow us to do so, and on top of that, can develop prototypes which support the decision-making process” (D. Häusler, personal communication, 6 February 2021).

Peter Rojko from thinkport Vienna confirms Dieter Häusler’s hopes for new ways of working within the labs as he talks about his motivation to work in a ULL:

” I am constantly questioning all processes which have been there for many years and ask, why? Are there no other possibilities of doing this? I try to enhance out-of-the-box thinking and to get innovations going. So far, the experiences we made with this approach in the thinkport prove us right” (P. Rojko, personal communication, 25 May 2021).

Interviewees also expect the ULLs to influence urban planning decisions in Vienna, although “not monocausal,” as Gerrit Thell notes (G. Thell, personal communication, 6 August 2021). Ina Homeier even sees it as her task to ensure the influence of ULLs both on administrative and political decisions:

” We are participating in labs for learning and incorporating learnings in our strategies, but also to novel the building code, for example. [...] It is also our mission to process the findings [from the labs], to present them on the administrative and political level to inform and support planning decisions” (City of Vienna et al., 2019).

Johannes Suitner from TU Vienna also expects a correlation, as he knows that the administration observes the labs closely. He believes there is the will to provide a better environment for labs, but its lacking ideas on how to do that:

” Yes, I think that there is an influence [on planning decisions]. The administration keeps a close eye on the labs. Either as a partner or as part of the city’s urban development network where they take part in informal exchange about the success and failure of labs. Additionally, the city sees potential in this laboratory “testing” of solutions for urban development. But so far, I believe that there is no clear vision of how to institutionalize this within the often so-called “rigid administration.” Therefore, I think it will still take some time until the city will dare to actively uses experimental approaches” (J. Suitner, personal communication, 21 June 2021).

Vienna’s director of urban planning confirms that also he sees a correlation between the work of ULLs and decisions the municipality takes concerning urban planning in Vienna:

”If an Urban Living Lab is successful, it has an impact on processes, changes procedures, and ways of thinking, although not in a formalistic sense” (T. Madreiter, personal communication, 14 June 2021).

5.1.3 Possibility for testing innovation

Interviewees expressed their expectation that ULLs are important testing sites for innovation in Vienna, and they see an advantage in the labs’ autonomy from big corporations. Lena Reiser from Vienna’s business agency explains:

“ I believe the labs are crucial for piloting and quick testing, especially for young companies who do not have the resources or own testing infrastructure. The labs save time and resources and provide neutral expertise in the corresponding field, not associated with any private consultancy. In that sense, the labs are also committed to the common good and do not follow any corporate interests” (L. Reiser, personal communication, 6 January 2021).

Dieter Häusler from MA 18 also mentions the advantage of the labs' independence from large corporations. He explains how the labs enable his department to discontinue the frustrating innovation efforts of past years: "In the past, we relied on companies like Wiener Stadtwerke⁸, hoping that they would somehow create innovation. Today we experiment with our ideas on a start-up-level in the labs, without big corporations looking over our shoulder, and having the pressure of creating something economically profitable" (D. Häusler, personal communication, 6 February 2021).

While Dieter Häusler sees the labs as a possibility for the liberation from market forces, Lena Reiser highlights the economic opportunities. She also thinks that the labs can support the labour market:

"There lies a great chance in implementing research and testing facilities [such as Urban Living Labs], because they lead to the creation of new jobs, and this eventually helps local companies. Therefore, we support any activity on that field, no matter the exact topic they are working on" (L. Reiser, personal communication, 6 January 2021).

Matching, Gerrit Thell from the municipal department 23 (economy, labour, and statistics) suggested, one way of measuring the value of ULLs could be counting the number of Start-Ups or follow-up projects that originated out of the lab (G. Thell, personal communication, 6 August 2021). Although answering different questions, both Reiser and Thell position ULLs as a tool that caters to the city's economic needs.

Vienna's planning director Thomas Madreiter thinks that ULLs can help to implement innovation. Asked if Vienna should initiate and provide more funding for ULLs in the future, he responds positively. He points out an example project, which is currently in implementation:

"If there is a concrete problem, for which it makes sense to process through a [Urban] Living Lab, I see the option [to set up and fund a ULL for it]. WieNeu+⁹ is a great example to show, where Vienna already directs relevant funds towards these topics" (T. Madreiter, personal communication, 14 June 2021).

5.2 Challenges for Urban Living Labs in Vienna

Although the general view on ULLs in Vienna is positive, various challenges for them remain. Asked about eventual challenges or obstacles for ULLs in Vienna, all interviewees gave multiple examples from the top of their heads. It is important to mention that a significant difference between Smarter Together and the two other labs. My interview partner from Smarter

⁸ Wiener Stadtwerke is Vienna's infrastructure service provider company. The company includes subsidiaries for energy, electricity, public transport services among many others. 100% of Wiener Stadtwerke is owned by the City of Vienna (Wiener Stadtwerke GmbH, 2021).

⁹ WieNeu+ is a follow-up project of Smarter Together, that seeks to implement the results and achievements of Smarter Together in other districts of Vienna (City of Vienna, 2020)

Together – Bojan Schnabl - did not state that the project faced difficulties cooperating with the City of Vienna. This statement might not be surprising, as Smarter Together was initiated and managed by one of the municipal departments. Still, knowing this fact is important for the reader to understand this study better as most answers from public servants focus on the two other ULLs – aspern.mobil Lab and thinkport Vienna.

