



# AN URBAN LIVING LAB **APPROACH** FOR THE IMPLEMENTATION OF CLIMATE ADAPTATION MEASURES



**OPPORTUNITIES FOR  
HOVINBYEN, OSLO**



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## COMMISSIONERS

Kjetil Kristensen  
kjetil@socentral.no  
+47 926 150 08  
Øvre Slottsgate 3  
N-0157 Oslo, Norway  
SoCentral

Isabel Seifert-Dähnn  
isabel.seifert@niva.no  
+47 982 154 14  
Gaustadalléen 21  
0349 Oslo, Norway  
NIVA

## AUTHORS

Maureen van den Brink\*  
Rosalie Fidder  
Janneke Remmers  
Jeroen Schoonderbeek

## SUPERVISOR

Bert van Hove



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### \*CORRESPONDENCE

maureen.vandenbrink@wur.nl

# FOREWORD.

This document contains recommendations for running an Urban Living Lab (ULL), with special consideration for climate adaptation opportunities. It is written as part of the 'Design of Climate Change Mitigation and Adaptation Strategies' (WSG60812) course at Wageningen University & Research. The purpose of this course for students is to gain more experience with consultancy by working on a project for a real-life client. Our project was commissioned by NIVA and SoCentral. The Norwegian Institute for Water Research (NIVA) is a non-profit research institute with a broad scope in environmental, climatic and resource-related research. Moreover, it is Norway's leading institute in marine and freshwater research (NIVA, 2018). SoCentral is an organisation whose purpose is to solve the most important social challenges of our time, by fostering cross-sector collaboration and innovation, and by sharing knowledge and models for others to use and copy. The overarching goal is system change (SoCentral, 2018).

We, Maureen van den Brink, Rosalie Fidder, Janneke Remmers and Jeroen Schoonderbeek, are four Master Climate Studies students. Each of us contributed their own skill set and open mind, which resulted in excellent teamwork. We are passionate about the innovative concept central to this project. Throughout the whole process we adapted the aim of our research on the basis of preliminary findings. Initially, the aim of this research was to apply an urban living lab approach to storm water solutions in Hovinbyen, Oslo, through the design of a 'toolbox'. In a later phase of our research, we realised that this approach is not suitable for ULLs: they are highly context-specific, making it difficult for us to design a few ULL concepts in this time-span, and without visiting the site. For this reason, we changed our focus to more general recommendations for running living labs in Hovinbyen. These are based on valuable interviews with several experts and stakeholders, and will provide new insights to New Water Ways.

We would like to thank several people who have helped with the creation of this report. We thank, first and foremost, Bert van Hove, who guided, supervised and supported us throughout the process. Kjetil Kristensen of SoCentral and Isabel Seifert-Dähnn of NIVA provided us with feedback, input and ideas. We like to thank them for this. Last but not least, we would like to thank our interviewees: the experts, the stakeholders of the Urban Living Labs (ULLs) and the experts from Hovinbyen. We would also like to thank the people from Hovinbyen who have filled out the online survey. The information obtained from all these personal accounts were indispensable for the creation of this report.

# EXECUTIVE SUMMARY.

One of the major challenges of the 21st century is climate change. Such a 'wicked' problem begs for new and innovative solutions. A promising new approach is an Urban Living Lab (ULL), which aims to enhance participation of different parties, and test and co-create new solutions in a real-life urban setting. New Water Ways aims to design such new solutions applied to (storm) water management (New Water Ways, 2018a). For this reason, ULL is an interesting field of research for them. Not only New Water Ways is interested in ULLs - for Oslo Kommune, urban living labs are also highly relevant. To tackle the expected future water problems in Oslo, the municipality called for a collaboration between everyone; from citizens to companies (Oslo Kommune, 2016). ULLs could play a role in this as well (as suggested by New Water Ways, 2018b). So, further research on urban living labs applied to Oslo could be of indispensable value for several stakeholders.

ULLs have no clear definition; in the literature, a plethora of definitions exists. However, key characteristics of urban living labs often recurring are innovative ideas; experiments to test these ideas; and the drive to learn from this. This has resulted in the following research question: how can ULLs be set up in a quick manner, while being of good quality and involving several groups within the society?

To answer our research question, we conducted a literature review, and interviews with experts on a) citizen participation, b) ULLs, and c) Hovinbyen. Based on the literature review, we establish our own definition:

*“An Urban Living Lab is an approach to innovation and learning by engaging all stakeholders, who will form public-private-people partnerships; co-create and test new technologies, services, products, systems and/or discourses in a real-life urban setting; and critically reflect on the whole process, challenges and results.”*

Besides this, we identify seven characteristics of urban living labs: **Urban real-life setting, Participation, Co-creation, Experimentation, Learning process, Innovation** and lastly **Evaluation**. We also discuss several similar lab configurations which bear similarities with ULLs, such as City Labs, Regional innovation networks, Smart Cities and Field Labs. Furthermore, there are several ways of categorising ULLs, based on **initiators** and **user-involvement**. As all urban living labs are different, it is good to consider that no categorisation can be made which focuses on all important aspects of an urban living lab. The first type of categorisation is based on initiation and can be seen as a bottom-up versus a top-down approach. Four sub-categories can be determined: **utiliser-driven ULLs** (company initiation), **enabler-driven ULLs** (large-scale actor initiation, e.g. municipalities), **provider-driven ULLs** (universities and consultants) and **user-driven ULLs** (local scale actors). The second type of categorisation is based on user involvement. This can be understood as a scale from minor citizen influence to citizens in control.

The interviews are the foundation of the recommendations for the management of ULLs. We have found that no real, one size fits all toolbox can be made, as the process differs for each ULL. Nonetheless, the lab process can be broadly divided into three phases: initiation, implementation and finalisation. Several remarks are also given about the **Whole process**, where it is important to have all expectations aligned, have good communication and build trust on that. The availability of resources is also important. Furthermore, when setting up a ULL the initiators should be aware that the design, implementation and operation of ULLs are time consuming. Lastly, innovation, evaluation and learning are important aspects of an urban living lab. During the **Initiation** phase it is firstly important to question whether a ULL is suitable for the problem or the idea. Next, a good definition of the problem or idea needs to be stated. Finally, involvement of the right stakeholders is important and a clear organisational structure needs to be defined. During the **Implementation** phase several aspects are important to consider. The first aspect is whether the ULL is led bottom-up or top-down. Furthermore, both experts and inhabitants need to be included.

It is also quite important during this phase to include a fun factor in the process and that the project is visible. The commitment of the stakeholders can also determine the success of the ULL. Lastly, during the **Finalisation** phase the evaluation and knowledge preservation need to be included, so that future urban living labs can learn from previous ones. It is also important to include follow-up steps, with for instance the scaling up of ULLs to other places.

WHOLE PROCESS	INITIATION	IMPLEMENTATION	FINALISATION
Similar expectations	Suitability of the problem or idea for a ULL	Top-down guidance versus bottom-up	Evaluation and knowledge preservation;
Communication and trust	Definition of problem or idea	Expert versus the inhabitants	Follow-up steps
Availability of resources	Participation	Visibility and fun	
Time	Organisational structure	Commitment of stakeholders	
Innovation			
Evaluation & Learning			

We apply these lessons to our case study, Hovinbyen in Oslo. Just like most cities, Oslo expects to be affected by climate change, e.g. more frequent flooding. At the moment, this issue is hardly present. Nonetheless, Oslo Kommune wants to prepare for future problems. Hovinbyen appears to be a quite suitable environment for ULLs: Hovinbyen is a test area, where new innovations can be launched. The area is emerging as an extension of the more busy Oslo. Through the rapid transition of the area, several challenges for its development arise: fragmentation and lack of identity and community, which is further enhanced by the rapid expansion.

Our recommendations can be used to operate new ULLs in Hovinbyen. Designing ULL concepts is impossible without a co-created process with local stakeholders. However, to serve as an inspirational example, we describe a couple of fictional ULLs about Hovinbyen and P adriv, a test and innovation platform initiated by SoCentral in Hovinbyen. They can be used to explain what a ULL is, what its impact could be, and generate a discussion.

There are several aspects to consider when reading this report. The first one is related to the ending of an Urban Living Lab process. One might gain the impression from the three distinguished phases of a ULL that a living lab always has a clear **ending**. However, ULLs can also be continuous projects without a set end-date or -goal. The finalisation phase will then be different or not present. The second aspect is about **convenience versus ideal**. We notice that there appears to be a tension between convenience and practicalities on the one hand, and the ideal living lab situation on the other hand. The last aspect we discuss is **co-creation: challenges similar to participation**. Here, it is highlighted that participation is a necessity for co-creation. Because of this, the challenges for both are similar.

Future research can also build upon our research. We pinpoint three main possibilities to extend our research: the innovation characteristic; pitfalls for each category; and the relationship between the characteristics participation and co-creation.

As mentioned before, it is not to develop one set of guidelines due to the case- and context-specific character of ULLs. Moreover, managing a ULL is not linear or straightforward, but an iterative process. All in all, Urban Living Labs help in order to participate, co-create, evaluate, learn, experiment with and innovate (new) solutions. When all these characteristics are present to a high degree, the ULL can be said to be 'of good quality'. The ULL approach is a wonderful way to enhance citizen engagement and understanding of certain issues; and design new solutions. Furthermore, it can serve as an innovative test-ground for climate adaptation measures.

**Key words:** urban living lab, open innovation, co-creation, citizen participation, Hovinbyen, urban transition, climate adaptation measures.



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# 1. INTRODUCTION



*One of the major challenges of the 21st century is climate change. Such a 'wicked' problem begs for new and innovative solutions. A promising new approach is an Urban Living Lab (ULL), which aims to enhance participation of different parties, and test and co-create new solutions in a real-life urban setting.*

## 1.1 PROBLEM STATEMENT

Climate change is a problem that will not be solved through one solution; a societal change is needed (Klein, 2014). This means that all layers of society, all sectors, will have to become involved in a transition to sustainability. Multiple angles and approaches are necessary that all contribute to this transition, such as policy or market forces. A new approach to such problem-solving is the so-called Urban Living Lab'. ULLs have potential to tackle several issues in which humans are involved, among which climate change. It is a relatively new concept, so no widely used or recognised definition of a ULL exists yet. However, it is possible to define some common characteristics: co-creation, innovation, a real-life use context, experimenting and learning (Steen & van Bueren, 2017). Box 1 shows an example of a ULL. ULLs could help cities with their sustainable transition. The urban living lab approach could be used to not only involve citizens, but make them active participants in the process. This in return could lead to new insights about the problems at hand and advance innovation (McCormick & Hartmann, 2017; Steen & van Bueren, 2017). Furthermore, it would ensure a match between the needs of the local users and the final implementation (Steen & van Bueren, 2017). Moreover, through co-creation, creative and new solutions can be tested. In the next section, the concept of an urban living lab will be discussed more extensively.

To focus our research, we will apply the ULL concept and recommendations to an industrial district in Oslo, which is currently transitioning to a more blue-green area: Hovinbyen. Climate change increases the frequency and severity of weather events, such as excess rainfall and droughts. Especially cities, which house around %54 of the global population, can be vulnerable to climate change (Jones, 2018; United Nations, 2014). For Oslo, Norway, this is a challenge. As a large part of Oslo's urban area is covered with impervious surfaces, storm water retention is limited which makes Oslo vulnerable to flooding at extreme precipitation events. So, storm water has been recognised to become one of the biggest challenges to tackle in the future (Climate Change Adaptation Strategy for the City of Oslo, 2014). Hopefully, ULLs can play a role in this.

As a new and upcoming concept, ULLs have been researched extensively by several academics and institutes. This has resulted in a plethora of different guidelines and handbooks. This document is meant as a next step in the field of ULL research; it synthesises recommendations from expert-interviews and supports this with existing guidelines and handbooks. Moreover, recommendations are made specifically tailored to Hovinbyen, the case study for New Water Ways.





## BOX 1: DE CEUVEL

**LOCATION:** AMSTERDAM

**TIMELINE:** 2000 - NOW

### PROJECT:

De Ceuvel is a sustainable experimentation site in a former shipyard in Amsterdam. A community of entrepreneurs and artists has formed after a group of architects won a tender by the municipality in 2012. Circular, future-proof buildings were constructed by locals. One of their most famous experiments is cleaning the heavily polluted soil by using specific plants. De Ceuvel is now a well-known example of sustainable experimentation within the Netherlands and abroad, and promotes sustainability through gatherings and workshops.

SOURCE: <https://delva.nl/projecten/zuiverend-park-de-ceuvel-amsterdam/>, [Visited on : 30-05-2018]

## 1.2 RESEARCH QUESTIONS

This project will investigate the best practices to start an urban living lab. The aim of this project is to design a toolbox for urban living labs with recommendations applied to the Hovinbyen case. This leads to the following research question:

***How can a ULL be set up in a quick manner, while being of good quality and involving several groups within the society?***

In order to answer this question, we have developed the following sub-questions:

1. *What is a ULL?*
2. *When is a ULL of 'good quality'?*
3. *Which steps have to be taken to implement a ULL?*
4. *Which categories of ULLs can be identified?*

## 1.3 RELEVANCE

This project contributes to the work packages in a larger project called New Water Ways that aims to design sustainable urban water management. The main goal is to “help Norwegian cities become frontrunners in the transition to sustainable [urban water management] – moving from drained cities to green, liveable, climate-adapted and water-sensitive cities” (New Water Ways, 2018b). Presently, the storm water issues are not always critical, but New Water Ways would like to prepare for future challenges by involving water solutions in current urban development (Interview 14). This

research contributes to their first step in the investigation of urban living labs. In that sense, the outcome of this project will be used as inspiration and input for the fourth work package of New Water Ways. Eventually, it could be used to guide future urban living lab initiatives and help cities to effectively involve their citizens in (climate) management. As the municipality of Oslo has designed a new action plan in 2016 to tackle storm water issues, the outcome of the project should also be relevant for the municipality itself. Table 1 gives an overview of the commissioners within the project.

**TABLE 1: An overview of main institutes involved in our project:**

Party	Description
SoCentral	Commissioner; Organisation aimed at solving the most important social challenges of our time
NIVA	Commissioner; Norwegian Institute for Water Research
New Water Ways	Work package including interest in ULLs; Research project by several parties (a.o. SoCentral and NIVA), aimed at innovative water management
Pådriv	Test and innovation platform initiated by SoCentral

## 1.4 REPORT OUTLINE

In **Chapter 2** we will discuss the methodological approach followed in this study. In **Chapter 3** we will give a review of the different definitions for ULLs found in literature. Based upon this, we come to our own definition. We will use both our definition and the characteristic to build on in the rest of the report. This will aid us in the search of potential ULLs or useful innovation projects. Moreover, we will discuss some forms of categorisation. Some types of categorisation will be used in the boxes containing specific examples of ULLs. After we de-

scribed the lessons learned in **Chapter 4**, we will apply this to the case study of Hovinbyen (**Chapter 5**). We will present the current issues at hand. Based on those issues, some imaginary ULL designs for this area will be described. Finally, we discuss and conclude the report, in respectively **Chapter 6** and **Chapter 7**. Throughout the report multiple boxes are included. These describe the different urban living labs or projects we have researched.

# 2. METHODOLOGY

*This project will explore and evaluate living labs in an urban setting and summarise these findings in the form of a set of recommendations for future organisation of urban living labs. The project consists of two main research steps. Firstly, an evaluation of existing living labs through interviews and a literature review, and secondly, a synthesis of this information. The material of the literature study will primarily be found online and consists of secondary sources. Examples of literature include academic papers, newspaper articles and blogs about ULLs. Several execution phases can be distinguished:*

## ● PHASE 1: BACKGROUND RESEARCH, EVALUATION AND CATEGORISATION OF URBAN LIVING LABS.

Numerous Urban Living Labs have been initiated, with varying levels of success. In this phase, we made an inventory of the ULLs described in literature and on websites. In addition, we interviewed (in person or via Skype) four experts working in the field of citizen participation (see Table 2 for an overview). In Appendix A, the full interview summaries are provided. As such, a shortlist of examples was obtained that was examined further. A selection of these was made on the basis of:

- Compatibility to ULL characteristics;
- Phase of the ULL: they had to be in an advanced phase to ensure that they had the time to learn and draw lessons from the ULL process;

Different ULL definitions were compared, evaluated and categorised. From this we derived one single definition that fits the scope and aim of the current project.

**TABLE 2:** Interviews conducted with experts

Interviewee	Expertise
1. Jeroen Kruit	Landscape Architecture and Cultural Planning, Wageningen University & Research
2. Christian Scholl	Post-doc at the ICIS Institute, Maastricht University & coordinator of the Urb@exp research project
3. Wiebke Klemm	Postdoc AMS Institute, focus on Green & Blue Living Labs
4. Judith Klostermann	Researcher at Alterra, focus on governance of adaptation to climate change

### ● PHASE 2: STAKEHOLDER INTERVIEWS.

Eventually, we conducted interviews with stakeholders from nine urban living labs (see Appendix A for the full interview summaries and Table 3 for an overview) either in person, or via Skype. The interviews were done iteratively; for each new interview lessons learned from the previous interview were used to possibly change the focus of the next interview. The results were structured based on the process of a ULL and the most important bottlenecks found during the interviews.

### ● PHASE 3: ANALYSIS.

The results from the interviews are analysed to make the recommendations for setting up a ULL quickly and with good quality. Research from phase 1 is used to accompany the analysis.