5.2.1 Setting up an Urban Living Lab

Struggles and unclarity during the starting phase of ULLs appear to be the norm since the concept is not unified, and people who set up the lab have, in most cases, never done that before. By listing various reasons, interviewees generally stated that the start-up phase is a significant challenge for the Labs. Before anything else, the project needs financial resources to start, as Ina Homeier stresses: "The biggest challenge is always to get to implementation – meaning financing. This has immense leverage on any project" (I. Homeier, personal communication, 8 April 2021)

Furthermore, the project staff has to find answers ahead of the kick-off, as Bojan Schnabl from Smarter Together explains:

"Central questions came up more in the run-up to Smarter Together. How do you set up the project strategically? What ethics, values, and visions should the project convey? If you have answers to these central questions, you can share them with all partners so that everyone then pulls together. That is why we have conveyed the central message of partnership and co-creation with the name of the project Smarter Together – or – as we named in vernacular German: - gemeinsam g'scheiter" (B. Schnabl, personal communication, 20 November 2020).

Peter Rojko from the thinkport Vienna similarly pointed towards the challenges of the beginnings, specifically the necessary learning process the team had to go through:

"We naturally needed the first half of a year to gain a foothold, establish our location, and to launch our first topics," but also mentioned how the lab gained from this process: "It grew. And that was very good. Also, for ourselves – we first had to learn to drive this vehicle called Thinkport. We also had ideas where we later found out: No, this is not a topic we want to keep" (P. Rojko, personal communication, 25 May 2021).

The aspern.mobil lab faced significant difficulty in an early stage of the lab's existence. One of their partners – Urban Innovation Vienna - who was also supposed to ensure good cooperation with the city administration, had to resign from the project due to legal requirements. The lab lost the direct link to the city administration, which caused struggles in being noticed by the public stakeholders.

"Rather than by disagreements, this resignation was caused by limited resources. They were in a restructuring process and also had to free human resources for projects of the city. [...] Therefore, the rapprochement with the

city took some time“ (C. Kirchberger, personal communication, 23 February 2021).

We can assume that the struggles during the early days of an Urban Living Lab are not a local issue specific to Vienna. Brigitte Tiefenthaler, who assessed the Austrian Urban Mobility Labs, points out how the novelty of the idea held a challenge for the initiators: “Urban Mobility Labs did not exist before. At the first day of their existence, it was the creation of something new” (B. Tiefenthaler, personal communication, 28 January 2021).

5.2.2 Operative difficulties and the diversity of stakeholders

Vienna has strong administration and many rules and hierarchies to support the city's organizational structure (J. Suitner, personal communication, 21 June 2021). That structure represents a challenge for ULLs that are not included in the hierarchy of Vienna's administration. Furthermore, the public administration relies on qualities, which are difficult to achieve for ULLs, as Brigitte Tiefenthaler explains: “For administrative actors, the long-term stability and confidentiality of relationships is essential—reconciling that as ULL is not easy. Even small changes in the personnel can cause trust issues” (B. Tiefenthaler, personal communication, 28 January 2021).

Vienna's director of urban planning, Thomas Madreiter, paints a picture with words, how one can imagine the co-existence and collaboration of the administrative body and ULLs in Vienna:

“The City of Vienna is a large administrative structure with many employees, exact rules and hierarchies, that we can imagine as a large tanker. Now, when a small and agile dinghy – the Urban Living Lab – is scurrying around that tanker, some questions occur: Where does this belong? How can we communicate with it? Where does it stick or not stick to the rules? It indeed represents a challenge for the organization. [...] We have to find the right amount of involvement and mutual convergence between the labs and us to ensure effective collaboration ” (T. Madreiter, personal communication, 14 June 2021).

Unclear distributions of roles in a planning process involving multiple actors complicate the situation despite the willingness to let many stakeholders participate. Johannes Suitner, a researcher at the technical university of Vienna, points at specifics of the Viennese urban planning in that matter:

“Vienna has a very prominent culture of participation. Unfortunately, this culture stands in conflict with the rich expert knowledge Vienna has to offer. That means that the role distribution and distinction between experts-driven and participative or co-creative decision-making processes often remain unclear” (J. Suitner, personal communication, 21 June 2021).

Christina Kirchmair pointed to a challenge she observed while setting up ULLs and other co-creative projects relating to the participation culture. She explains that participants' expectations often misfit with the possibilities of the projects: “The citizens expectation

towards a project implementation is usually very high, and we have to be careful not to create too much upset. Therefore realistic expectation management beforehand is crucial for the collaboration with local actors” (C. Kirchmair, personal communication, 8 April 2021).

Dieter Häusler, who actively participated in ULLs, mentioned that it was challenging and unusual to work in such a diverse group of participants:

” I believe the biggest challenge is to try out new ways of working. In a grown and rigid hierarchy, it is not easy to suddenly start working across municipal departments and political parties, telling everyone: You make the decisions together – no need to ask the superiors”. That was very difficult at the beginning because we all felt insecure. But we quickly adapted to this new way of working, produced good results, and even enjoyed it” (D. Häusler, personal communication, 6 February 2021).

The existing structures can represent obstacles for the work of ULLs, but at the same time, this exact issue is what they ought to overcome, as Dieter Häusler mentioned. Brigitte Tiefenthaler explains how she noticed this discrepancy during her audit of the Austrian mobility labs:

“I got the impression that many processes which were lengthy and difficult for the labs show why it needs the transformation the labs are working on, and why it did not happen yet. In the current situation, most actors have never communicated and do not even know each other. All of them follow their own rules and logic, which makes the work difficult, and is exactly the challenge that has to be overcome” (B. Tiefenthaler, personal communication, 28 January 2021).

5.2.3 Scepticism and missing acceptance

A fundamental challenge for ULLs is overcoming scepticism and existing prejudgements and gaining the acceptance and trust of decision-makers. Dieter Häusler explains why he thinks this is important and that the city invests resources to develop ideas and solutions for a problem. At the same time, the politicians who rather trust their experience than the results found through experimentation make the final decision.

” You need to convince the politics because we still have the problem of politicians who say: What you developed there seems to be nice, but I know my district better. I know where the real problems lie, and I decide what we should do about it.” If everyone acts like that, we create intersections that do not function. In the worst case, you build a cycle lane ending in one alley and continuing in another one a block down, without connection in between. This has happened before – a long time ago, but it has happened” (D. Häusler, personal communication, 6 February 2021).

Christoph Kirchberger from aspern.mobil Lab agrees that the Lab faced scepticism, especially in the early years of its existence. Still, he has an explanation why the results were not met with acceptance at the beginning:

“In the first two years, we supported many projects that were in very early stages of the innovation process, and therefore not yet applicable in the city or tangible for the users. Also, the users much rather physically test innovation than fill out questionnaires – which is understandable. Nowadays, we are working much closer with the city administration and can cater better for their needs”(C. Kirchberger, personal communication, 23 February 2021).

He continues explaining that ULLs also find difficulties in receiving acceptance from the municipal departments for their way of working. As the Labs focus on a particular area, they often have no resources to set up projects in other locations in the city, which the colleagues in the administrative institutions happen to dislike, as the project manager of aspern.mobil Lab describes:

“We get asked why to implement another project in the lake city, although it is already prosperous with innovation. ‘Would it not make more sense to upgrade a different neighbourhood with a research project?’ they ask. [...] So, in short, they are questioning the cluster-effect of the lake city, which creates many advantages and is, in my understanding, the main strength of the lake city. Unfortunately, this meets only a little appreciation [in the municipal departments]” (C. Kirchberger, personal communication, 23 February 2021).

Lena Reiser from the business agency understands the described scepticism and warns from the misconception that new is always better:

“Naturally, there will be some kind of scepticism or prejudices towards everything new. I think that is normal and don’t see scepticism as something negative at all. People often say that the City of Vienna is full of blockers and preventers. But we also should acknowledge that Vienna is a city that works extremely well, especially on the administrative level. And that is because the employees know what they are doing. They might say: ‘No, this won’t work.’ We should learn from that. I think this is not about blocking something. One does not have to love everything that comes with a fancy name immediately.” (L. Reiser, personal communication, 6 January 2021).

Despite the efforts of the Labs and the output they produce, the scepticism of individuals that work in the municipal department limits the Labs’ impact on and benefits for urban planning in Vienna.

5.2.4 Conclusive remarks on the challenges for Urban Living Labs in Vienna

The joint programming initiative (JPI) Urban Europe, who also funds ULLs, published a paper in which the authors identify three main challenges for ULLs, based on their ten years of experience in the field: equity and inclusiveness, integration in local and regional ‘proper’ governance, capacity building in public administration (Bylund et al., 2020). The challenges I

presented in the previous section widely align with what Bylund and his colleagues call “Integration in local and regional ‘proper’ governance: “Current urban living labs sometimes run in parallel with institutions and governance instead of in an integrated way. This affects the project’s ability to ensure longer-term impact, and to be a resource in governance issues rather than a side runner” (Bylund et al., 2020)

This depiction of the challenge resembles Vienna’s planning director’s metaphor of the tanker and the dinghy, presented earlier in this study. Rather than acting like a dinghy scurrying around a tanker, ULLs should aim to be on the deck of that tanker to serve as innovative support to the ship's crew. In the following section, I will discuss how ULLs use different tactics to enter the “tanker” and establish better collaboration with the crew - to stay with the metaphor.

5.3 Tactics of ULLs

Said connection to decision-makers and the urban planning institutions of the city of Vienna is an essential aspect in the work of ULLs, as they struggle to find direction without close relations to the administrative body and cannot respond to current issues. Christoph Kirchberger explains, how aspern.mobil Lab was facing difficulties in creating a connection with the city administration:

“The cooperation with the City of Vienna was always an open flank for us. It was always difficult to prioritize a thrust to follow to improve that. The bottom line is that the cooperation with the City of Vienna is based on mutual trust” (C. Kirchberger, personal communication, 23 February 2021).

The following list exemplifies the tactics ULLs in Vienna use to build better collaboration between the labs and the administrative and operative institutions of the City of Vienna.

5.3.1 Support from “ambassadors” inside of the administration

Individuals that support the work of ULLs and personally believe in their importance for Vienna are essential touchpoints for ULLs in the city administration. These individuals are subsequently called “ambassadors,” inspired by the definition of Christoph Kirchberger during an interview: “We noticed that the trust grew through individuals in the municipal departments. We can build on this trust in the future because these *ambassadors* already know we are doing a good job and that our work is feasible to support the city with certain questions.” Then, he elaborates on the importance of the ambassadors, “For cooperations to work, it often needs long-term, personal relations – ideally also in other contexts. These relations create a network of trust that can carry the cooperation” (C. Kirchberger, personal communication, 23 February 2021).

Now, these ambassadors are not sent from the ULLs to represent their interests inside of the administration. They much rather act by conviction and represent a direct link between the labs and the administration. This link helps the labs increase their profile as the ambassadors

often appear high in the hierarchy, making these connections relevant for the future role of ULLs in Vienna.

As an expert who worked with many ULLs through role in JPI Urban Europe, Johannes Riegler could assure me of the importance of ambassadors for ULLs. At the same time, he mentioned two risks that occur along with the existence of said ambassadors:

” We saw many people who are highly invested [in ULLs] because they want to try something new and actively implement it within the administration. But these enthusiasts are usually outnumbered, so firstly, they risk burnout because the lab work comes on top of their daily business. And secondly, when they leave the administration, all their experience and knowledge goes with them” (J. Riegler, personal communication, 20 July 2021).