### ● PHASE 4: CASE STUDY HOVINBYEN.

The Hovinbyen area in Oslo is used as a case study, to translate the knowledge obtained in the previous phase. We conducted in-depth interviews with a local and an expert of the area via Skype, as well as an online questionnaire with locals (for the interview summaries and the questionnaires see respectively Appendix A and B, for an overview see Table 4). The results were used to design a few examples of ULLs that could serve as inspiration for Hovinbyen.

**TABLE 3:** Interviews conducted with Urban Living Labs/Projects

Interviewee	Expertise
5. Alessio Antonini	MK:Smart & MKInsight, Milton Keynes (UK)
6. Project leader of Healing Gardens	Healing Gardens, Almere
7. Wim de Haas	Buiksloterham, Amsterdam
8. Doesjka Majdandzic	Stadslab Apeldoorn (citylab), Apeldoorn
9. Michel Handgraaf	The Student Hotel, Amsterdam
10. Godecke Blecken	Green Blue Cities, Kiruna (Sweden)
11. Maarten Terpstra	Knowledge Mile & Hemelswater, Amsterdam
12. Harko van den Hende	Fieldlab, Amsterdam
13. Ivonne Jansen-Dings	Amsterdam Citizens Lab, Amsterdam

**TABLE 4:** Interviews conducted with experts Hovinbyen

Interviewee	Hovinbyen
14. Håkon Iversen	New Water Ways + Pådriv
15. Hege Grande Fjellbirkeland	Citizen in Hovinbyen + Pådriv

# 3. THE CONCEPT URBAN LIVING LAB

*ULL is a relatively new concept that is still being developed. Currently, this field of research is moving towards establishing a more uniform definition and clear, unambiguous characteristics (Interview 3; van Soest, 2017; Steen & van Bueren, 2017; Voytenko McCormick, Evans, & Schliwa, 2016). Because of this and the context-based aspect of urban living labs, it is important for the New Water Ways project to define their own definition. The first part of this chapter entails this. Furthermore, it is crucial to operationalise the project definition through establishing the characteristics of a ULL (Amsterdam Institute for Advanced Metropolitan Solutions (AMS), 2017; Steen & van Bueren, 2017), which will be done in the second part. Each characteristic will be described in detail. Then, concepts similar to ULLs that are often used in literature (Almirall, Lee & Wareham, 2012, Edwards-Schachter, 2012; Schaffers et al., 2011; Scholl & Kemp, 2016; van Soest, 2017), will be discussed shortly. This is done to provide the bigger picture of the whole research field, to which ULL belongs. Finally, types of urban living lab categories will be discussed to further analyse them.*

## 3.1 DEFINING ULLS

As stated previously many definitions are used for the concept of ULLs (Interview 2; Interview 3; van Soest, 2017; Steen & van Bueren, 2017; Voytenko et al., 2016). It has also been argued that within each project a specific definition has to be determined (Almirall et al., 2012; Interview 2). That is why multiple definitions are compared in order to come to a sound definition for the New Water Ways Project. See Appendix C for a list of handbooks and literature for more definitions

and information about characteristics or the design process. We have not included these definitions for various reasons. Firstly, some were quite similar to the ones used in this section. Secondly, sometimes the given definitions were not clearly distinguishable from the rest of the text. Finally, we only want to give the most relevant definitions. Therefore, we have limited it to three. These three definitions show the process of coming to our own definition.

### IN BETWEEN: HEMELSWATER BIER

Hemelswater is the first beer that is crafted with rainwater. The MediaLAB Amsterdam (part of the University of Applied Sciences in Amsterdam) together with a few students investigated the possibilities of this beer. The project was a collaboration between MediaLAB Amsterdam, Amsterdam Rainproof and brewery the Prael. Around the campus, several rain barrels collected

the water needed for brewing the beer. In July 2016, the first beer was launched. The aim of the project is to create awareness of water problems and resource use in a fun way. The project received major attention from national and international media. Key of this success was the 'fun factor' and also the trend of brewing craft beer. Currently, they are planning to scale up the whole project.



The next definition is a good starting point of this process:

*“Living Labs represent an approach to user-centred innovation by engaging users actively as contributors to the creative and evaluative processes in innovation and development.” (de Kraker, Cörvers, Scholl, & van Wanroij, 2016, p. 337)*

This definition emphasises user participation and co-creation. On top of that, this definition focuses specifically on innovation and development, so it underlines the learning curve within a ULL. These aspects are considered important by some (Interview 2; de Kraker et al., 2016; Juujärvi & Pessa, 2013). Implicitly this definition states that a ULL should be based on real-life setting (user-centred; engaging users), but this aspect should be identified more clearly, since it is an important part of an urban living lab (AMS, 2017; Steen & van Bueren, 2017).

This second definition by Juujärvi and Pessa (2013) incorporates this aspect explicitly:

*“The living lab is a virtual reality or a physical region in which different stakeholders form public-private-people partnerships of public agencies, firms, universities, and users collaborate to create, prototype, validate, and test new technologies,*

*services, products, and systems in real-life contexts.” (Juujärvi & Pessa, 2013, p. 22)*

This definition focuses on the inclusion of all stakeholders and co-creation, as well as a real-life setting of the ULL. Participation and the real-life setting are mentioned as important aspects of a ULL (AMS, 2017; Interview 3). Besides this, it still includes the innovation and development aspect, yet it is put slightly more to the background compared to the first definition. Finally, The European Network of Living Labs (ENoLL), the international federation of benchmarked Living Labs in Europe and worldwide, defines a ULL in the following way:

*“Living Labs (LLs) are defined as user-centred, open innovation ecosystems based on systematic user co-creation approach, integrating research and innovation processes in real life communities and settings.” (ENoLL, 2006)*

This definition is also used by AMS (AMS, 2017), but they critically reflect that this definition does not provide a framework for direct action, because it is too abstract. This point of critique applies to the first two definitions too. Still, this final definition encompasses the most important aspects of an urban living lab in a more equal manner, though evaluation/critical reflection is missing.

## 3.2 OUR DEFINITION

All three definitions discussed in the previous section are used as a starting point for our own definition. For this project the following definition will be used, covering all aspects of a ULL:

***“AN URBAN LIVING LAB IS AN APPROACH TO INNOVATION AND LEARNING BY ENGAGING ALL STAKEHOLDERS, WHO WILL FORM PUBLIC-PRIVATE-PEOPLE PARTNERSHIPS; CO-CREATE AND TEST NEW TECHNOLOGIES, SERVICES, PRODUCTS, SYSTEMS AND/OR DISCOURSES IN A REAL-LIFE URBAN SETTING; AND CRITICALLY REFLECT ON THE WHOLE PROCESS, CHALLENGES AND RESULTS.”***

Our definition emphasises the real-life setting; participation; co-creation; evaluation; learning; experimentation and innovation all equally. In the next section, the setup of these characteristics will be explained.

The three definitions described before focused slightly more on certain aspects, while others were

not or only partially covered. This is logical, because these definitions were established to suit particular situations. Since all aspects are emphasised equally, our definition is applicable to this and other studies. The equal emphasis means that in this report the different ULLs in the boxes can be described more easily in a similar way. They will be discussed more in depth in the next part.



### 3.3 CHARACTERISTICS

Since none of the definitions can lead to direct, clear action, the concept of a ULL has to be operationalised (AMS, 2017; Steen & van Bueren, 2017). Defining clear characteristics of ULLs is one way of operationalising the definition (Steen & van Bueren, 2017). Multiple guidelines have been set up that all distinguish slightly different characteristics or emphasise other characteristics (AMS, 2017; Interview 2; Juujärvi & Pessa, 2013; McCormick & Hartmann, 2017). Here the characteristics of ULLs will be discussed based on the three components of its name: 'Urban', 'Living' and 'Lab'.

Firstly, 'Urban' is the most straight-forward component of these three. ULLs are used for solving complex challenges in an urban setting (de Kraker et al., 2016). This immediately tells that a ULL is a specific subset of Living Labs.

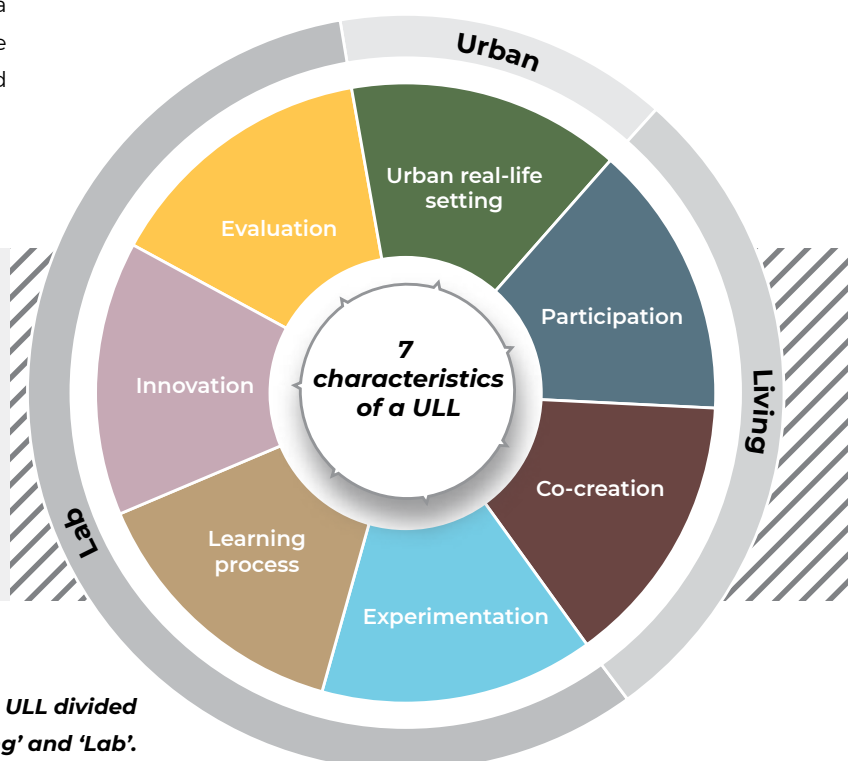
Second of all, the part of 'Living' encompasses three characteristics of a ULL: a real-life setting; participation; and co-creation. A real-life setting means that the ULL should be applied to a physical area (Almirall et al., 2012; van Bueren, 2017; McCormick & Hartmann, 2017; Steen & van Bueren, 2017), which in this project will be the Hovinbyen neighbourhood. Participation is the inclusion of stakeholders, everyone that is related to the issue, in the development and creation of a certain outcome. All included stakeholders will have decision power. This can lead to co-creation, the third

characteristic, because all stakeholders participate in the innovation and development of the urban living lab (Almirall et al., 2012; AMS, 2017; Interview 4; de Kraker et al., 2016; McCormick & Hartmann, 2017; Scholl & Kemp, 2016).

'Lab', short for laboratory, entails one main characteristic: experimentation. In a ULL the setup is not similar to a traditional research lab. Still, in the regular meaning of a laboratory, it is a place where experiments are conducted. The goal of an experiment is to test new products, methods, services or discourses. Thus experimentation is a crucial characteristic of a ULL (Interview 2; Juujärvi & Pessa, 2013; Kemp & Scholl, 2016; de Kraker et al., 2016; Voytenko et al., 2016). Through conducting experiments, a process of learning and innovating can be initiated (Juujärvi & Pessa, 2013; Kemp & Scholl, 2016; Voytenko et al., 2016). This makes that a ULL is constantly evolving/growing/developing. Throughout an experiment it is important to evaluate the process, results and analysis (Kemp & Scholl, 2016; de Kraker et al., 2016). So, a ULL is characterised by experimentation, which in turn is characterised by a learning process, innovation and evaluation. Thus, these last three are inherently characteristics of an urban living lab as well.

#### IN SUMMARY:

An ULL has the characteristics visible in Figure 1. Each ULL can determine which characteristics are more important for itself, but it should incorporate all characteristics to a certain extent (Almirall et al., 2012). This can lead to different ways in which a ULL can be set up resulting in a diversity of ULLs (Almirall et al., 2012; Bulkeley et al., 2016; de Kraker et al., 2016; Leminen, 2013).



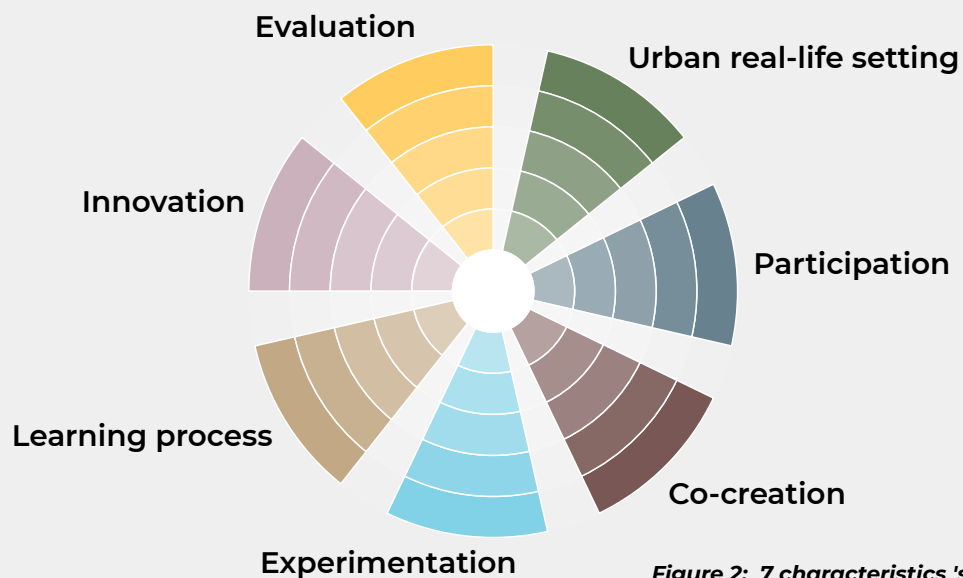
**Figure 1: The 7 characteristics of a ULL divided over 'Urban', 'Living' and 'Lab'.**

# ABOUT THE BOXES.

This report includes several 'boxes', which describe different ULLs or related projects that we investigated for this report. These boxes provide basic information about the location, the duration of the project and which category these boxes belong to. Furthermore, some background information about the project will be given.

All boxes are accompanied by a 'spiderweb' (Figure 2). In this spiderweb the 7 characteristics discussed in

chapter 3.3 are set out. Each characteristic can range from scale 1 to 5, from the inner circles to the outer circles respectively. If a characteristic scores a five, this means that this characteristic is most clearly present in this project. All characteristics were scaled based on a comparison with the other projects from this report. It should be noted however that the scales were not based on empirical and basic literature research. Therefore, they serve more as a quick overview of the ULL



*Figure 2: 7 characteristics 'spiderweb'*

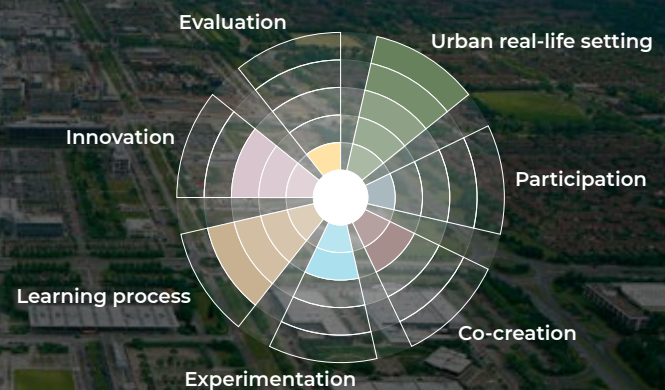


# INTERMEZZO.

## BOX 2: MK:SMART/ MKINSIGHT

<b>LOCATION:</b>	MILTON KEYNES, UK
<b>TIMELINE:</b>	MK:SMART: 2014- 2017, MK:INSIGHT: 2016 - PRESENT
<b>CATEGORY:</b>	
<b>INITIATOR</b>	UTILISER-DRIVEN
<b>USER INVOLVEMENT</b>	PLACTION, SOMETIMES PART- NERSHIP

### CHARACTERISTICS CHART:



<https://environmentjournalonline/articles/milton-keynes-half-century-green-innovation/>, visited on 1-06-2018

### PROJECT BACKGROUND

MK:Smart the project is in a sense **to collect data** from Milton Keynes on several types of data, and making good use of this generated data. The data is collected from the city, as well as by citizens, and covers transport, energy and water sector. The citizens are actively engaged in the project. Furthermore, the MK:Smart project is quite connected with entrepreneurial side of city, aiding startups and enterprises. The ULL includes educational components, and knowledge exchange, experimentation, learning and evaluation are lastly important parts of the ULL. In this, universities, next to governments play a role in the project as well.

MKInsight is part of the MK:Smart initiative, and **builds on the data collected** during MK:Smart. The goal of MKInsight is to provide information of Milton Keynes, in a quick and organized manner, more centrally. To do this they provide documents, information and data. Next to this they have created tools to explore this data in any convenient form. In the MKInsight project, the involvement of users is an important inclusion often forgotten in Smart City Models. The intent of this is to close the gap between what the user wants and what is measured, as Smart Cities can be quite costly.