Brigitte Tiefenthaler shares her insight on the value of ULL ambassadors for the labs. Their enthusiasm can act be a catalyst for the relation between labs and local administration:

” It is crucial to get your foot in the door of the administration because the staff often tries to avoid the transformative process the labs are pushing forward. But there are door openers. In any serious urban administration, we find people who know that the status quo of working is outdated. They know we cannot keep the same planning processes and the same decision criteria. Something has to change if we want to meet climate goals. It needs people who strongly support this cause, and who want to be supported by the labs in their daily work” (B. Tiefenthaler, personal communication, 28 January 2021).

5.3.2 Institutionalizing connections & exchange of information

ULLs seek to institutionalize how they collaborate with Vienna's administrative body to meet and overcome the organizational and operative challenges in cooperation with formal institutions. As described in chapter 5.2.5, the team of aspern.mobil Lab identified shortcomings in their way of working with and for the city. They realized that a too theoretical approach in the first two years of the lab's existence was not tangible and applicable for the urban planning institutions. The project manager Labs is optimistic for the future, basing his positive outlook on the increasingly successful efforts of recent years.

“Institutionalizing [the connection to the public institutions] is a very central concern for us. It is observable that the interface to the city is forming more clearly in the last two years – we will see how this develops in the future. We want to go further than One-to-one communication within our network to reach institutional commitment. With our achievements of the last years, we set a good base for negotiation, and we also know better which role to take, and how to contribute” (C. Kirchberger, personal communication, 23 February 2021).

Both aspern.mobil Lab and thinkport Vienna have applied for new funding at the national ministry and plan to tighten their cooperation with the public institutions in this period. They also decided to join forces and submit a joint letter of intent to support this objective, proposing their future collaboration (P. Rojko, personal communication, 25 May 2021).

Bojan Schnabl underlines the gravity of constructive communication between institutions also within the city administration. He shares how Smarter Together kept all of the various participants in the loop of information about the project:

”The partnership-based cooperation of numerous project partners created enormous added value - not only for Smarter Together and the City of Vienna but also for each project partner. Moreover, this has contributed quite significantly to the project dynamics. For the matters of the City of Vienna, we have always tried to actively involve, inform and motivate all municipal stakeholders who have worked on it - there were more than 70 people from 9 departments - through communication work using newsletters or via the homepage” (B. Schnabl, personal communication, 20 November 2020).

As Smarter Together was working with many employees of multiple municipal departments, the project has shown an effect in broad areas of the administration, and by doing so, initiated 50 follow up projects, some of which we can see in the tree graphic below (figure 11)

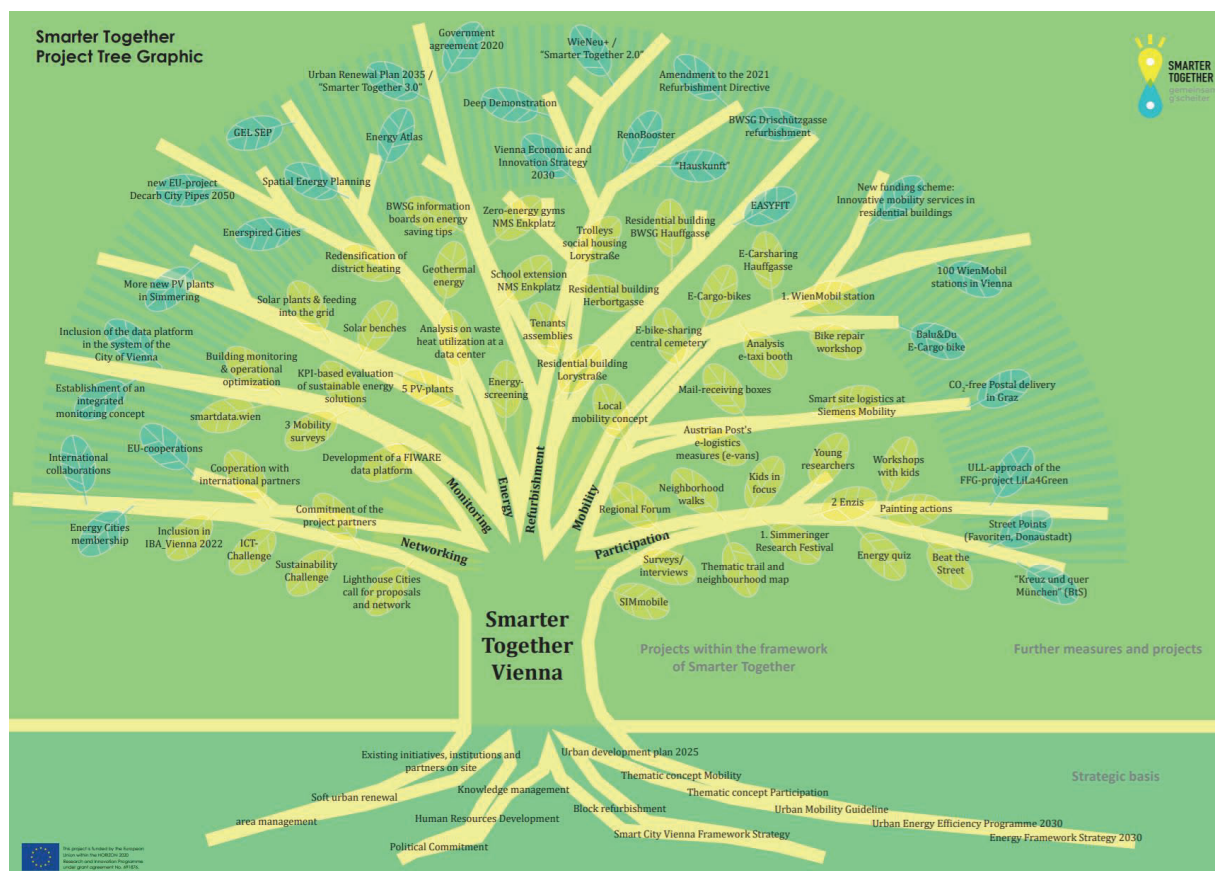


Figure 10: The Smarter Together Project Tree, visualizing the ideas and outcomes of the project (City of Vienna, 2021)

A proposal that might be very relevant for the future of ULLs in Vienna came from both ends of the actors' spectrum. Both Christoph Kirchberger (aspern.mobil Lab) and Gerrit Thell (MA 23) identified the need for a superstructure under which ULLs can work in Vienna. This superstructure should allow an improved knowledge exchange between the administration and the labs to grant a timely response to urban issues. Furthermore, organizing ULLs through a framework would help overcome the challenge and uncertainty of setting up a lab (chapter 5.2.1) by supporting new projects with the knowledge gained from the existing ULLs.

“In the future, we will have to think about how we connect all the information we are gathering [in the ULLs]. The networks created through innovation platforms [like ULLs] are already highly complex. If we try to link these networks, the complexity increases even further. So we have to find a way to create a network of networks that allows us to work together in an effective manner, where each individual can provide their expertise for Vienna” (G. Thell, personal communication, 6 August 2021).

In the same vein, Christoph Kirchberger explains how he sees the situation and presents a suggestion for a ULL framework, similar to Thell's: “We noticed that it needs an organized superstructure, to create a workflow through which the city can introduce problems for us to work on” (C. Kirchberger, personal communication, 23 February 2021)

The City of Vienna already executed a ULL that successfully responded to pending problems of the city – Smarter Together. With his insider perspective, Bojan Schnabl gives a glimpse of how a demand-oriented project creation, proposed by Kirchberger and Thell, already happened inside the municipal department ahead of Smarter Together:

” As the City of Vienna, we first analyzed our needs in detail. We then tailored the project to them, thus ensuring the sustainability of the work. We see this as a mandate and an obligation to the citizens. [...] The 50 follow-up initiatives show how much potential and necessity to continue this project” (B. Schnabl, personal communication, 20 November 2020).

5.3.3 Gaining trust through proofing competence

The three labs under closer examination in this study have different organizational proximity to the city authorities, influencing the level of trust their work was initially met with. Smarter Together was organized and managed by the municipal department MA 25. With the funding through the EU project Horizon 2020, the lab performed various actions on different topics. The city authorities strongly supported it throughout the process.

Thinkport Vienna and aspern.mobil Lab had different prerequisites in their collaboration with city authorities. The thinkport Vienna has a link to the city administration because it is managed from the Hafen Wien, which belongs to the Holding Wien, and has a formal connection to the city administration, even if this is not related to urban planning. For aspern.mobil Lab, the link to the planning institutions, was even a more significant problem

after Urban Innovation Vienna who was supposed to ensure a fruitful collaboration with the city administration, had to leave as a project partner early on.

Both Thinkport and aspern.mobil Lab reported that it took time and effort to build up mutual trust with the city authorities and institutions of urban planning. They ultimately achieved trust through continuous proof of competence and credibility by working on tangible projects for the city. The project manager of aspern.mobil Lab explained how the improvement of the collaboration was time-intensive and based on the discovery of common ground:

“The rapprochement with the city took time and mainly happened through individual projects. [...] For instance, through one-on-one conversations, we discovered that the MA 18 has a strong interest in surveying mobility behaviour at the neighbourhood level, so we agreed to keep each other up-to-date on this topic” (C. Kirchberger, personal communication, 23 February 2021).

Furthermore, the lab was able to prove competence in projects that they carried out with other stakeholders:

“Eventually, we had to prove the abilities of our lab through projects we realized with external actors. We showed what is possible, how we work, and how we include residents in the process, and that enhanced our portfolio to have a starting point for talks about future projects with the city” (C. Kirchberger, personal communication, 23 February 2021).

Peter Rojko from thinkport Vienna believes that the lab already had success in building trust over the years. He shared a short story about how Daimler¹⁰ approached them at an Automotive fair:

” After we gave a presentation at the IAA 2018 about the activities of the thinkport, Daimler [representatives] came to squeeze further information out of us. Instead, we invited them to visit us in Vienna. They went to the business agency Vienna, Urban Innovation Vienna, Thomas Madreiter, and two other companies with the same request. All five of them told Daimler to bring their request to the thinkport, as we later found out. The moment we hear this, we knew that we made it – we positioned ourselves well enough to become a point of reference for others” (P. Rojko, personal communication, 25 May 2021).

¹⁰ Daimler AG is a German multinational automotive corporation headquartered in Stuttgart, Baden-Württemberg, Germany. It is one of the world's leading car and truck manufacturers (Daimler, n.d.)

6. Discussion and Conclusion

In this final part of the study, I will discuss my empirical findings (chapter 5.) with the theoretical framework (chapter 2.) to answer the initially asked research questions, which I want to remind the reader of again at this point:

How do Urban Living Labs meet challenges and overcome difficulties in the cooperation with institutions of urban planning in Vienna?

Sub–research questions for empirical research:

- Which narrative surrounds Urban Living Labs in Vienna?
- What do Vienna's civil servants expect from the work of ULLs?
- What are specific challenges for ULLs in their cooperation with the administration of the City of Vienna?

Expectations and the general narrative

I observed the general narrative evolving around ULLs in Vienna as very positive. Experts have hopes and expectations for the labs that literature also reflects. They anticipate the *creation of networks* between actors and institutions (von Wirth et al., 2019), *new ways of working* (Voytenko et al., 2016), and possibilities to *test innovation* in real life (Bulkeley et al., 2019; Karvonen & van Heur, 2014).