### HIGHLIGHTS INTERVIEW:

- *SMART CITIES ARE EXPENSIVE*
- *ONLY MEASURE WHERE THERE IS NEED OF MEASUREMENTS;*
- *INCLUSION OF USERS IS IMPORTANT;*

### 3.4 RELATED CONCEPTS

Besides the link within the whole study field, ULLs are used in combination with other similar concepts in literature. Due to this link between the concepts, confusion might arise. That is why a short overview about four other concepts is given here: City Labs, Smart Cities, Regional Innovation Networks and Field Labs. Since these four share quite a few characteristics with ULLs and are more widely used as well, we selected these for further discussion (Capdevilla, 2014; Interview 9 ,7; Pekkarinen & Harmaakorpi, 2006; Rodríguez-Bolívar, 2015). Besides these four concepts, there are also other related concepts, for instance City Hub, Social Innovation and Citizen Initiative (Edwards-Schachter, 2012; Interview 10 ,1).

#### City Labs

Definitions of the concept 'City Lab' are similar to the definitions of Urban Living Labs (Capdevilla, 2014; Kemp & Scholl, 2016; de Kraker et al., 2016). Like a ULL, a City Lab can function as the overall organisation for multiple projects (Capdevilla, 2014). Both City Labs and ULLs emphasize all the criteria distinguished in the previous section. The main difference is that City Labs focus more on innovating planning processes and actively involve the (local) government. ULLs aim to

improve products, services, systems and discourses and ULLs do not necessarily involve a governmental body (Capdevilla, 2014; Kemp & Scholl, 2016; de Kraker et al., 2016). For these reasons, urban living labs often have a more technical and scientific approach compared to City Labs (Kemp & Scholl, 2016; de Kraker et al., 2016).

#### Smart Cities

A 'Smart City' is a city which uses complex IT to deal with equally complex economic, social and environmental challenges (Rodríguez-Bolívar, 2015; Höjer & Wangel, 2015). The main pillar of a smart city is technology, but it is a multidisciplinary concept. Therefore, IT has to be applied simultaneously as transitions in the government processes, regulations and structures are made (Rodríguez-Bolívar, 2015). The concept 'Smart City', like ULL, has still many definitions. For both concepts even similar definitions have been defined in literature (Anthopoulos, 2015; Rodríguez-Bolívar, 2015). However, a smart city focuses much more on IT and does not include experimentation, co-creation or evaluation compared to a ULL. On top of that, a smart city encompasses the whole city, while a ULL can be applied to only a neighbourhood as well (Höjer & Wangel, 2015; de Kraker et al., 2016; Voytenko et al., 2016).

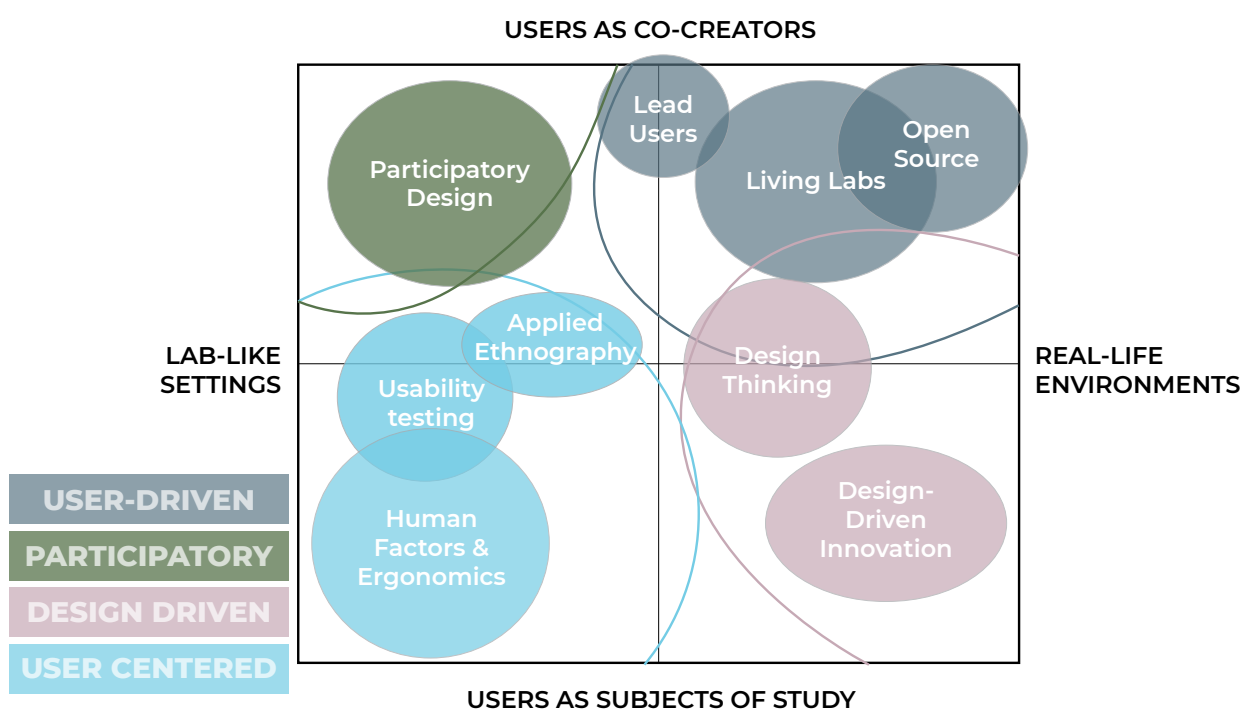


Figure 3: Position of Living Labs within the whole study field of citizen participation (Almirall et al., 2015, p. 16).

## ***Regional Innovation Networks***

Regional Innovation Networks focus on innovation; networks/cooperation; and learning (Cooke, 1996; Pekkarinen & Harmaakorpi, 2006; Sternberg, 2000). The aim of a Regional Innovation Network is to create a competitive advantage through innovation (Cooke, 1996; Pekkarinen & Harmaakorpi, 2006). Within this concept, it is believed that networks are a successful approach to innovate (Cooke, 1996; Sternberg, 2000). Thus similar to ULLs, Regional Innovation Networks emphasise learning, participation and innovation. However, the Regional Innovation Networks focus more on creating extra economic value. Thus participators of Regional Innovation Networks are mainly private actors (Pekkarinen & Harmaakorpi, 2006; Sternberg, 2000).

## ***Field Labs***

Field Labs, like urban living labs, are an up-and-coming concept. Therefore, almost no literature is available yet. We will still discuss the concept, because it is closely related to ULLs and it has been mentioned in two interviews. A field lab is often used to test a technological innovation in a real-life setting. The setup of a field lab is therefore similar to a traditional experiment. This is often initiated by a company who wants to test a new product. Because of this, there is less co-creation in a field lab than in a ULL. Besides this, the field lab tests the innovation; the field lab does not stimulate innovation itself (Interview 9,7; Raats, Majoor & Suurenbroek, 2016).

## 3.5 EVALUATION & CATEGORISATION OF ULLS

So far, we showed that ULLs can be recognised by several characteristics, but the degree ULLs incorporate each characteristic can vary. In this section we discuss whether it is therefore possible to categorise urban living labs according to certain features. This categorisation enables easier recognition and comparison of ULLs.

Living labs can be categorised in different ways, and several categorisations are recognised in literature. We will focus on two ways of categorisation, which were researched most extensively: based on initiators (Leminen, 2013; McCormick & Hartmann, 2017) and on user involvement (Almirall et al., 2012).

### 3.5.1 ULLs based on initiators

ULLs need to have someone to plant the proverbial first seed. These initiators can have different backgrounds, expertise et cetera. In general, there is a **bottom-up versus top-down** approach in regards to policy making. In research, this way of categorising ULLs has been most widely researched and used<sup>2</sup>. Table 5 summarises these two approaches in more detail. In general, top-down management is operated by a centralised body, and with an authoritarian and hierarchical style. Bottom-

up systems originate at the grassroots level, inspired by local needs, and focus on collective development and mutual targets.

Since urban living labs can be quite complex, with different stakeholders involved at different times, a pure bottom-up or top-down approach is insufficient in defining and categorising all urban living labs. Where the categorisation of Budweg, Schaffers, Ruland, Kristensen & Prinz (2011) consisted of only two categories (either bottom-up or top-down), this was expanded in Westerlund & Leminen (2011), Leminen, Westerlund & Nyström (2012) and Leminen (2013) into four categories, based on the **main driver/promoter**. These are: *utiliser-driven, enabler-driven, provider-driven* and *user-driven*. This division, can be extended by the McCormick & Hartmann (2017), the AMS handbook (AMS, 2017) and by Ståhlbröst & Holst (2012), who focused on the goal instead of initiator. Table 2 summarises this categorisation. Important to note is the inclusion of scale; as the scale increases, complexity and duration of the project will also increase (Leminen, Westerlund & Nyström, 2012).

**Table 5:** Summary of the top-down bottom-up approaches (Leminen, 2013)

	Top-down	Bottom-up
Initiated and led by	Centralised bodies (e.g. government)	Grassroots level (e.g. civilians)
Targets based on	Nationally determined goals/regulations	Local needs
Approach	"Authoritarian, hierarchical innovation approach" (Leminen, 2013, p. 7)	Collective development, "validated for mutual and shared objectives" (Leminen, 2013, p. 7)

<sup>2</sup> It was first explored by Sabatier (1986), but was adapted to make the concept applicable to ULLs by several research projects including Westerlund & Leminen (2011), Leminen, Westerlund & Nyström (2012) and further developed by Leminen (2013). It was furthermore discussed in interview 1 and 2.

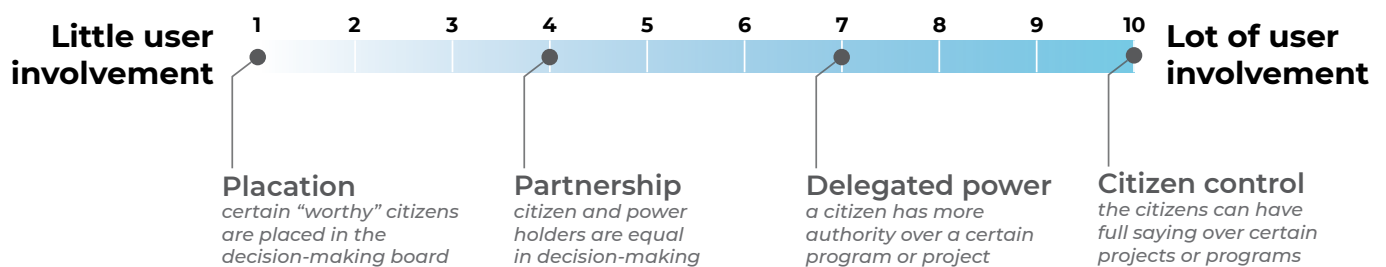
**Table 6:** A summary of the user-based categorisation as proposed by Leminen, Westermund & Nyström (2012) and Leminen (2013). It is complemented with McCormick & Hartmann (2017), AMS (2017) and Ståhlbröst & Holst (2012).

	Utiliser-driven	Enabler-driven	Provider-driven	User-driven
Main approach (not clear-cut)	Top-down	Top-down	Top-down	Bottom-up
Initiated and led by	Companies	Public-sector actors, NGOs, financiers (e.g. municipalities)	Educational institutes, universities, consultants	User communities (grassroots)
Goal	Strategic research and development: obtain rapid knowledge results; testing	Develop strategies through action; could be projects that are part of an umbrella project on whole city scale; development	Promote research and theory development, knowledge creation, solutions to specific problems; standalone project or on city scale; research	Solving particular community sized problems through collaboration; micro-projects or single issue; implementation
Duration	Short	Short to long	Short to long	Short
Scale	Street to city	Street to city City	Neighbourhood	Street

### 3.5.2 ULLs based on users

Another categorisation approach is based on users, which consists of several methods. It is a different way of categorising as there is no clear indication of user involvement in the utiliser-driven, enabler-driven and provider-driven categories mentioned in the previous section.

One method of this type of categorisation is the degree of user involvement. In this method, an adopted form of the ladder of participation could be a useful metric. Here, user involvement is set on a scale, from little user input to maximum citizen involvement (Arnstein, 1969). Generally four useful categories in this scaling can be determined<sup>3</sup>. See Figure 4 for the scaling of ULLs based on user involvement following Arnstein (1969).



**Figure 4: scaling based on Arnstein (1969), adapted for this report**

A second method is based on user characteristics. These different characteristics were explored by Schuurman and De Marez (2012). Categorisation could be based on the amount of *user expertise* of the topic, *usage intensity* of the user and *user innovativeness*

(Schuurman and De Marez, 2012). The implementation of these forms of categorisation can be difficult due to varying factors since it is difficult to measure them. Therefore, we decide to use Arnstein (1969), as this can be more easily observed and appointed per ULL.

#### IN SUMMARY:

For this project it is important to clearly define and give a context to the concept 'Urban Living Lab', which we have done in this chapter. By giving our own definition of a ULL we highlight all the relevant characteristics of a ULL. These characteristics have been discussed in more detail as well in order to show what an urban living lab entails more specifically and the diversity within ULLs. Furthermore, several related concepts have been discussed. Also, it has been shown where ULLs position themselves in the field of citizen participation. These two parts are necessary to give an overview of the context of the field of Urban Living Labs. Finally, the categorisations of ULLs are discussed, since they are diverse and can be set up in different ways.

<sup>3</sup> The ladder of participation actually involves many more steps. However, these exclude user involvement, and are therefore not useful for the categorisation of ULLs (Arnstein, 1969).

# 4. RECOMMEN- DATIONS FOR A ULL

*This chapter will discuss the do's and don'ts for the different phases of setting up an urban living lab. So far, several guidelines have been developed when it comes to ULLs (see Appendix C for more recommended literature on this topic). Furthermore, much research has been conducted on participation and co-creation. Here, we will discuss our own findings of the interviews, supported with literature. The chapter is divided in several phases. First we will discuss important aspects of the whole ULL process. Next we will discuss: the initiation phase, the implementation phase and the finalisation of the process.*

## 4.1 WHOLE PROCESS

### SIMILAR EXPECTATIONS

There are several aspects that are important during the whole process of a ULL. First of all, it is important that all stakeholders have similar expectations. In Interview 4, it became apparent that an important aspect in participation is that there should be a clear definition of the problem and the area. Setting up a ULL is difficult due to their playful, unpredictable and idealistic character. There is no 'one size fits all' approach; it is therefore important to mind the situation (Goldkuhl et al., 2017; Interview 3; SubUrbanLab, 2016) and openly discuss the expectations (Interview 9).

### GOOD COMMUNICATION & TRUST

A second aspect that should be noted is the importance of good communication and trust (Goldkuhl et al., 2017; Interview 3, 4, 7, 9, 10; SubUrbanLab, 2016; Veeckman, Schuurman, Leminen, & Westerlund, 2013; van Bueren, 2017). The different partners need to trust each other in order to co-create. Good and open communication is key to stay connected to the project (Interview 3, 7). Furthermore, different interpretations of the goal, problem and results can be avoided this way.

The stakeholders involved have to be brought together, so they can speak with each other (Friedrich et al., 2013; Interview 4, 9). One way to do this is making a communication plan at the start (Friedrich et al., 2013). This ensures that all stakeholders are heard and considered (Interview 9). In the Student Hotel project (Box 3), the contracts between stakeholders had expired in 2016, yet no one had complained about this; signifying how they never used them. This can be a risk, however, in this case it actually signified trust between the parties (Interview 9).

**GOOD COMMUNICATION IS KEY**

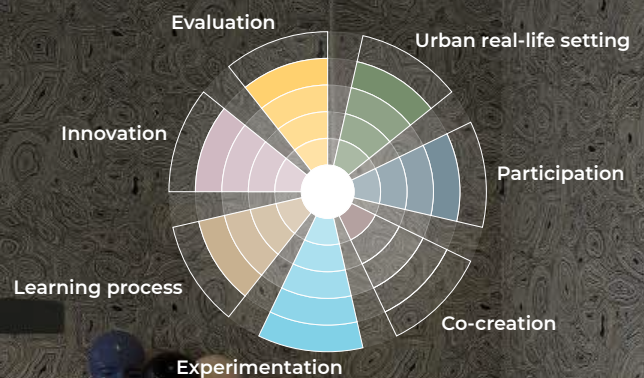


# INTERMEZZO.

## BOX 3: THE STUDENT HOTEL

<b>LOCATION:</b>	THE HAGUE, NL
<b>TIMELINE:</b>	2014 – NO END DATE, ONGOING
<b>CATEGORY:</b>	
<b>INITIATOR</b>	PROVIDER-DRIVEN WITH EL- EMENTS OF UTILISER-DRIVEN
<b>USER INVOLVEMENT</b>	N/A, USERS ARE RESEARCH SUBJECTS

### CHARACTERISTICS CHART:



[https://p133.qe.com/hotel/images/670/670596/670596\\_14091815350022239072.jpg?w=1024&h=768](https://p133.qe.com/hotel/images/670/670596/670596_14091815350022239072.jpg?w=1024&h=768), visited on 01-06-2018

### PROJECT BACKGROUND

In the Student Hotel (TSH) living lab **different energy-saving technologies to steer behaviour are tested** in a real-life setting. It is 'an infrastructure for research'. Michel Handgraaf (Interview 9) would actually call TSH project a fieldlab, as there is a low degree of co-creation.

The hotel houses both students living for longer time, as well as short-stay guests. The hotel wanted to stimulate energy saving behaviour, and in this quest a collaboration with the WUR and Amphiro (a startup) was born. As often financial incentives are hard to implement or have a low impact, new ways of stimulating energy-saving behaviour were tested. For example, they installed meters in the shower that would

depict a polar bear on a melting ice cap; the longer a guest would shower, the more the ice cap would melt.

In this Lab, many measurements are conducted with a large pool of participants. There is close collaboration with all parties, and staff of the Student Hotel is also heavily involved. As so many measurements are taken, and learning and evaluation by the researchers is an important part of the lab, a lot of interesting, new knowledge has been obtained. The outcomes of the lab will be used in other student hotels from the same chain, and also inspired other organisations to either use the results of TSH, or also set up a living/field lab.

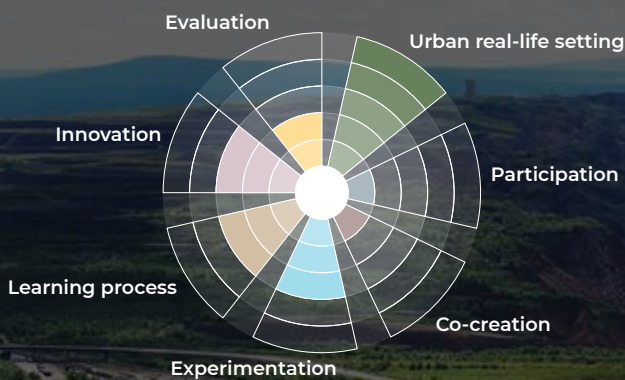
### HIGHLIGHTS INTERVIEW:

- *IT IS IMPORTANT TO HAVE THE RIGHT AND MOTIVATED PEOPLE INVOLVED*
- *HAVE OPEN COMMUNICATION WITH THE DIFFERENT STAKEHOLDERS; BE HONEST AND UPFRONT*



## BOX 4: GREEN BLUE CITIES (KIRUNA)

### CHARACTERISTICS CHART:



**LOCATION:** KIRUNA, SWEDEN

**TIMELINE:** 2013- 2016,

FINISHED

**CATEGORY:**

**INITIATOR** PROVIDER-DRIVEN

**USER INVOLVEMENT** LOW; AIM WAS PARTNERSHIP  
BUT THIS DID NOT WORK

### PROJECT BACKGROUND

GreenBlueCities is an international Urban Living Lab collaboration between Kiruna (Sweden), Zwolle (the Netherlands) and Innsbruck (Austria). The goal of this collaboration was **to obtain new knowledge on future water challenges** in urban areas and to develop tools that deal with these challenges in unforeseen ways. Eventually, stormwater has to be managed in a way that uses green/blue infrastructure that is multi-functional, interactive and durable. To reach this goal, collaboration with users is a focal point in this project as well. In this, collaboration with citizens, practitioners, de-

cision makers and researchers has been established. However, the three ULLs are all different in a sense that they wanted to tackle unique problems. Kiruna is quite special, in the sense that the whole city has to be moved, as it currently exists on top of a mine at risk of subsiding. This, in combination with the arctic surroundings of Kiruna created unique challenges in the water infrastructure. Zwolle however faces flooding of the IJssel Delta, while Innsbruck, due to their alpine location, faces flooding, stormwater runoff and on top of that lacks the space to address their problems

### HIGHLIGHTS INTERVIEW:

- *ULLS CAN BE QUITE TIME-CONSUMING, AND GETTING ALL STAKEHOLDERS INVOLVED CAN THEREFORE BE A CHALLENGE*
- *FIND THE RIGHT AND MOTIVATED PEOPLE TO COLLABORATE WITH DURING THE PROJECT*

## ...CONTINUATION ON 4.1 WHOLE PROCESS

### RESOURCES

The next advice is that enough resources have to be available in a ULL for every aspect in the process. This includes, amongst others, financial means, capacity and time (Interview 1, 2, 3, 6, 8). For example, often for various reasons not enough resources are reserved for evaluation (Interview 2, 10). In Kiruna (Box 4) there was no one specifically appointed to initiate the evaluation during the whole process. This resulted in a missed opportunity. However, there were enough financial means, because the ULL attracted the right stakeholder; namely the mining company (Interview 10).

### TIME

Another important aspect for the whole process is time. Many interviewees identified that it is highly important that there should be enough time for all the aspects involved in setting up a ULL, since ULLs are not a fixed process (Interview 2, 3, 8, 10, 11, 12). The amount of time it costs should not be underestimated as well, since the process of citizen involvement is time consuming (Interview 3, 8). The ULL process cannot be rushed, and the outcomes cannot be attained quickly. ULLs are not a suitable approach when the final goal is too specific and concrete. ULLs need flexibility to enable learning and collaboration (Interview 3).

One of the major pitfalls that often occur are not having enough time and resources to experiment and learn from each other (Interview 2). This might lead to pressured decision making (Interview 2, 6, 10, 12). Projects often suffer from short-term thinking with a too clear vision or goal in mind at the start (Interview 3), while the ULL approach is not suitable for short-term solutions (AMS, 2017). The Knowledge Mile (Box 5) acknowledged that they sometimes tend to rush in setting up their projects while not giving enough room and time for processing new knowledge. Time is always a problem (Interview 11).

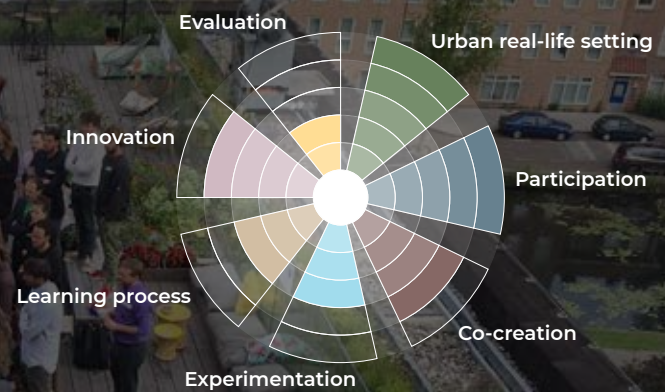
**DO NOT RUSH: TAKE YOUR TIME WHEN  
SETTING UP AN URBAN LIVING LAB**

# INTERMEZZO.

## BOX 5: THE KNOWLEDGE MILE

<b>LOCATION:</b>	AMSTERDAM, NL
<b>TIMELINE:</b>	2015 - PRESENT
	ONGOING
<b>CATEGORY:</b>	
<b>INITIATOR</b>	PROVIDER-DRIVEN
<b>USER INVOLVEMENT</b>	PARTNERSHIP, SOME CITIZEN CONTROL.

### CHARACTERISTICS CHART:



### PROJECT BACKGROUND

The Knowledge Mile is initiated by the Amsterdam University of Applied Sciences and is a living lab in Amsterdam. It wants **to improve the quality of the innovation district**, which is mainly the Wibautstraat and Weesperstraat **by sharing knowledge and enhancing networks**. These streets face several challenges such as traffic, flooding and air pollution. The community includes 30.000 residents, 60.000 students and almost 400 organisations, hotels, mu-

seums, social and municipal institutions. The Amsterdam University of Applied Sciences, the University of Amsterdam and Amsterdam University of Arts are all located here. They have four goals:

- Improve quality of life
- Knowledge Exchange
- Community Engagement
- PR & Communication

### HIGHLIGHTS INTERVIEW:

- *EVEN THOUGH YOU WANT TO INCLUDE ALL STAKEHOLDERS, IT IS ALSO IMPORTANT TO MAKE ACTUAL PROGRESS*
- *COMMUNICATION AND GAINED KNOWLEDGE ABOUT THE PROJECTS IS SOMETIMES LACKING, THEY TEND TO JUST START AND RUSH.*

## ...CONTINUATION ON 4.1 WHOLE PROCESS

### INNOVATION

In the interviews it was also defined that innovation is an important factor for Urban Living Labs. This aspect helps people to think outside of the box and come up with new ideas. Involving citizens gives people room to think about how to solve certain issues (Interview 13). Stadslab Apeldoorn (Box 6) organised a meeting place for people which stimulated people to come together. This resulted in brainstorm sessions with new creative and innovative ideas. Besides the positive effects that innovation within a ULL context can have, there are also some downsides. It was indicated that with the innovation of new projects, the possibility for the implementation and/or design of other ideas could decrease (Interview 1). Furthermore, innovation does not only play one role throughout the whole process, but has a different role in every phase. Innovation can occur in the idea, implementation, solution, learning process and evaluation.

### EVALUATION & LEARNING

The last aspect that is important during the whole process is evaluation. Evaluation is required for learning throughout the whole process. Multiple challenges can rise when doing an evaluation: what resources (e.g. time, data, financial means) are needed? How will the evaluation be organised? Who has to be included? (McCormick & Hartmann, 2017) The Student Hotel had regular evaluation moments with the most important stakeholders. This was partly because The Student Hotel's set up is more similar to a traditional experiment. The regularity of these evaluation moments ensured that they stayed in contact throughout the different experiments.

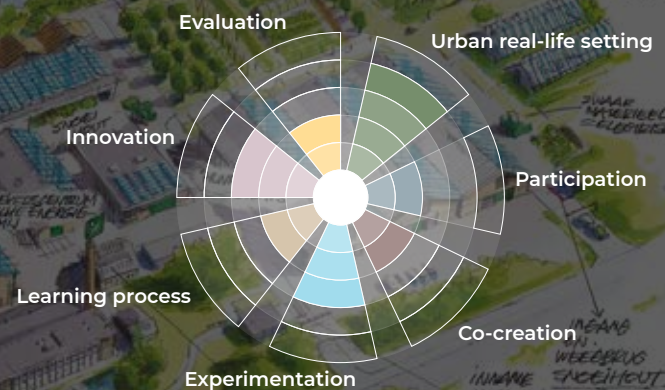


# INTERMEZZO.

## BOX 6: STADSLAB APELDOORN

<b>LOCATION:</b>	APELDOORN, NL
<b>TIMELINE:</b>	2014 - 2016 FINALISED
<b>CATEGORY:</b>	
<b>INITIATOR</b>	ENABLER-DRIVEN
<b>USER INVOLVEMENT</b>	BETWEEN PLACATION AND PARTNERSHIP

### CHARACTERISTICS CHART:



### PROJECT BACKGROUND

The goal of Stadslab (city lab) Apeldoorn was “**greening the inner city**”. This ensured that the city became more pleasant, more beautiful, and in that sense, better. The city lab as an incubator provided a “vehicle” for ideas, and ensured that quick (temporary or permanent) projects could be carried out. The initiative started with Doesjka, a civil servant of the municipality of Apeldoorn. She wanted to create a so

called “meeting place” where people of different walks of life could meet each other and interact, setting their backgrounds aside. The city lab, in collaboration with others, has set up several projects. One of these was the ZwitsalLab, which sought to find a new purpose for the old Zwitsal factory.

### HIGHLIGHTS INTERVIEW:

- CITY LABS OR SIMILAR INITIATIVES HAVE REPEATEDLY SHOWN TO WORK;
- MAKE A LAB FUN, BUT DO NOT FORGET THE ISSUES AT HAND;
- LAB INITIATIVES ARE VERY TIME-CONSUMING;

## 4.2 INITIATION

*Although a ULL is difficult to clearly structure beforehand, several common steps can be observed occurring in most ULL initiation processes. Of course, like any project or innovation, a ULL has to start with a problem or an idea. This has to be translated to a concrete project with all the right stakeholders included. For the project a plan has to be established that entails the vision/goal; the process; the management structure; the available resources; and the projected results (AMS, 2017, McCormick & Hartmann, 2017).*

### SUITABLE TO BE SOLVED BY A ULL?

From the interviews, we retrieved several important tips and points of attention for this phase. First of all, it is good to consider if the idea or problem is suitable to be solved by a ULL (Friedrich et al., 2013; Interview 2, 3, 6, 7, 9, 10). Even though in theory every problem might be solved through a ULL, there are many ULLs that do not fulfill all the criteria of a ULL (AMS, 2017; Steen & van Bueren, 2017). For example, during Interviews 7, 9 and 10, about respectively Buiksloterham (Box 7), The Student Hotel and Kiruna, each discussed urban living lab cannot necessarily be classified as a ULL. Buiksloterham is not focused enough on experimentation (Interview 7). The ULL in Kiruna might not have had enough citizen involvement, even though they did try to involve as many as possible (Interview 10). Also, within The Student Hotel there is hardly any co-creation, therefore it is probably more honest to call The Student Hotel a field lab instead of a ULL (Interview 9).

Especially for some water and climate change related challenges, a ULL might not be the best option to solve the problems. The reason for this is the scale of these problems. If the scale is quite large, urban living lab is not really suitable. If the scale is smaller, such as a neighbourhood or a part of the city, a ULL might work (Interview 7). Thus, it is good to investigate at the beginning why the ULL approach is used for this specific problem (Friedrich et al., 2013). Furthermore, areas in development and transition offer room for different ideas of implementation since not everything is already set. Suitable for these kind of areas is a project structure where municipality and researchers collaborate together to involve private partners and citizens (Interview 4). If a ULL is the way forward to solve a certain problem, the stakeholders have to strive to the ideal and incorporate all characteristics.

### GOAL & VISION

Secondly, the goal/vision of all the participants of the ULL should be clearly stated upfront. This entails both defining the problem as well as the area (Evans et al., 2015; Friedrich et al., 2013; Interview 1, 3, 4; McCormick & Hartmann, 2017; SubUrbanLab, 2016). Part of this is also looking at the context, meaning familiarising with the area and challenges, before the problem is defined (Friedrich et al., 2013). In order to do this, good communication is needed. Besides this, all stakeholders have to be in agreement regarding this. So, this is one of the moments in which communication and similar expectations are important in the process (Interview 4, 7, 10; McCormick & Hartmann, 2017). Note the difference between a goal and end-goal; a goal is an overarching aim for the ULL, whilst the end-goal also predetermines that the ULL is finished once the end-goal is reached.

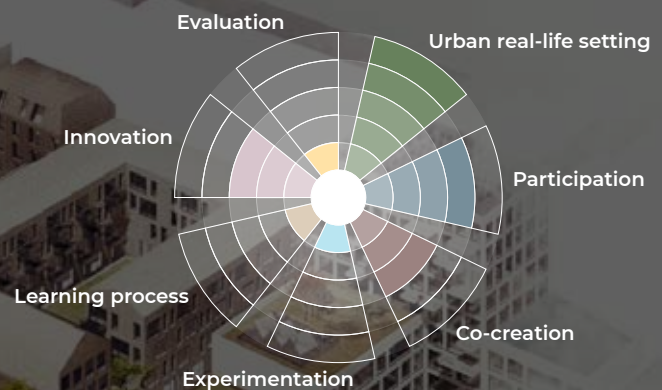
**THERE IS NOT 'ONE SIZE FITS ALL' APPROACH;  
ULLS ARE CONTEXT-BASED**

# INTERMEZZO.

## BOX 7: CIRCULAIR BUIKSLOTERHAM

<b>LOCATION:</b>	AMSTERDAM, NL
<b>TIMELINE:</b>	2015 - PRESENT
	ONGOING
<b>CATEGORY:</b>	
<b>INITIATOR</b>	GRASSROOTS, USER-DRIVEN
<b>USER INVOLVEMENT</b>	CITIZEN CONTROL

### CHARACTERISTICS CHART:



<http://sustainableurbandelta.com/wp-content/uploads/2016/05/DLA-13-Buiksloterham-Cityplots-DELVA-Landscape-Architects-Studionedots-Amsterdam-Antwerpen-openbare-ruimte-water-straat1.jpg>, visited on 08-06-2018

### PROJECT BACKGROUND

Buiksloterham, as a ULL, has an organic origin. Initially, it was started by inhabitants living in the subarea 'De Ceuvel' and a group of people who wanted to build environmentally-friendly houses. Many other stakeholders wanted to join, because Buiksloterham is considered hot and happening. Since so many stakeholders are involved, there is not a clear structure in the organisation. Furthermore, they all have the vision to make Buiksloterham circular, but there is not a clear action plan. This makes the focus too broad. Only the municipality chose to stay in the background initially. Due to this, it is sometimes difficult to execute projects. For instance, if regulations do not allow for innovations, the municipality is needed to adapt these regulations.

In 2015 the manifest Buiksloterham Circular was signed by 20 organisations. This manifest underlines their vision **to transform Buiksloterham to a circular and sustainable area of development**. Another aspect of this manifest is to make Buiksloterham an example for other cities thinking about transitioning towards sustainability and circularity. The development is planned to run till 2030. Even though the development of Buiksloterham is not finished yet, there has so far been limited evaluation. One of the reasons for this could be the lack of structure or the fact that it has grown organically. Thus, it could be better if moments of evaluation will come naturally.

## ...CONTINUATION ON 4.2 INITIATION

### PARTICIPATION

Thirdly, many interviewees (1, 3, 4, 5, 6, 7, 8, 9, 10) and scholars (Evans et al., 2015; de Kraker et al., 2016; Veeckman et al., 2013; McCormick & Hartmann, 2017) mentioned that finding and involving the right stakeholders, in other words participation, is key to establishing a ULL. This is important because (demographic) inequality might occur if not all relevant stakeholders are included in the process (Interview 1, 4). Another form of inequality can be in who voices their opinion or who designs solutions. It might be that the people with the strongest opinion are the only ones that participate (de Kraker et al., 2016). Fear to include others, especially in the initiation phase, is one of the main reasons for a lack of participation. All stakeholders should be involved from the problem definition onwards (Friedrich et al., 2013; Interview 4, 12; SubUrbanLab, 2016). Including more stakeholders implies that some actors have to give away some of their power (Interview 4, 12). This creates tension: dividing the power is necessary for effective participation, but also creates uncertainty (Interview 12).