Similarly, Savini and Bertolini recognized in their study that urban practitioners increasingly celebrate the value of experimentation that addresses the fundamental problems of today's cities. However, they underline that only in rare cases, niches [like ULLs] significantly affect the established order that lets transformation happen. The political, societal, and market forces at play strongly influence experiments and lead to different outcomes and results (Savini & Bertolini, 2019).

Interestingly, I could observe a duality of reasons why practitioners in Vienna recognize the possible achievements of ULLs are essential. On the one hand, civil servants expect the labs to create *better planning processes* and support *climate adaptation processes* and *urban sustainability* in general. Literature also broadly reflects these views, as ULL “have become a popular approach to urban development on which hope is fixed to accelerate the generation and adaption of sustainable innovations in the urban innovation system in the light of the urban sustainability transition” (Steen & van Bueren, 2017).

The other civil servants recognize ULLs as tools contributing to economic indicators and catalysts for innovation to create jobs. This expectation is partially confirmed through the fact, that for instance Smarter Together lists 50 “results and follow-projects” in the project's final report, some of which acquired more funding on the state level or cooperate with companies such as Siemens Mobility (City of Vienna, 2021).

Similarly, in a study of three ULLs, Rizzo and colleagues found tension between different city actors' understanding of ULLs and the "city" itself. Their findings show a juxtaposition of an ecological view of the city on the one hand and a positivistic view of social and economic progress on the other (Rizzo et al., 2021). In Vienna, experts who expect positive effects on the city's ecological aspects and urban sustainability outnumber those who mainly see value in economic aspects. Those two, who underlined the economic benefits, are also professionally involved in the economic progress. They work in Vienna's business agency and the municipal department for economy, labour, and statistics.

Regarding the *creation of networks*, the interviewees are expecting what Booher and Innes call *network power* – "a shared ability of linked agents to alter their environment in ways advantageous to those agents individually. The power grows as these players recognize their interdependencies to create new potential. In the process, innovations and novel responses to environmental stresses can emerge. These innovations, in turn, make a possible adaptive change and constructive joint action" (Booher & Innes, 2002).

As the "linked agents" also act for their advantage, the equal inclusion of all urban actors is crucial. And although citizen participation is an intrinsic aspect of ULLs, only two of six interviewees from the City of Vienna underlined the importance of public participation in ULLs during the interviews. Other employees of municipal departments and public companies gave little to no gravity to the topic. This view might relate to Vienna's robust public participation framework, presented in the master plan for participation, that neither mentions ULLs, nor co-creation but covers multiple other ways of public participation (Municipal Department 21 - district planning and land use, 2017). The fact that public servants do not discuss public participation concerning ULLs might indicate an incomplete understanding of the concept, as ULL literature generally points to citizen involvement as a central part of every ULL.

Analysing the Smart City Framework Strategy also shows a divided view of user involvement in (urban) living labs. First, to pursue the path of becoming a digitalisation capital, the strategy suggests setting up "living labs" for technology to collect real-time data from end-users in a pilot district. This data will then be analysed in detail, and the results contribute to the development of new applications (City of Vienna et al., 2019, p. 54). This view of living labs, with the user as providers of data but not as co-creator of the final product, relates to an early definition of the concept (Bergvall-Kåreborn et al., 2009). Yet, on a later point in the document, the Smart City Framework Strategy presents an understanding of "living labs", which much more resembles the ULL concept this study focuses on: "In living labs at local neighbourhood level, research institutions collaborate with local public sector and civil society stakeholders to develop technical and social innovations, new products or procedures and test them out in the local community" (City of Vienna et al., 2019, p. 144).

Other than some of their pendants in the municipal departments and city companies, are representatives of ULLs emphasize the value of public participation for the ULLs and ensure the intended implementation of citizen involvement in Vienna's ULLs. The observed ULLs show different levels of user involvement. Menny and colleagues relate this variation to the fact that allowing for co-creation is easier in certain ULLs than in others (Menny et al., 2018). In

aspermobil Lab and Smarter Together, where citizens participate in innovations of individual mobility or sharing concepts and urban renewal, we find significant user involvement. thinkport Vienna focuses on freight logistics, which is a less tangible topic for most citizens, and therefore they are not involved in every project. Yet, Peter Rojko told me that thinkport Vienna tries to improve public participation and works with aspermobil Lab in that matter: “We are very close with the colleagues from Aspern [.mobil Lab], and exchange information about citizen involvement for example. Together, we try to provide something for Vienna in that matter” (P. Rojko, personal communication, 25 May 2021).

Lastly, I could observe a strong alignment in reply to whether the work of ULLs influences urban planning decisions in Vienna. All representatives of the City of Vienna agreed. The general view here is that participating in a lab, changes which decisions a person takes in the future – therefore, the correlation. Yet, Thomas Madreiter and Gerrit Thell emphasize that the labs are not the “monocausal” reason why planning decisions are taken in one way and not the other.

Challenges for ULLs and how they aim to overcome them

To objectively understand the case of ULLs in Vienna, we must make a clear distinction between the three ULLs included in that study. On the one side are the Austrian mobility labs, thinkport Vienna, and aspermobil LAB, on the other side Smarter Together. Since Smarter Together was initiated and managed by the City of Vienna, the project did not face challenges that impeded effective collaboration. Bojan Schnabl, my interview partner from Smarter Together, could not think of any specific difficulties in cooperating with the city administration from his viewpoint as communication manager of the project.

Furthermore, many municipal departments and subsidiary companies of the city were directly involved in Smarter Together. The project acted as a hub of exemplifying the experimental approach to urban development and carried it throughout the municipal administration structure. Besides executing urban renewal with a vision, the immediate result was a long list of follow-up projects that transmit the idea of Smarter Together beyond the project's end date. In that sense, Smarter Together overcame the common problem of upscaling and broader embedding of the project. Other projects and actors subsequently used the reciprocal learnings from the initial ULL – Ersoy and van Bueren call this a learning ecosystem (Ersoy & Van Bueren, 2020). Creating this learning ecosystem was possible because of Smarter Together's unique position within the city administration. The project received high recognition within the administration and became a representative example of Vienna's innovative planning and implementation projects.