In order to achieve a high level of participation, it is helpful to address issues that people can relate to. This will make it more likely that people want to participate and stay connected to the project (Interview 12, 13). Following a ULL approach implies that some actors might need to change their way of working and that the hierarchical structure should be minimised (AMS, 2017; Interview 8). Stakeholders of the Healing Garden research project (Box 8) experienced that momentum can be created by finding the right stakeholders. The interest from and the eagerness of the stakeholders to make this project a success was the momentum. This momentum was beneficial to have the project running (Interview 6). On the other hand, in Kiruna it was at first quite difficult to establish contact with the municipality due to its quick staff turnover. The municipality was necessary to approve and implement the innovations. Even though in the end they succeeded to make this contact, the ULL lost time in the process (Interview 10). So, it is important to motivate and give incentive to stakeholders to participate in an urban living lab (Interview 1; McCormick & Hartmann, 2017).

***CLEARLY DEFINE THE PROBLEM AND AREA  
TOGETHER WITH THE STAKEHOLDERS***

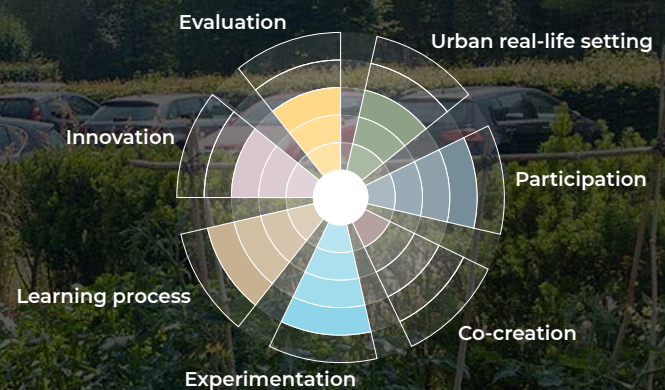


# INTERMEZZO.

## BOX 8: HEALING GARDENS

<b>LOCATION:</b>	ALMERE, NL
<b>TIMELINE:</b>	2015 - PRESENT
	ONGOING
<b>CATEGORY:</b>	
<b>INITIATOR</b>	PROVIDER-DRIVEN
<b>USER INVOLVEMENT</b>	N/A, USERS WERE RESEARCH SUBJECTS

### CHARACTERISTICS CHART:



<https://www.healinggardenswur.nl/onderzoek/> visited on 08-06-2018

### PROJECT BACKGROUND

Healing Gardens was set up as a pilot project **to test whether gardening has a positive effect on the healing process of patients in hospitals**. The project was initiated by researchers from Wageningen University who cooperated with researchers from AMS. They commissioned a group of students to discover which locations might be suitable. One of these locations was Parkhuys Almere. Besides finding the right location, other partners had to be contacted as well. Among others, the municipality became involved and also DonkerGroen, a gardening company. Many organisations wanted to be involved or at least associated with the project. This interest made sure that the project could continue quickly.

The goal was to find 10 to 15 participants. However, in the end only 6 participants signed up. The participants were asked what they wanted during the project, though they had little input or ideas. As the project continued, participants showed less commitment than they had at the start. In the middle of the project the stakeholders and the participants held an evaluation. No changes were made afterwards, because according to the participants no changes were needed. At the end of the project another evaluation with the stakeholders was held. Currently, an investigation runs to see whether a similar project can be set up in a different location. However, funding for this is still lacking.

### HIGHLIGHTS INTERVIEW:

- *IT IS IMPORTANT TO FIND THE RIGHT STAKEHOLDERS;*
- *CREATE MOMENTUM/MAKE IT HAPPEN;*
- *COMMITMENT OF STAKEHOLDERS;*

## ...CONTINUATION ON 4.2 INITIATION

### CLEAR ORGANISATIONAL STRUCTURE

Finally, a clear organisational structure is beneficial for the functioning of a ULL. With a clear structure it will be easier to define the vision and the process with all the stakeholders. This entails looking at the end of the project: what does the ULL want to achieve? Moreover, communication and coordination of all aspects of a ULL will be easier (Interview 1, 2, 4, 6, 7, 8; Ståhlbröst & Holst, 2012; Veeckman et al., 2013). For example, the Healing Gardens project had a clear vision of what they wanted to achieve, because they defined this at the beginning. On top of that, it was clear who was responsible for which part in the process. Of course, like every project there were (minor) challenges. Still, from the project satisfactory results could be obtained (Interview 6). In Buiksloterham the lack of organisational structure resulted in a broad, ill-defined vision; and experimentation and evaluation were not a priority (Interview 7). The municipality is often an important actor when it comes to ULLs. They can have the role of promoter, enabler and/or partner (McCormick & Hartman, 2017), but also pose challenges regarding regulation (Interview 7). In Interview 8 it was emphasised that within an urban living lab the relationship between the different stakeholders, e.g. citizens, the municipality and companies, should be unambiguous. Any one of these parties can take the lead, but the other parties have to be involved to a certain extent (Interview 8).

## 4.3 IMPLEMENTATION

*After the initiation phase, the project can actually be implemented. Each ULL is different, so they are formed in different ways (Interview 2). There are several ways of implementation, and therefore different conditions will be discussed.*

### TOP-DOWN VERSUS BOTTOM-UP

First of all, a distinction can be made between top-down versus bottom-up guidance (see also section 3.5.1, 'Categorisation'). In many projects it is not possible to make a clear division between a top-down and bottom-up structure. Most initiatives need top-down guidance to optimally realise co-creation, learning and experimentation (Interview 2; de Kraker et al., 2016). During the Buiksloterham project the lack of organisational structure meant that there was not a party who guided the process. More guidance would have helped in narrowing down their scope and obtaining a more successful result (Interview 7). A successful top-down structure needs people who take the lead in the ULL. Furthermore, when a project is not initiated from the bottom-up, it is often necessary to make it attractive or motivate citizens to join the ULL (Interview 1). When it is initiated by local people, the system is more unstructured and forms organically. For example, a local partnership in Wageningen was initiated by a citizen initiative and is a bridge between citizens and the municipality. This partnership started with two people and has now grown to a full organisation with subsidies from the municipality. Besides, problems that often rise with a bottom-up ULL are responsibility issues and also how to arrange finances. The initiators of the partnership in Wageningen find it difficult to deal with the extra responsibilities, because they did not know the official procedures (ibid.).

### EXPERT VERSUS THE INHABITANTS

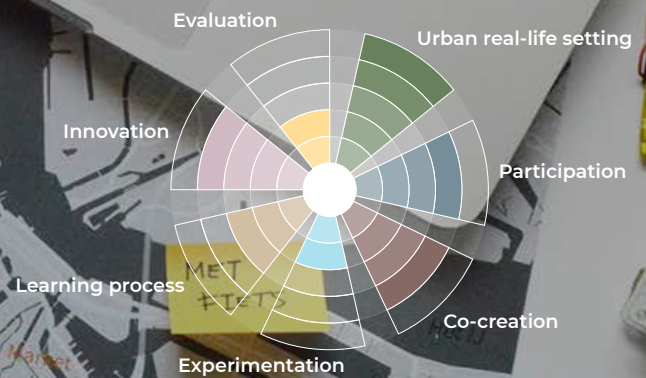
Although ULLs often have aspects of top-down and bottom-up approaches, it is good to think about the division of tasks, especially between the role of the expert versus the inhabitants (Interview 13, 9, 8). Several questions arise, such as: Who takes the lead? What is the role of the municipality? Does every stakeholder have equal rights? In Interview 7, it was identified that citizens cannot be expected to organise a whole ULL. Essential for influence of these actors is that they should be seen as active partners and experts (Ståhlbröst & Holst, 2012). In the Student Hotel project, the participants have a low degree of input, and partners are more facilitators than co-creators (Interview 9). On the other hand, in the Amsterdam Smart Citizens Lab (Box 9), citizens do have a prominent role in measuring data. They see everyone as an expert: some people are experts about a certain topic, while local citizens are experts about their neighbourhood (Interview 13). Both the expert and the locals can add their own information to the ULL, so facilitation of a role for both is important. There should be room for local citizens to evaluate the experts and also to come up with their own ideas and thoughts (Interview 8).

# INTERMEZZO.

## BOX 9: SMART CITIZENS LAB

<b>LOCATION:</b>	AMST, NL
<b>TIMELINE:</b>	2015 – PRESENT, ONGOING
<b>CATEGORY:</b>	
<b>INITIATOR</b>	ENABLER-DRIVEN WITH BOT- TOM-UP APPROACH
<b>USER INVOLVEMENT</b>	CITIZEN CONTROL

### CHARACTERISTICS CHART:



### PROJECT BACKGROUND

The Amsterdam Smart Citizens Lab (SCL) empowers citizens with tools to measure their environment (e.g. air quality). They analyse this data together, and can take action based on the conclusions. **SCL wants to create more technical autonomy for citizens.** “We are slightly activist in that regard” (Ivonne Jansen-Dings, 25-08-2018). Ivonne Jansen-Dings has to network for new projects, by giving lectures, workshops and free consultancy. The basic principles of SCL are co-creation, design thinking and agility. Co-creation asks for a certain mindset, such as being open and fair. Everyone is considered an expert of their own life. There is a strong bottom-up approach. The SCL facilitates the data gathering. All the results are public. The participants build

their own sensors, which creates a higher awareness of the complexity of measuring. They gain more agency through the higher responsibility. Eventually, they increase their knowledge and vocabulary: they change their mindset from “the municipality should do this” to “I could do this”. Their strategy to involve citizens is the 1% rule: focus on the 1% that is already interested or enthusiastic, 9% will then follow. Related to this, they go where energy is: they only approach people that seem enthusiastic. The participants are diverse age-wise; however, most of them are white, higher-educated people. Sometimes, projects appeal to another audience. Evaluations are carried out by the participants and SCL themselves, but also by research institutes.

### HIGHLIGHTS INTERVIEW:

- *LOOK FOR ENTHUSIASTIC PEOPLE*
- *USE EXISTING INFRASTRUCTURE*
- *WORK TOGETHER; DO NOT TRY TO SET SOMETHING UP BY YOURSELF*

## ...CONTINUATION ON 4.3 IMPLEMENTATION

### VISIBLE & FUN

Another aspect that is important for the implementation phase is the visibility of the project and that it should be fun (Interview 4, 6, 8, 11). Several interviewees identified that the ULL should be fun, especially when the issue at stake is not really visible or 'fun' by itself. It is recommended to bring the issues and the relevance of the initiative in a positive way, without forgetting the urgency of the issues at hand (Interview 8). One of the success factors of the Hemelswater beer was that it was fun, which made citizens and media enthusiastic (Interview 11). When it comes to storm water solutions, you could think of weather amateurs that measure rainwater or green roofs projects (Interview 4). These examples have a fun factor and could help in engaging people. Furthermore, sometimes you just need to start with the project and stop thinking about the best practices for implementation (Friedrich et al., 2013; Interview 6). With the Stadslab Apeldoorn they would have liked to start earlier with experimenting instead of thinking about the implementation and set-up extensively (Interview 8). Furthermore, fun components might seem to consume a lot of time, but they can also lead to other projects or positive results (Interview 11).

### COMMITMENT OF THE STAKEHOLDERS

A highly important aspect for a successful implementation is the commitment of the stakeholders. We already discussed the fun factor, to make it more attractive for citizens to become involved. Citizens might not be involved that strongly, because they experience more basic concerns (e.g. housing). It is therefore important to find the 'right' people (Interview 6, 10). Voluntary participation often does not lead to people who actually want to participate in developing the project. Enforcing participation is not possible, therefore it is recommended to work with an existing community (AMS, 2017; Interview 11, 13). When you engage and/or recruit a community, the issue at stake becomes clearer and it is more likely that people want to participate in the process (Making Sense, 2018). The 90-9-1 community management strategy of Jakob Nielsen could be used. The strategy works as follows: you spend most time and energy to find the 1% enthusiastic citizens that already want to change something, or are interested in the topic. This leads to another 9% citizens that will follow to become involved. The other 90% is difficult to engage (van Wijnen, 2017).

When starting with a project, it is important to realise that not everyone has to be engaged (Making Sense, 2018). Some people might not be interested, or do not have the resources to participate (Making Sense, 2018; Interview 13). The Knowledge Mile as well as Amsterdams Citizens Lab both work with this 90-9-1 strategy. They recommended to look for enthusiastic people (Interview 11, 13) and investigate what they are already doing instead of just starting off with a project (Interview 13). Furthermore, it is important to see where the (potential) drive for change is, and join these groups (Interview 13). It is also important to note that during the Healing Gardens project and the Green Blue Cities project the commitment of participants diminished over time. In the beginning the people engaged were more enthusiastic than during the end of the project (Interview 6, 10).

**MAKE IT FUN**



## 4.4 FINALISATION

*The last phase calls for several actions. First of all, through critical self-reflection the ULL can draw and generalise lessons from its own process and results. These lessons have to be generalised, documented and shared. This might lead to the opportunity to apply the lessons from this specific ULL to a new situation or city (AMS, 2017). Thus in the final phase preservation of knowledge gained from evaluation is a major aspect (AMS, 2017; McCormick & Hartmann, 2017).*

### EVALUATION & PRESERVATION OF KNOWLEDGE

Two aspects of finalisation have been highlighted in the interviews as important: evaluation and the preservation of knowledge; and follow-up steps (Interview 10 ,9 ,7 ,6 ,2). The interim and final evaluation moments result in a drawing of lessons from the results, analysis and the process of the ULL (Interview 9 ,2). When the lessons learned have been determined, they have to be preserved along with other knowledge that has been acquired. Documentation and sharing of them is the main part of preserving the knowledge (AMS, 2017; Kemp & Scholl, 2016).

### FOLLOW-UP STEPS

The lessons that are learned can be used for the follow-up steps (Interview 10). Follow-up steps can be, for instance, to implement the ULL in a different city or extend the existing urban living lab in that specific city (Interview 10 ,7 ,6). Though there are also some challenges with the implementation of follow-up steps, which are mainly related to resources and stakeholders. The former means that enough financial means and capacity need to be available. The latter encompasses that there have to be stakeholders that are interested in these follow-up steps (Interview 7 ,6).

# INTERMEZZO.

## BOX 10: FIELDLAB

<b>LOCATION:</b>	AMSTERDAM, NL
<b>TIMELINE:</b>	2012 - PRESENT
	ONGOING
<b>CATEGORY:</b>	
<b>INITIATOR</b>	PROVIDER-DRIVEN
<b>USER INVOLVEMENT</b>	AIM IS TO INCLUDE ASPECTS OF DELEGATED POWER AND CITIZEN CONTROL, THIS PHASE HAS NOT BEEN REACHED YET

### CHARACTERISTICS CHART:



<https://rijswijkty-5787.kcdn.com/wp-content/uploads/2017/03/wateroverlast.jpg>, visited on 08-06-2018

### PROJECT BACKGROUND

Fieldlab is a collaboration between the municipality and the University of Applied Sciences (HVA). They want to find solutions in several neighbourhoods by conducting practice-oriented research. By **bringing together several stakeholders, a more resilient environment in Amsterdam is created**. By including citizens they tend to co-create. In these projects learning and experimenting are important aspects. Projects are initiated around a certain theme; one of these is inclusive area development. Within

this theme, they consider: cohesion within the theme, outside the theme (other projects), the projects self and acquisition of new projects. Since the collaboration moved from district to municipality level, the organisers are currently in the starting phase again. Therefore, they are still looking for new projects. They have a vision/goal of how to create co-creation, but are currently not at the desired level of participation yet.

### HIGHLIGHTS INTERVIEW:

- *WHEN YOU WANT TO HAVE CO-CREATION, IT IS NECESSARY THAT SOME ACTORS GIVE AWAY SOME POWER.*
- *BE PRAGMATIC AND WORK TO YOUR IDEAL.*

## 4.5 SUMMARY TABLE

*From all the interviews a few lessons and recommendations can be drawn. They are described and explained above. To sum them up, a ULL has to pay attention to the following aspects per phase:*

WHOLE PROCESS	Similar expectations	Stakeholders should openly discuss and align their expectations to the context.
	Communication and trust	Good communication and trust are key to co-creation and to stay connected to the project.
	Availability of resources	Enough resources (e.g. financial means, capacity and time) have to be available in a ULL.
	Time	There should be enough time for all the aspects involved in setting up a ULL, since ULLs are not a fixed process and the process of citizen involvement is time consuming.
	Innovation	Innovation is important and can be applied to every phase of the ULL.
	Evaluation & Learning	Evaluation is required for learning throughout the whole process.
INITIATION	Suitability of the problem or idea for a ULL	We advice to consider if the idea or problem is suitable for a ULL approach.
	Definition of problem or idea	Clearly define the problem/idea with all stakeholders.
	Participation	Finding and involving the right stakeholders is key to establishing a successful ULL.
	Organisational structure	With a clear structure it will be easier to define the vision and the process with all the stakeholders.
IMPLEMENTATION	Top-down guidance versus bottom-up	Both these approaches have different benefits and pitfalls that should be kept in mind.
	Expert versus the inhabitants	It is good to think about the division of tasks, especially between the role of the different stakeholders.
	Visibility and fun	Important for the implementation phase is the visibility of the project and that it should be fun.
	Commitment of stakeholders	The commitment of the stakeholders is an important aspect for successful implementation. The 90-9-1 community management strategy could be used to achieve this.
FINALISATION	Evaluation and knowledge preservation	The interim and final evaluation moments result in the drawing of lessons from the results, analysis and the process of the ULL.
	Follow-up steps	A successful ULL is not a one-off project, but transfers its knowledge to other settings. Follow-up steps can help in this.