Aspermobil LAB and thinkport Vienna do not have the institutional proximity to the city administration that Smarter Together had. So, besides the challenge of setting up the lab, which all of the ULLs reported, aspermobil LAB and thinkport Vienna faced *scepticism* towards their work as well as *operational and practical* difficulties collaborating with Vienna's public administration. Therefore, the ULLs installed tactics to overcome the

challenges in cooperating with the Viennese administration to unfold their full potential for transforming urban planning processes in Vienna.

Although none of my interviewees personally harbours distrust against ULLs, some reported scepticism of politicians and colleagues in the municipal departments. The scepticism mainly occurred at the beginning of the labs' existence. Dieter Häusler, for example, said that some political decision-makers in the districts ignore the labs' findings and rather trust their knowledge about the local situation. To tackle this issue, the ULLs have identified potential in realizing projects with external actors. By doing so, they showcased the possibilities of the labs and reportedly built a starting point for talks about future projects with the city. In that matter, the labs used a tactic in line with Dijk and colleagues' suggestions. In case of *low institutional receptiveness*, they suggest bringing outcomes of Living Labs to traditional channels of democratic representation and fostering a public discussion with and within political representatives (Dijk et al., 2019). Von Wirth and colleagues observed a similar tactic they called *activating network partners* in their study of multiple European ULLs and highlighted that "transparency and communication of actions and activities create openness to the innovation process and to change in the making itself" (von Wirth et al., 2019). In the same vein, Fünfschilling and others write about the importance of trust for experimental practices in their paper on urban experiment and sustainability transitions. They claim, "experimentation is open-ended and requires *trust* in both the people who are collaborating in the experimentation as well as in the experimentation process itself" (Fuenfschilling et al., 2019; emphasis added).

Another tactic is fostering support through *ambassadors* in the administrative institutions of Vienna. A set of individuals, many of which I have interviewed, support ULLs and their seeking for transformation. The high-ranked ambassadors (i.e., planning director; head of Smart City Vienna; project manager of Vienna 2030) agree that business-as-usual is often outdated and insufficient to approach contemporary urban issues and raise Vienna's climate resilience (T. Madreiter, personal communication, 14 June 2021). The ULLs are well aware of the ambassadors' value for the labs. The fact that multiple high-ranked civil servants support the use of ULLs for Vienna's urban planning might lead to the future growth of the labs in number and relevance.

The main tactic of ULLs to improve the collaboration with Vienna's administrative body is the institutionalization of the cooperation. Both the ULLs and the City of Vienna seek to institutionalize the labs to overcome existing operative issues that comprise rigid planning processes and strict hierarchies. Judging by the interviewee's answers, the question is not if or when, but how to institutionalize? But it seems that the right level of institutionalization might be a fine line that is hard to find. While inclusion into Vienna's structure would mean funding security and longevity for the labs, it likely would also mean losing liberties in the way of working and, therefore, loss of transformation potential. Savini and Bertolini list in their study typical trajectories of niches as experiments (like ULLs) in the context of urban development and planning once the policymakers recognize them. In Vienna, the public administration has already recognized ULLs and started implementing them in urban

development and planning guidelines (STEP 2025, Smart City Framework Strategy, Vienna 2030).

Furthermore, public servants know about the ULLs and speak of them with high expectations. This situation resembles what Savini and Bertolini call *assimilation*. In this case, an emerging practise is recognized as innovative or transformative by its environment. Yet, the environment acts upon the practice to disempower its political value. Assimilation creates a paradox relation between the emerging practice and the institutional order, as the institutions employ the “transformative” practice and actively upscales it, but at the same time understates the more profound potential for change. Therefore, assimilated practices are those that – although recognized as potentially transformative – are constrained to give up their transformative potential in order to survive (Savini & Bertolini, 2019).

With the tactic to further institutionalization, ULLs in Vienna must be careful not to be assimilated into the established institutional order. Assimilation bears the risk of emptying the potential for institutional change of urban planning in Vienna. Instead, they should aim for the *transformation* trajectory that Savini and Bertolini describe. A niche might also transform existing regulations and the physical urban fabric. In some cases, practices evolve from being a niche to become the established order, empowering new actors and changing urban spaces and regulations. In other cases, the practice stays a niche but continuously and effectively confronts the existing order. An example of a niche that evolved along the transformation trajectory is cycling in Amsterdam (Savini & Bertolini, 2019). After the Second World War and the advance of cars, cycling drastically declined, and many experts expected bicycles to disappear in the 1950s and 1960s. But in the 1970s, the momentum changed, and Amsterdam’s cycling numbers are on the rise ever since. Policy and planning had to react and adapt to this development, and today Amsterdam is often seen as the world's cycling capital (Oldenziel et al., 2016).

Accordingly, if Vienna wanted to become something like a ULL capital, the local labs ought to aim for the *transformation* path in their evolution. But it is unclear if that path is even desirable for the labs or helpful for achieving sustainability goals (von Wirth et al., 2019). Furthermore, how the ULLs can achieve the institutionalization they are aiming for remains is not fully answered yet. As suggested by two of my interviewees, creating a “superstructure,” that functions as an exchange platform between the labs and the urban administration could be one solution. They expect such superstructure to allow the ULLs to directly address a topic that the city authorities identified as an issue.

Additionally, an overarching structure could help overcome the difficulties of setting up ULLs in the future because knowledge can be preserved and passed on routinely. The Amsterdam Smart City is an international example of a comparable system. It functions as an interface (i.e., superstructure) to connect innovative practices and create synergies for institutional innovation. For Savini and Bertolini, this is an example of the previously mentioned assimilation process. Actors in key positions promote the network yet witness little change of power structures of the existing regulatory framework of the city (Savini & Bertolini, 2019). Puerari and colleagues counter this statement, suggesting cities should create a portfolio or

“urban labs ecosystem” to broaden the impact and visibility of ULLs, and enhance learning and knowledge development across different labs (Puerari et al., 2018).

An alternative for the institutionalization of ULLs is how Vienna conducted Smarter Together. The example of Smarter Together shows that the city is willing to contribute to an innovative milieu for urban sustainability. After identifying a demand, the city applied for and received EU funding and managed the project through experts from the municipal departments. This process could be an example framework for ULLs in the future, as also Johannes Riegler from JPI Urban Europe suggests: “Ideally, cities would decide on an issue to address, identify relevant partners, and submit the project for funding” (J. Riegler, personal communication, 20 July 2021).

Conclusion

I conducted this study to get a detailed understanding of ULLs in Vienna, specifically to find out how the local ULLs aim to overcome challenges in collaboration with the city administration. The three ULLs in the focus of this study are currently at the end of a cycle. While Smarter Together officially ended as a project (with many follow-up initiatives), aspern.mobil Lab and thinkport Vienna are at the end of the first four-year funding period and recently applied for new funding from national pots. Therefore, the timing fitted for the experts to reflect on the whole operation time of the labs.

I observed that the general sentiment towards ULL is very positive, and civil servants and staff of public institutions who know about the ULL concept have high expectations. At the same time, the nature of the urban administration of Vienna creates challenges for the ULLs. Therefore, they have difficulties unfolding their potential to perpetuate urban sustainability in various fields and meet administration and decision-makers expectations.

The challenges the ULLs face in collaboration with the urban institutions are mainly operative difficulties related to the rigid structure of Vienna’s administration on the one hand and scepticism of individuals in the municipal departments on the other hand. As expected, the ULLs employ tactics to meet the challenges they are facing. The tactics aim to build mutual trust with the established urban planning institutions, with the ultimate goal of institutionalizing the collaboration between the city and the ULLs. In this endeavour, the ULLs can already rely on trust and support from high-ranked ambassadors in the institutions of Vienna. The civil servants already anticipate the implementation of the labs in the institutional order of the city. However, the further inclusion bears the risk of assimilation of the ULLs, therefore, a loss of their transformational potential. Additionally, it remains unclear how ULLs can realize the transformative potential, literature attests to them. A study by Bylund, Riegler, and Wransten notes that despite increasingly uncovering areas of improvement over the last decade, “few if any, urban living labs have made concrete contributions to urban transformation” (Bylund et al., 2020). Yet, the authors also identify *integration in local and regional ‘proper’ governance* as one of the current challenges for ULLs, which is in line with the anticipations of the Viennese civil servants.

The public servants in Vienna place little gravity on the aspect of citizen participation in the labs. They mainly recognize ULLs as a vehicle to create network power between different urban actors. It is important to note that user involvement plays a positive role in raising the transformation potential of ULLs for sustainability. However, it is not the only requirement for ULLs to propel change and successfully implement sustainable solutions for urban problems (Menny et al., 2018). In the current situation in Vienna, the ULLs secure the involvement of citizens, as the lab representatives are aware of its importance for the outcomes of the labs. Suppose the labs take on the assimilation path towards further institutionalization; user involvement might risk falling behind in the Viennese ULLs, lowering their potential to catalyze urban sustainability.

For a future outlook, interviewees suggested a “superstructure” for ULLs, as a solution to coordinate and implement the labs in the institutional order of the city. Also, von Wirth and colleagues point towards a coordinative institution that could be beneficial: “New actors may be needed in order to coordinate and (further) support the adoption of individual experiments within broader transition schemes in the city” (von Wirth et al., 2019). The question of how this superstructure/framework/institution for ULL implementation in Vienna could look needs to be answered soon. Then ULLs in Vienna might be able to unfold their full potential to improve urban planning processes, and by doing so, contribute to the urban sustainability goals of the city.

In conclusion, the ULLs in Vienna observed in this study gained noticeable momentum and acceptance over the last five years. Smarter Together had a not negligible impact on the gross of innovation projects in Vienna. At the same time, thinkport Vienna and aspern.mobil lab enriched the urban mobility sector for both freight and people. The public servants who took part in this research reported high expectations in the labs' activities and based these expectations on the achievements of the labs. As expected, the labs face challenges in collaboration with the administrative institutions. To overcome the obstacles, the ULLs build trust and further implement the labs in Vienna's administrative order.

Limitation of the research & future outlook

I conducted this research during the global COVID-19 pandemic, which also influenced the work of ULLs. Many of their activities moved to online platforms, and participants could not live out the intrinsic aspect of the ULLs as participants could neither interact face-to-face with each other nor experience the space. Therefore, I decided to focus on individuals who either work in the labs or the institutional order of Vienna. A similar study in the future might also include views of citizens, who participated in labs, to understand how and to which extent they are included in decision-making processes in the ULLs.

Ina Homeier, Christina Kirchmair and Gerrit Thell gave me a future outlook by introducing the “Climate Hub Vienna”, which is currently in the planning stage. They described it as a platform supporting co-creative processes and representing a hub between Living Labs and municipal institutions. Studying the “climate hub Vienna” once it is operating will undoubtedly mean a valuable contribution to ULL research. It might inform the design of future collaboration

frameworks for ULLs and municipal structures. Furthermore, future studies should examine how Vienna realizes the institutionalization of ULLs to their urban planning system.

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