**FOCUS ON THE 1% OF A GROUP WHO IS  
ALREADY ENTHUSIASTIC, THEN MORE  
PEOPLE WILL FOLLOW**

**JOIN EXISTING INITIATIVES**

# 5. HOVINBYEN: A CASE STUDY

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An aerial photograph of the Oslo city centre, Norway, with a semi-transparent map overlay. The map shows a dense urban grid with various colored areas representing different zones or districts. The text "Oslo city centre" is overlaid in white on the map. The background of the entire page is a dark, textured aerial view of the city.

Oslo city centre



An aerial satellite view of the Høvinbyen neighborhood in Oslo, Norway. The image shows a dense urban area with a mix of residential buildings, green spaces, and infrastructure. A white hatched overlay covers the top portion of the image. The word "Høvinbyen" is written in white text across the middle of the image.

# Høvinbyen

*Figure 5: Hovinbyen and Oslo, (google maps)*

## 5. ABOUT THE HOVINBYEN CASE STUDY

*So far, our research concerned the different aspects of ULLs and recommendations for setting these up. Now, these lessons will be applied to a real-life case as commissioned by SoCentral and NIVA: Hovinbyen. This chapter will encompass this. First, it will delve deeper into the history and context of Hovinbyen, and then apply recommendations for ULLs to certain challenges arising from Hovinbyen's development. In Case Study we present a few opportunities and conceptual designs for (an element of) urban living labs in Hovinbyen. Afterwards, it will describe the flood risk and new storm water management plan in Oslo.*

### 5.1 CITY DISTRICT HOVINBYEN

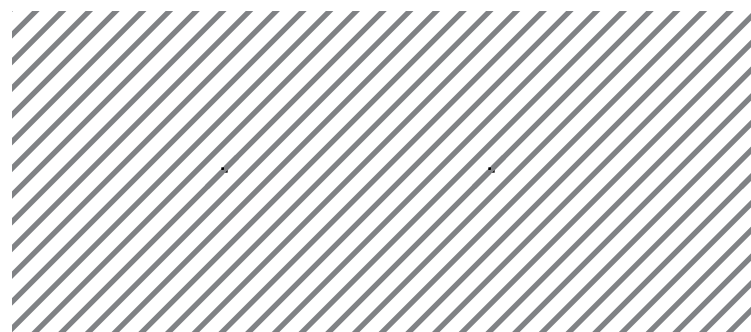
Hovinbyen is a large area at the Eastern side of Oslo, Norway. It has roughly the same size as the city centre of Oslo: 11 km<sup>2</sup> (Agency of Planning and Building Services, n.d.); it would be the second-largest city of Norway if it had been a city by itself (Interview 15). Hovinbyen is located close to the city centre of Oslo. The industrial past is an important aspect of Hovinbyen's historical identity. As a result of historical developments, Hovinbyen is a region that contains many industrial and residential areas (see Figure 4). These all have their own history, identity and role. Now most of the districts are developing further: industries move to the east (away from Oslo), while residents and businesses move to Hovinbyen.

In 2017, 660.000 inhabitants live in Oslo (SSB, 2017), but a high population growth is expected by 2030 (De Vibe & Wasstøl, 2016). This offers challenges, as well as opportunities. Hovinbyen is now prioritised by the municipality for urban development. This because of the high potential for extra residential areas (over 50-60.000 new inhabitants) and its strategic location in proximity to the Norwegian city centre (De Vibe & Wasstøl, 2016).

Oslo Kommune aims to develop Hovinbyen into a "climate smart urban expansion [of Oslo]" (De Vibe & Wasstøl, 2016, p. 38). This means that Hovinbyen will have its own identity, while being perceived as a natural part of the inner city (ibid., Interview 14). Some citizens experience this already, and state that Hovinbyen feels as a part of the city (Citizen C). However, these developments put pressure on Hovinbyen and its existing landscape, which its residents already

experience (De Vibe & Wasstøl, 2016, Citizen A, B, D). Citizen C worries about the possibility that Hovinbyen might become an unstable neighbourhood due to these developments. As these new challenges arise, innovative approaches are needed to tackle these challenges. Urban living labs might be a suitable approach to stimulate these innovations (New Water Ways, 2018).

Still, citizens also experience the positive aspects of the development of Hovinbyen. Hovinbyen is described as a new, modern, lively and family-friendly area. People of different ages, phases of life, culture and religion live in Hovinbyen. This is perceived as desirable. (Citizen A, D, E) Hovinbyen used to be a more industrial area with warehouses, but has transformed to more residential and living areas, with a higher degree of office jobs rather than industries (Citizen B). Overall, Hovinbyen is emerging as an extension of the more busy Oslo (De Vibe & Wasstøl, 2016). Citizen C confirms this: Hovinbyen has become a part of the city. In sum, Hovinbyen is transforming from a robust industrial area, to a more diverse and quickly expanding city-hub. As Citizen A puts it: "it is an area in transition".



## 5.2 CHALLENGES AND OPPORTUNITIES: ULLS IN HOVINBYEN

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For urban living labs in Hovinbyen, several aspects have to be considered, such as the suitability as environment for living labs. Moreover, following the description in the previous section, several challenges arise, such as fragmentation, and identity and community feeling. The rapid expansion and transition of Hovinbyen could exacerbate Hovinbyen's identity issues. Storm water might become a challenge in the future, which is why it is also included. This section will apply recommendations from the previous chapter to ULL opportunities that arise from these challenges.

Before the ULL approach is adopted to, among others, increase participation and innovation, two recommendations have to be made. First of all, the

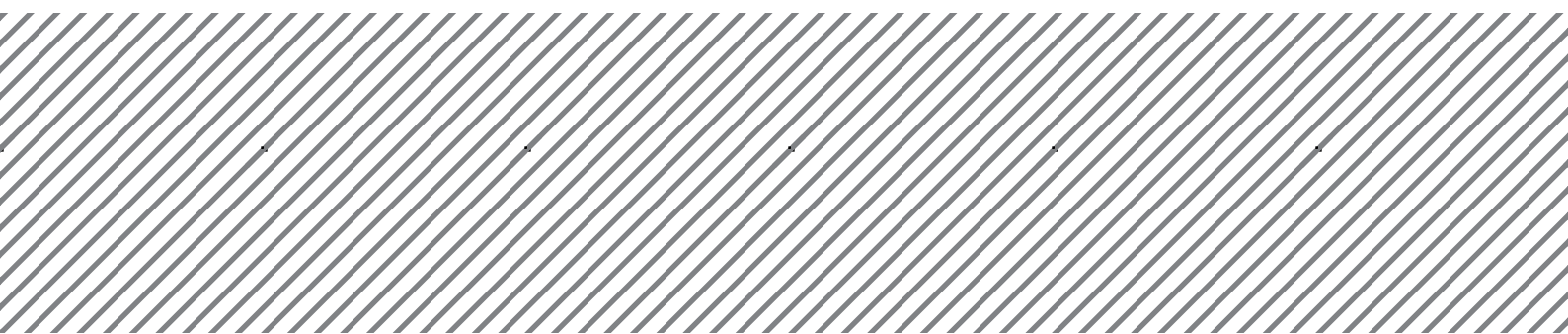
suitability of the approach has to be assessed, because if intensified water issues due to climate change is the main focus, the scale and scope of the issue might be too large. On a too large scale, ULLs might not be successful; a smaller scale (such as a neighbourhood) might then be more applicable for a living lab. The same is true for scope: if the scope is too broad (such as climate change in general) it might be difficult to apply an urban living lab to reality. There are some possibilities, however, on a smaller scale. Secondly, the recommendations made for participation in Chapter 4 are applicable here as well. The major pitfall could be that participation does not happen early on, so from the problem definition onwards.

### SUITABILITY AS ULL ENVIRONMENT

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Hovinbyen appears to be a quite suitable environment for ULLs: Hovinbyen is a test area, where new innovations can be launched. Ideally, Hovinbyen should function as a sustainable example of urban spaces (Interview 14). Through integrated, new solutions with long-term objectives, this could be reached. A part to reach this goal is Pådriv, a test and innovation platform initiated by SoCentral. It is a public-private-civic partnership; it connects different stakeholders from these groups on equal terms. Pådriv organises various activities, such

as workshops. Another initiative that contributes to sustainability is Vollebekk Fabrikker. Here around 20 small enterprises came together to develop, test and demonstrate their new green solutions (Vollebekk Fabrikker, 2018). The people of Hovinbyen are laid-back and open to try new things, also related to environmental issues (Interview 15). This all contributes to the potential of Hovinbyen to become an example for other urban areas, and appropriate environment for ULLs.





## FRAGMENTATION

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The distinct subregions result in a fragmented and not so well-connected landscape. This is partly caused by busy highways, creating a physical barrier. Due to this, there is a lack of communication and connection within Hovinbyen and between Hovinbyen and Oslo. During the setup of an urban living lab in Hovinbyen, therefore, special attention has to be paid to communication and trust. Citizen E/Interview 15 notes that it would be a challenge for Hovinbyen to enhance the interaction between different cultures and religions. Right now, she experiences a difference between subgroups. This is mainly related to the type of area that they live in (e.g. apartment complex or detached house). Thus, a ULL should not only look at the context of Hovinbyen, but

also at the context of each subarea. However, not all interviewees recognise this as a major issue (Citizen A, D), some even state that they actually feel connected (Citizen B, C); they both live in different districts, so this is not related to a specific area. Håkon Iversen (co-founder SoCentral and representative in Pådriv; Interview 14) does agree that there is fragmentation, and says it is really complex to solve. Thus, it could vary to a high degree whether inhabitants actually feel disconnected. This might also depend on the area of Hovinbyen they live in. Here two other recommendations are good to consider. Firstly, the problem has to be defined with the citizens. Secondly, the citizens have to be recognised as experts, especially regarding the area they live in.

## IDENTITY & COMMUNITY

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An issue related to fragmentation is a lack of identity for Hovinbyen (Citizen E/Interview 15). According to Interview 15, most inhabitants of Hovinbyen have never heard of the term 'Hovinbyen'. They identify themselves with the subarea that they live in, Oslo itself, or the larger region. Citizen B fears that the construction works, with the high buildings, will only make matters worse: the tall buildings will form another physical barrier. A way to solve this would be by creating something that makes Hovinbyen special, so that people want to identify with it (Interview 15). This could for example be sustainability. Just like with fragmentation, the definitions of the problem/idea should be clear. Moreover, the expectations, maybe in this case interpretations, should be similar for each stakeholder. Through a ULL, this feeling of community and ownership could be enhanced.

The identity issue could be further exacerbated by the rapid expansion and transition of Hovinbyen. The interviewed citizens identified the rapid expansion of

Hovinbyen as a challenge, rather than fragmentation. This indicates that they worry about the future of their district. Besides the physical impact that the new developments have, they could also disrupt the neighbourhoods and relationships of current inhabitants, and of new residents with the current inhabitants. A major challenge for Hovinbyen, according to Citizen A, B and C, is to ensure that this development happens whilst ensuring the wishes and needs of current inhabitants. Moreover, it will be difficult to preserve all the existing green areas (Citizen B, D), which are loved by several interviewees (Citizen B, E). Another risk is that the buildings are constructed too close to each other, and too tall, ruining the landscape, view and 'suburban' feeling (Citizen B, C, D). Citizen A even called the new areas 'soulless'. The concern for the rapid expansion might be prioritised over the problem dealt with in the ULL (such as storm water). Therefore, the problem should be defined together with all parties. The problem, the process and the solutions should be relatable for the stakeholders, especially the citizens.



## STORM WATER AND FLOOD RISK

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Just like most cities, Oslo expects to be affected by climate change, e.g. more frequent flooding. At the moment, these issues are not problematic (Interview 14). Nonetheless, Oslo Kommune wants to prepare for future problems. The Kommune, therefore, established a new approach to climate-adapted water management (Oslo Kommune, 2016). Everyone is supposed to contribute to tackling storm water and flooding issues. In practice, the city of Oslo will develop physical measures to deal with these issues. Besides this, acquiring and preserving more knowledge will be emphasised. ULLs could play a valuable role in this. A bottom-up approach can be used in the process and to identify how to involve citizens in developing these solutions (Interview 14). Locally, flooding is already an issue in Hovinbyen (Interview 15). Such a small-scale issue might also be suitable to solve in a ULL.

## 5.3 CASE STUDIES

*Keeping these recommendations in mind, we have designed the following conceptual ULL designs. Of course, one of the main characteristics of an urban living lab is that they are co-created. It is therefore not possible for us to design a few ULL-concepts. However, we can describe a couple of fictional ULLs that could serve as inspiration for Hovinbyen and Pådriv:*

# BORREBEKKEN FESTIVAL

### AIMS

- Experiment with new (storm)water solutions;
- Create more awareness about (storm)water issues;
- Inspire new Urban Living Labs;
- Allow different people from Hovinbyen to meet each other and become more connected.

In August 2019, the Borrebekken water festival will be organised. Different stakeholders met each other at a Pådriv workshop about Hovinbyen and water issues. Together, they decided that it would be important to create a better understanding in Hovinbyen about water issues, as well as try to make sure that different inhabitants of Hovinbyen would meet each other to form new connections. Another goal is to allow people to experiment with new (storm)water solutions, and inspire them to start their own Urban Living Labs in Hovinbyen. Here, two recommendations have been applied: involve citizens from the start; and define the problem together. Both can result in similar expectations of all stakeholders regarding the problem, the process and the outcomes, which is another recommendations. So far, this festival incorporates the following characteristics of an ULL: urban real-life setting, participation, co-creation and experimentation.

Through meetings organised by Pådriv specifically for the festival, more partnerships were formed. For example, the Norwegian nation television company, which had just moved to Hovinbyen, decided to become a financial partner and also promote the festival in their news segments. Eventually, a large group of people was formed that all contributed to the organisation of the festival. Here even more participation is stimulated, specifically including stakeholders from all sectors.

Festival of co-creation

**BORREBEKKEN  
FESTIVAL**

THE PARTY OF THE YEAR  
20 TO 22 AUGUST @ BJERKEDALEN PARK  
OPEN AIR / FREE ENTRY

Come and meet the community! With sustainable foodtrucks, locally made products of rainwater and many more!

[WWW.BORREBEKKENFESTIVAL.SE](http://WWW.BORREBEKKENFESTIVAL.SE)

# REGREENING

## AIM

Create more green areas in Hovinbyen for leisure activities, as well as to enhance stormwater absorption in Hovinbyen.

Regreening is a team formed after a workshop of Pådriv. A large variety of people, ranging from inhabitants to policy makers in the Oslo Kommune to water experts from the university, all work together on new solutions to create more green areas in Hovinbyen. Different projects fall under the umbrella of Regreening:

A monthly workshop and brainstorm session at a different place, to involve new people (e.g. primary school, university, hospital, cafe);

A bimonthly design competition where inhabitants of Hovinbyen are invited to think of new areas where green spaces can be enhanced, including sketches of the final design;

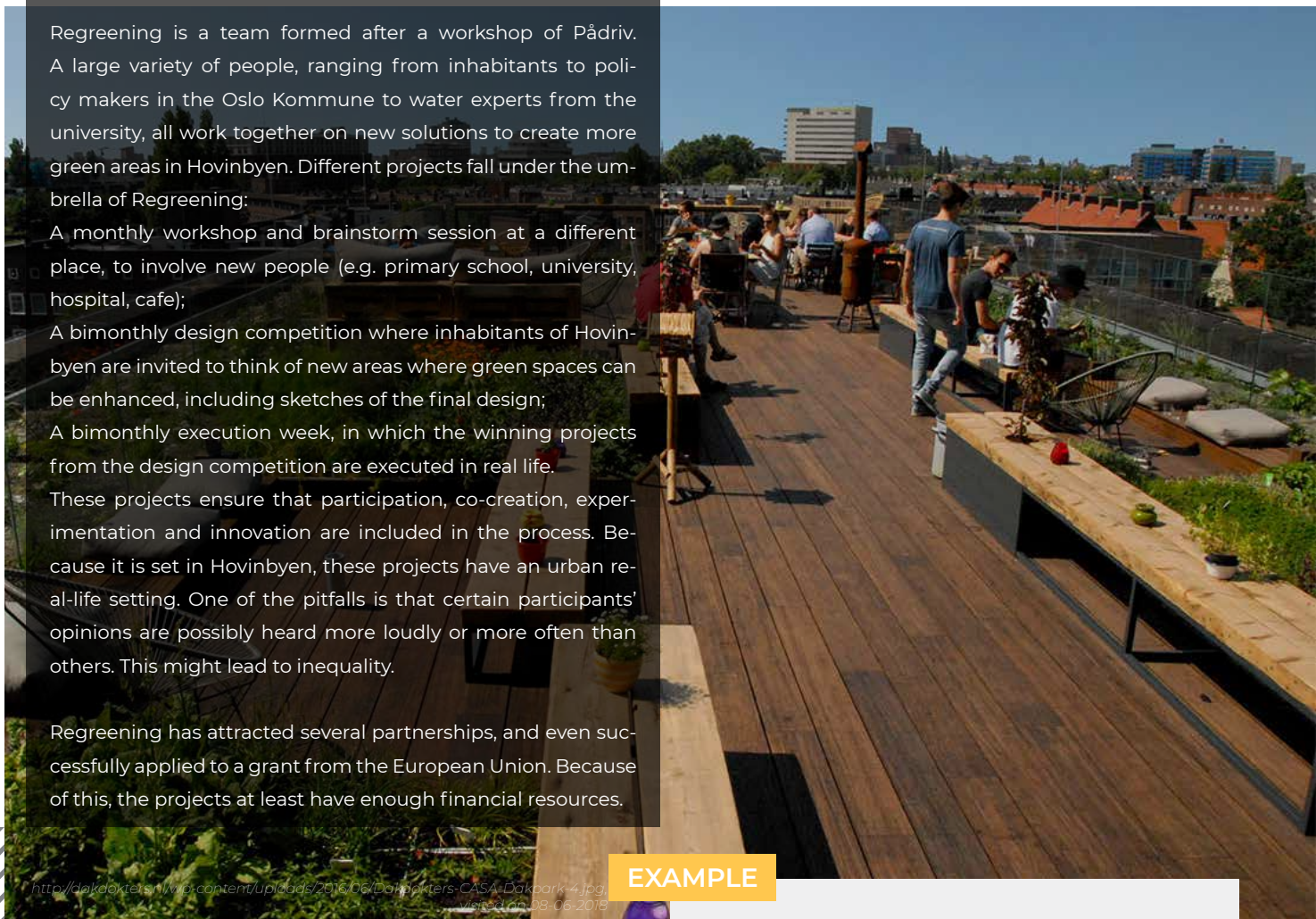
A bimonthly execution week, in which the winning projects from the design competition are executed in real life.

These projects ensure that participation, co-creation, experimentation and innovation are included in the process. Because it is set in Hovinbyen, these projects have an urban real-life setting. One of the pitfalls is that certain participants' opinions are possibly heard more loudly or more often than others. This might lead to inequality.

Regreening has attracted several partnerships, and even successfully applied to a grant from the European Union. Because of this, the projects at least have enough financial resources.

## EXAMPLE

For example, a student from Bjerke designed a rooftop garden for Aker Sykehus (Aker Hospital) that is now constructed; patients and staff can go there for a short stroll and to enjoy the nature. Moreover, inspired by the Healing Gardens project in Almere, patients maintain it themselves. This has led to new friendships and enhanced the mental and physical health of the patients. A beekeeper is now working on constructing a beehive on the rooftop as well, to make the area even more multifunctional.



<http://dakdokters.no/content/uploads/2016/06/Dakdokters-CASA-Dakpark-4.jpg>, visited on 08-06-2019

# BARSEL GROUPS<sup>4</sup>

## AIM

Barsel groups can be co-creators regarding new infrastructure such as meeting places, walking and cycling paths and parks/playgrounds.

As mentioned in the 'Recommendations', it is important to use existing infrastructure and use the energy of the citizens. One opportunity in Hovinbyen has to do with the shift to relatively more young families in the area. Since these families reside in Hovinbyen, there are probably more Barsel groups formed in Hovinbyen<sup>5</sup>.

These groups can be meaningful, because they can give input regarding their own needs, but also about what they think their children need now and in the future. On top of that, through these groups the ULL has the opportunity to reach out to children of different ages and get in contact with them if deemed desirable. This way the ULL has reached out to a major demographic group and stimulate inter-cultural, generational and religious communication. So this could potentially stimulate participation.



**I NEVER THOUGHT THAT I COULD MEET NEW PEOPLE WHO SHARED THE SAME IDEAS. I HAVE FOUND NEW FRIENDS, AND I AM ABLE TO IMPROVE MY NEIGHBOURHOOD**



Essential is to approach them with something that is close to them. For example, these groups can be co-creators regarding:

- The establishment of new meeting places;
- The planning of the walking and cycling paths around Hovinbyen;
- Promotion of above ground transport;
- The greenness of Hovinbyen, especially parks and playgrounds.

This way new and innovative ideas might arise, which is one of the characteristics of an ULL. Additionally, the groups and these new innovations might help with the creation of an identity for Hovinbyen: Hovinbyen can obtain the association 'Family-friendly, but vibrant area'. Of course, this is supplementary to the identity of being sustainable.

These innovations can be used for experimentation as well. For instance, multiple designs of new meeting places can be realised. For a certain period, all these meeting places will be tested by the inhabitants. Throughout and at the end it can be evaluated why certain meeting places do or do not work. For the evaluation the Barsel groups can be asked to participate alongside other inhabitants of Hovinbyen.

<sup>4</sup> The suggestions made here could be part of a Urban Living Lab. It cannot be regarded as a ULL on its own because it will not incorporate all the characteristics.

<sup>5</sup> Barsel groups are groups formed by the local health stations in Norway. In these groups 6 women, who just had a baby, are brought together. The first meeting is facilitated by the health stations; afterwards the women have to organise meetings themselves. These groups are set up to stimulate connections and to provide social support.





# 6. DISCUSSION

*This chapter will discuss several aspects that should be considered when reading this report. Furthermore, the limitations of our research will be discussed. Finally, we will give recommendations for future research.*

## 6.1 CONSIDERATIONS

### *Ending*

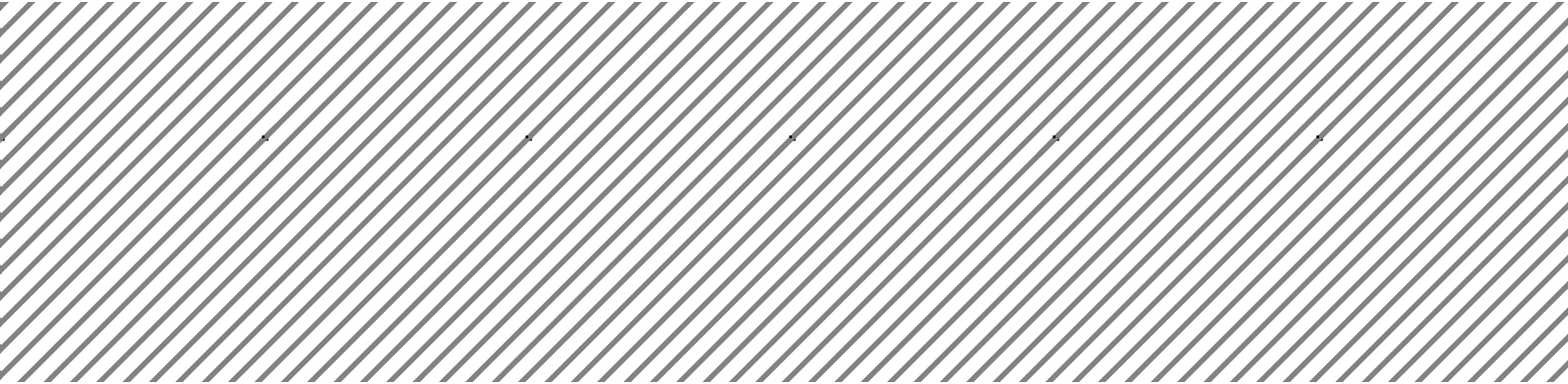
We defined several phases of the ULL process, namely; initiation, implementation and finalisation. This setup gives the impression that an urban living lab is an approach with an ending. It is good to remark that this might not always be the case, since the process of a ULL is not that straightforward; they are strongly case- and context-specific. Whether there is indeed an ending to the process, depends on the ULL itself. Some ULLs are project-based with a clear end-date. Other urban living labs have no specific end-date or -goal, resulting in a continuous process. Therefore, it is good to consider whether you have an end-date or an end-goal for your ULL. If you want to keep innovating based on the lessons previously learned, you have no clear end-goal. However, if you want to solve a specific issue, you do. This also influences the evaluation process: ULLs without an ending will only have interim evaluations, which will still result in lessons learned that can be applied to other settings. However, there will likely be no further follow-up steps outside of the specific lab domain.

### *Convenience versus ideal*

We also noticed that there appears to be a tension between convenience and practicalities on the one hand, and the ideal living lab situation on the other hand. Sometimes, certain decisions have to be made that will make the executions of the project easier, but will not result in ideal circumstances for the living lab. For example, the Healing Gardens were connected to Almere. This was because Flevo Campus<sup>6</sup>, a sub-organisation of AMS, whom together funded the research, and they preferred Almere. Possibly, the Healing Gardens would have been more suitable for another region, but this option was not explored due to this practical reason. Harko van den Hende (Interview 7) also mentioned this in his interview. With his field lab, the ideal living lab is taken as an ideal to strive to. In reality, the theoretical living lab, with high participation and co-creation, is not achieved. When decisions have to be made within the ULL process, this is important to keep in mind; sometimes, it is simply impossible to work under the ideal living lab circumstances. The stakeholders will have to decide whether they prefer to continue executing the project, or re-evaluate the ULL circumstances to try and work around the issue at hand, ensuring the living lab qualities. Moreover, sometimes a project can be called 'ULL' to resonate with the living lab principles and ideal, even when it is not a living lab in practice (yet).

<sup>6</sup> A new knowledge hub in the Netherlands





### ***Good quality***

This paper intended to investigate how a ULL can be set up while being of good quality. However, we realised that this is too large a topic to cover within the current research project. Yet, we still tried to give 'good quality' some attention during our interviews. Several aspects were indicated, but it is good to mention that this is not a complete overview. First of all, the question arises what good quality exactly means? Some people might experience certain aspects as being 'good', while others do not share this experience. Furthermore, due to our limited time, only nine urban living labs were interviewed. This does not give a complete overview of what good quality might mean. Using our seven characteristics (Urban real-life setting; Participation; Co-creation; Experimentation; Learning process; Innovation; and Evaluation) can be a solid basis for the discussion. Living labs that score high on these different aspects, likely are successful. Interview 12 mentioned that sometimes, it is easier to work towards an ideal. So, living labs that strive towards being 'good', could use this mindset as an example, and set goals accordingly. However, in order to truly discuss what a 'good' living lab is, one should first conduct further research to establish what it really means to be 'good'.

### ***Co-creation: challenges similar to participation***

In the chapter about 'Recommendations for a ULL' (Chapter 4) several characteristics, such as participation and evaluation, have been discussed elaborately. Some turned out to be more complex, such as co-creation. This is probably because co-creation needs participation in order to be successful, as was said in the section about characteristics. Therefore, it shares several main challenges with the characteristic 'Participation'. First of all, like with participation, it is important to start the process as early on as possible. This means that co-creation preferably starts when the process is being set up. The challenges this entails are: fearing to let others co-create; and sharing the power. Secondly, the strongest opinion might overrule others. So some ideas or innovations might be suppressed this way, which could be a missed opportunity. However, each innovation has this effect, no matter how it happens. This is a challenge within a ULL. Though the final challenge is not similar to any of the challenges related to participation, it is probably important to take it into account as well. Participants with a good understanding of the problem is crucial for the process of co-creation innovation.

## 6.2 LIMITATIONS

*As with every research, our study has some limitations:*

### **Expert selection**

Some bias occurred regarding the selection of experts. We reached most of them via the other expert interviews. This means that we mainly interviewed people whom were in some manner related to the WUR. The same goes for the ULLs: quite some of them were related to the WUR or AMS. We consciously tried to find other experts and ULLs (also abroad) to avoid a bias, but it was difficult to find, reach, and interview these people. Often, they would not reply, or when they did reply, would not reply to further emails when we tried to plan the interview.

### **ULLs**

Another limitation of our research is the online presence of our researched ULLs: all of them had their own website, or were included in a database or handbook. So, ULLs that cannot be found online, were excluded from our research. This was also mainly from a practical point of view: with our limited resources (especially time) there was no space to search for offline urban living labs. On top of this, some projects call themselves a living lab, whilst upon further investigation, they did not really apply to our seven criteria. On the other hand, other projects that could be classified as a living lab, are not called a ULL, making them difficult to find. So, we interviewed projects that turned out not to be a living lab, whilst we were unable to find certain projects that could have been classified as a ULL.

Moreover, all the ULLs we spoke to succeeded to a certain extent to reach their goals; we did not consider failed attempts at ULLs from this research. This means that, on the one hand, we learned more about the successes and some tips about pitfalls, but on the other hand, we never learned what happens if they really fail, and why.

### **Hovinbyen**

Lastly, our conceptual designs for ULLs in Hovinbyen should be considered as an inspiration, not a blueprint. Any urban living lab design needs to be context-specific, and stakeholders should be involved in the decision process. This was not the case in our design of Hovinbyen ULLs. For the actual design of Hovinbyen ULLs, it is thus imperative to involve local citizens and communities from the start of the problem definition and goal.

*Future research could take these limitations in consideration.*

## 6.3 RECOMMENDATIONS FOR FUTURE RESEARCH

*Besides taking into account our limitations, future research can also build upon our research. We pinpointed three main possibilities to extend our research: the innovation characteristic; pitfalls for each category; and the relationship between the characteristics participation and co-creation.*

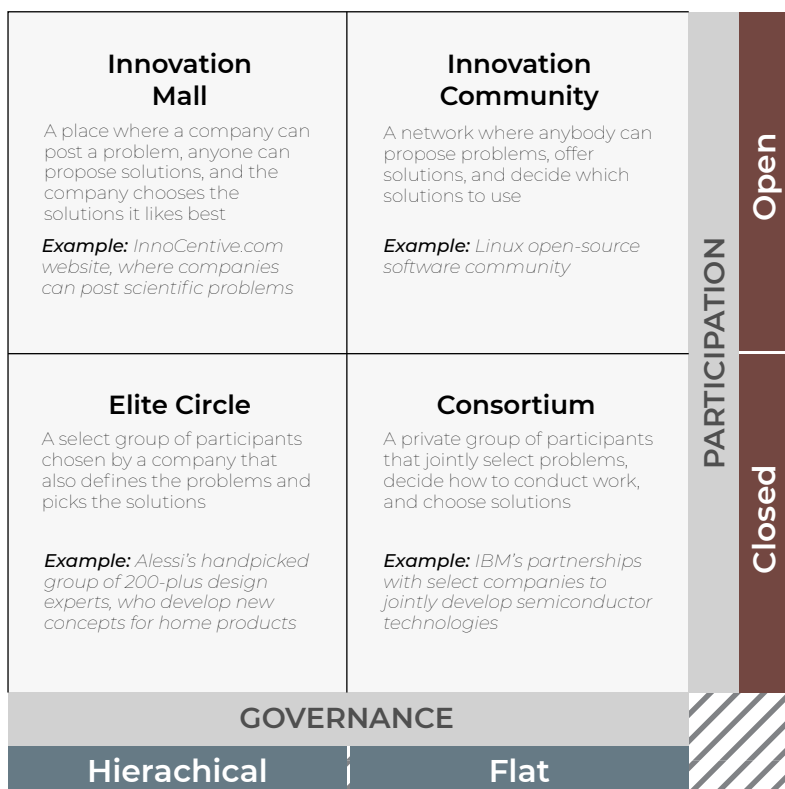
### The innovation characteristic

During our research, we encountered some recommendations regarding innovation. Yet, it was relatively little compared to other characteristics of a ULL. This can be extended with, for example, the theory about 'Open Innovation', which expands the knowledge regarding innovation with theory about 'collaborative architecture' (Pisano & Verganti, 2008). The 'collaborative architecture' defines the structure and organisation of collaboration. Collaboration networks can differ in openness for the participation of new stakeholders and in form of governance (ibid.). There are four ways for collaboration: "a closed and hierarchical network (an elite circle), an open and hierarchical network (an innovation mall), an open and flat network (an

innovation community), and a closed and flat network (a consortium)." (Pisano & Verganti, 2008, p. 1) These are shown in Figure 5. Open systems allow everyone who wants to be involved to participate. In closed systems, several partners try to solve the problem by themselves. In flat forms of governance, the power is shared and the stakeholders are equal. Lastly, within a hierarchical network, some partners have the power to make decisions. The four collaboration approaches can all be effective, dependent on the conditions of the company/project at stake. Urban Living Labs could suit as an innovation community (ENoLL, 2006) and this approach is therefore in line with an open and flat network. The ULL approach helps in bringing different stakeholders together. The stakeholders could collaborate in order to innovate.

### Pitfalls per category

In Chapter 4, we described our recommendations for the whole process and each phase in the process of setting up a ULL. In the implementation phase we elaborated on the different challenges between using



**Figure 5. The four different types of collaboration networks (Pisano & Verganti, 2008, p. 6).**

a top-down or bottom-up approach for an urban living lab. Yet, in the section 'Evaluation & Categorisation of ULLs' (Chapter 3.5) we describe a different categorisation based on initiators (see Table 2). Here, four categories are defined: utiliser-driven, enabler-driven, provider-driven and user-driven (Leminen et al., 2012; Leminen, 2013). For these four categories no pitfalls are identified in our recommendations for the set up of a ULL. Likewise, no pitfalls are identified for all categorisations based on user. Identification of these pitfalls per category would be beneficial for one main reason: an urban living lab is context-specific. Yet, overarching categories regarding e.g. the goal or organisational structure can be identified. These categories might have their own challenges, which is helpful knowledge to guide the management of these new ULLs.

### ***The relationship between participation and co-creation, and the other characteristics***

Before, we discussed the similarity in challenges that ULLs can experience regarding these two characteristics. Besides this, we noticed something else in our research. When comparing different examples of ULLs in this report (see the Boxes), both participation and co-creation score quite low in the radar charts for each urban living lab. We do not know the exact reason for this, but we consider the following causes:

- Both participation and co-creation are difficult to establish;
- The majority of ULLs are set up by universities or other top-down institutes, who find it harder to control these characteristics;
- It is difficult to assess if these characteristics are met. When is everyone participating/co-creating? Is everyone equally involved?

*As there is still uncertainty regarding this part, further research that addresses this issues will be valuable for the domain of ULLs.*

# 7. CONCLUSIONS

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This research tried to uncover the best practices for setting up Urban Living Labs (ULL). First of all, it is evident that 'urban living lab' is not an indisputable term. Almost every researcher and handbook seems to have their own definition of what a ULL is. This is partially due to the context-specific character of living labs. For these reasons, we synthesised these definitions, and coined our own definition.

Furthermore, we defined the following **characteristics**: (urban) real-life setting; participation; co-creation; evaluation; learning; experimentation and innovation. These are all present equally. To even further analyse ULLs, one could try to **categorise** them. We summarised two of the main manners to do so: based on initiators and based on users. The different categories often go hand-in-hand: for example, bottom-up (grassroots) projects tend to operate on a small, local scale.

Since setting up urban living labs is not that straightforward, but rather strongly case- and context-specific, it is not possible to develop one set of guidelines. Therefore, we shared several recommendations, based on a literature review and interviews with experts and stakeholders. These recommendations were divided in the following phases of a ULL: **the initiation, the implementation, and the finalisation**. Moreover, we gave some advice about things to keep in mind throughout the **whole ULL** process. Some of our main recommendations are discussed below:

First of all, it is good to consider if the idea or problem is **suitable to be solved by a ULL**. There are many

urban living labs that do not fulfill all the criteria of a ULL. Especially for some water related challenges, a ULL might not be the best approach to solve the problems, due to the large scale of these problems. If the scale is smaller, such as a neighbourhood or a part of the city, a ULL might work. Furthermore, urban living labs are not a suitable approach when the final goal is too specific and concrete. However, when you strive for participation and co-creation, a ULL works as a good approach. This aspect should be considered regarding climate adaptation measures, because for some issues there is time and room for co-creation, while for other issues this is not the case.

The next step is to **clearly define the goal/vision**. This entails both defining the problem as well as the area. Furthermore, it is important to see where the (potential) drive for change is, and join the already active groups and/or communities. Enforcing participation is not possible, therefore it is recommended to work with an existing community. We recommend to focus on the 1% enthusiastic citizens that already want to change something, or are interested in the topic. It is important to note that the amount of **time** a living lab costs should not be underestimated, since the process of citizen involvement is time consuming. The ULL process cannot be rushed, and the outcomes cannot be attained quickly.

Often, participation and co-creation are two related characteristics, and they tend to be low in ULLs. The relation stems from their reliance on external participants; co-creation cannot happen without sufficient involved participants. We hypothesise that

they are often low, because researchers cannot control these factors, whereas the other ones (e.g. 'urban real life setting') are more easily organised. In order to achieve **participation** and a high level of **co-creation**, it is helpful to find ideas/address issues that people can relate to. In this way, it is more likely that people want to co-create and stay connected to the project. A way to reach a higher level of co-creation is related to the **visibility** of the project and that it should be **fun**, especially when the issue is not really visible or 'fun' by itself. It is recommended to introduce the issues and the relevance of the initiative in a positive way, without forgetting the urgency of the issues at hand. Fun components might seem to consume a lot of time, but they can also lead to other projects or positive results.

In Hovinbyen, these recommendations can be applied to form new ULLs. Designing living labs concepts is impossible without a co-created bottom-up process with local stakeholders. However, to serve as an inspirational example, we described a couple of fictional urban living labs about Hovinbyen and Pâdriv. They can be used to explain what a ULL is, what its impact could be, and generate a discussion.

All in all, Urban Livings Labs help in order to participate, co-create, evaluate, learn, experiment and innovate in an urban real-life setting. When all these characteristics are strongly present, the ULL is more likely to be of good quality. This approach is a wonderful way to enhance citizen engagement and understanding of certain issues. Furthermore, it could also suit as an innovative climate adaptation measure; contributing to the sustainable transition of cities, governments and people all over the world.



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## APPENDIX A. SUMMARIES OF INTERVIEWS

*Within each summary we provide: some details about the interview itself; the background of the interviewee; the main points of the interview; and recommended literature/contact persons/ULLs. We excluded any of these aspects if it was not mentioned in the interview or the interviewee requested us not to include it.*

**Here a short overview of all the interviewees is given again:**

Number	Interviewee	Capacity for interview	Page number
1	Jeroen Kruit	Expert	63
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3	Wiebke Klemm	Expert	64
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6	Project leader of Healing Gardens	ULL	66
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## Interview 1

**Name interviewee:** ir. Jeroen Kruijt

**Date:** 20-04-2018

**Time:** 10.30 h

**Interviewers:** Janneke Remmers & Jeroen Schoonderbeek

**Background interviewee:**

Ir. Jeroen Kruijt is a researcher at the WUR. His expertise is Landscape Architecture and Cultural Planning. He is also involved in the Wetenschapswinkel from the WUR (which includes THUIS).

**Main points of interview:**

- Innovative ideas suppress other innovative ideas;
- Categorisation:
  - Top-down / Bottom-up;
  - Subject specific or general ULL;
- Challenges/problems:
  - Demographic inequality;
  - For Top-down:
    - Find people who will take the lead in the ULL;
    - Tempt people/citizen to join the ULL;
    - Goal of ULL: only retrieve things or also offer something?
  - For Bottom-up:
    - Unstructured;
    - Responsibility issues;
    - How to deal with money?
- Citizen participation in THUIS (Wageningen):
  - Organically formed;
  - Formed from a citizen initiative;
  - Bridge between citizens and municipality.

**Recommended literature/contact persons/ULLs:**

- Bsc Thesis by Anne van Soest about ULLs and specifically THUIS, a citizen initiative/ULL in Wageningen;
- Doesjka Mazdandzic from Apeldoorn Living Lab;
- Magazines about citizen initiatives (Pionieren).

## Interview 2

**Name interviewee:** Christian Scholl

**Date:** 23-04-2018

**Time:** 13.00 h

**Interviewers:** Janneke Remmers & Jeroen Schoonderbeek

**Background interviewee:**

Christian Scholl is a post-doctoral research fellow at the ICIS Institute, Maastricht University, and a coordinator of the Urb@exp research project. His expertise is transnationalisation processes, global and climate justice, social movements, participatory forms of governance, and social control in urban contexts.

**Main points of interview:**

- Each ULL is different, so they are formed in different ways. However, not each initiative that calls itself a ULL, can be officially qualified as a ULL;
- Characteristics of a ULL:
  - Experimentation: very important;
  - Co-creation: innovation with all stakeholders;
  - Learning: evaluation is an important aspect to stimulate learning, though often too little budget is set aside for this; too few clear rules are made; and not enough time is available. So little attention is paid to this characteristic;
- Categorisation:
  - There is not really a division between top-down and bottom-up approach;
  - Most initiatives need top-down guidance to optimally realise the three characteristics.

**Recommended literature/contact persons/ULLs:**

- Mark Kuip for literature about ULLs;
- Rapport Urb@Exp;
- ULLs: SMULLN, SmarterLabs & M-Lab.



## Interview 3

**Name interviewee:** dippl. ing. Wiebke Klemm

**Date:** 24-04-2018

**Time:** 9.30 h

**Interviewers:** Rosalie Fidder & Maureen van den Brink

**Background interviewee:**

The research field of dippl. ing. Wiebke Klemm is landscape architecture. She works as a postdoc for AMS, where she investigates Green & Blue Living Labs by being actively involved in setting up one.

**Main points of interview:**

Wiebke Klemm considers ULLs as a way to find new solutions, which can be immediately implemented, creating a sustainable result. According to her, when setting up a ULL it is important to pay attention to:

1. The physical impact (it needs to design or test a solution to a certain problem);
2. Partnerships between different groups (of disciplines and of people, e.g. scientists, end-users, government).
  - a These need to **trust** each other to collaborate (co-create). In order to succeed, open communication and a long-term strategy are vital;
  - b These need to maintain good and open communication in order to stay connected and up to date on the progress.
3. The final goal: the ULL process cannot be rushed, and the outcomes cannot be attained quickly. ULLs are not a suitable approach when the final goal is too specific and concrete. ULLs need flexibility to enable learning and collaboration;
4. Soft factors: available resources (such as finances).

Setting up a ULL is difficult due to their playful, unpredictable and idealistic character. There is no 'one size fits all' approach; she advises to mind the situation. If a municipality knows exactly what the problem is, you can directly approach people. Consider how to create a snowball effect: which groups should be involved from the very start? Who are the potential players? When you know this, you can use it to your advantage.

Mrs Klemm proposes the following first steps to set up a ULL, based on her own experience:

1. Set up an interdisciplinary and tight group of stakeholders to create networks;
2. Make your ideas concrete: find the available resources such as finances.

This is not a linear process, but a back and forth between different parties: flexible and iterative. It is important to work in an integrated way, and collaborate with different people.

According to Mrs Klemm, a good ULL encompasses all this, whilst ensuring that:

1. Every party can benefit: it should be a win-win situation on any timescale;
2. Transfer knowledge to other ULLs and projects.

This success has partially to do with the team itself and how they interact with each other.

**Recommended literature/contact persons/ULLs:**

- Voytenko, Y., McCormick, K., Evans, J., & Schliwa, G. (2016). Urban living labs for sustainability and low carbon cities in Europe: Towards a research agenda. *Journal of Cleaner Production*, 123, 45-54. <https://www.sciencedirect.com/science/article/pii/S0959652615011439>
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- Rathenau instituut (NWO) currently conducts quite some research regarding ULLs.
- Michel Handgraaf: Student Hotel ULL
- Healing Gardens ULL

## Interview 4

**Name interviewee:** dr. Judith Klostermann

**Date:** 30-04-2018

**Time:** 10.00 h

**Interviewers:** Maureen van der Brink & Janneke Remmers

**Background interviewee:**

Dr. Judith Klostermann is senior researcher at Alterra, where she is working in several research projects on the governance of adaptation to climate change. Her main fields of expertise are among others policy science, governance, and stakeholder involvement.

**Main points of interview:**

- Important aspects in participation:
  - Clear definition of the problem and area;
  - Determination of the work process beforehand: which stakeholders need to be included when and where?
  - Good communication of the problem, area and process to all the stakeholders. Different interpretations can be avoided this way;
  - Keep the options regarding solutions open. Possibly multiple solutions can be combined;
  - Stakeholders have to be brought together. They need to speak with each other;
- Possible pitfalls in participation:
  - Fear to include others; the design can be developed to far;
  - Include certain stakeholders, but not all relevant stakeholders are included;
- Often citizens are only asked to provide input. This does not mean that their input is taken into account. This is not co-creation;
- Possible ways to include citizens with water:
  - Weather amateurs;
  - Green roofs.

**Recommended literature/contact persons/ULLs:**

- Wim de Haas of Buiksloterham in Amsterdam, The Netherlands;
- Other ULLs/cities with projects resembling a ULL:
  - Uiterwaarden: Steenfabriek;
  - EcoShape;
  - Soesterkwartier Amersfoort;
  - City Centre Nijmegen;
  - Dordrecht;
  - Ede;
  - Utrecht.

## Interview 5

**Name interviewee:** Alessio Antonini

**Date:** 15-05-2018

**Time:** 10.00 h

**Interviewers:** Maureen van der Brink & Jeroen Schoonderbeek

**Background interviewee:**

Alessio Antonini works on MKInsight, a challenging project with the goal of simplifying the access to data produced by a smart city. His research addresses three main topics: urban data analysis of civic/urban open data, geographical exploration through in map-based web applications, and crowdsourcing of urban activities. He is also engaged in the technical support of SMEs for the CityLabs project.

In short, the human dimension is too often missing from Smart City models. For all the user-centered design processes, user profiling, and context awareness, when people are considered as 'end users' and not an integral part of the system itself, they end up doing things differently than the engineers expected.

**Main points of interview:**

- MK:smart was born under a different paradigm. Now it is different, very keen to collect information directly from people. Asking them permission, explain how they are going to use it. MK:smart engagement of people, more on other level. More open for people;
- Everyone learned: they cost a lot. Smart cities are costly;
- Another lessons they learned: more different approach to data collection. Much better to use mobile devices;
- Make the city accessible: this is unique of smart city;
- They have unique point of the city: is about engagement;
- MK:smart it is a framework of many activities;
- More sustainable smart city: engaging people is now very important.

## Interview 6

**Name interviewee:** Project Leader of Healing Gardens

**Date:** 17-05-2018

**Time:** 12.00 h

**Interviewers:** Rosalie Fidder & Janneke Remmers

**Main points of interview:**

- General recommendations:
  - Make the project or ULL happen/visible;
  - Find the right stakeholder: who can help in the project?
  - Create a sympathetic image;
- Project Healing Gardens:
  - This is a research project with multiple characteristics of a ULL;
  - After the project the patients were able to form a clearer opinion about what they would have liked during the project;
  - Certain challenges, such as finding enough patients, due to the fixed city;
  - Interest in follow-up projects, but not yet the financial means.

**Recommended literature/contact persons/ULLs:**

- Bsc Thesis about ULLs;
- Straat van de Toekomst (project of AMS).

## Interview 7

**Name interviewee:** dr.ir. Wim de Haas

**Date:** 15-05-2018

**Time:** 16.00 h

**Interviewers:** Rosalie Fidder & Janneke Remmers

**Background interviewee:**

Dr.ir. Wim de Haas is a senior researcher at Wageningen University and Research Centre. He works at the department of Nature and Society. His field of expertise is among others Land Use Planning; Innovation; Governance; and Circular Economy. He coordinated the water, food and energy in the 'Adaptive Circular Cities'-project. Through this project he was involved in Buiksloterham.

**Main points of interview:**

- Threshold for being a ULL or not;
- General recommendations for ULLs:
  - Communication is key; different forms have to be used;
  - Citizens cannot be expected to organise whole ULLs;
  - There should be interest in order to extend a ULL to another city or level;
- Scale of water problem determines suitability for ULL;
- Buiksloterham:
  - Manifest Circular Buiksloterham;
  - Reasons why Buiksloterham is not necessarily a ULL:
    - Unstructured;
    - Too broad;
    - Experimentation is not a priority;
  - Little evaluation due to the way Buiksloterham was established;
  - Sub area, De Ceuvel, can be described as a ULL;
- Field lab:
  - More technical;
  - More like a traditional experiment;
  - Less co-creation.

**Recommended literature/contact persons/ULLs:**

- ULLs:
  - Infofest;
  - Austin, Texas;
  - Student Hotels;
- Rathenau institute report about the typology of ULLs;
- Dekker et al. Introducing the living lab methodology to public administration: a systematic literature review.

## Interview 8

**Name interviewee:** Doesjka Majdandzic

**Date:** 16-05-2018

**Time:** 14:30 h

**Interviewers:** Maureen van der Brink & Jeroen Schoonderbeek

**Background interviewee:**

The goal of city lab Apeldoorn was to make the city centre greener. The city lab acted as a sort of incubator, where either permanent or temporary projects that would make the city centre greener could be initiated. The goal is involvement of citizens, as they make up the city and know best what the existing problems are. Doesjka is a civil servant at the municipality of Apeldoorn, and is one of the initiators of the city lab Apeldoorn.

**Main points of interview:**

- Doesjka came to the idea of the city lab (stadslab) through a similar initiative (the VIP bus): wanted to talk more to locals and hear about their perspectives and expertise on local problems;
- She had little aid from the municipality (i.e. colleagues) in initiating and facilitating the city lab. She believes that for instance the Maastricht Lab had more success as this was lead/initiated by a group, not an individual;
- The city lab, as well as other initiatives gave her the belief that the idea that citizen have an important role in promoting initiatives can work;
- During the city lab they had meetings with interested citizens. As there was budget, the ideas obtained during these meetings were immediately carried out. The city labs (and the meetings) were really popular;
- Lessons learned from her citylab are:
  - Start earlier with experimenting and learning from mistakes;
  - Budget is good to have, but can also bring limitations (when stops the voluntary involvement and starts the professional involvement);
  - Make the ULL fun! Bring the issues and the reason of the start of the initiative in a positive way, but don't forget the urgency of the issues at hand;
  - Do not underestimate the amount of time it cost; the process of citizen involvement is time consuming;
  - Both the expert and the local can add their own info to the ULL, so facilitation of a role for the both in a ULL is important;
  - Process is as important as the eventual end results of the ULL;
  - Local municipalities can help ULLs, but the process would most ideally be where all participants (municipality/citizen) are on the same level.

**Recommended literature/contact persons/ULLs:**

- Action plan of the Stadslab Apeldoorn;
- VIP bus of Dennis Nolte.

## Interview 9

**Name interviewee:** dr. Michel Handgraaf

**Date:** 17-05-2018

**Time:** 15:30 h

**Interviewers:** Rosalie Fidder & Jeroen Schoonderbeek

**Background interviewee:**

Dr. Michel Handgraaf is a Social Psychologist and Behavioural Economist who researches, among other, environmental decision-making. He leads the research at the Student Hotel living lab, where his team investigates non-financial incentives for behavioural change in a real-life setting.

**Main points of interview:**

Living Lab: The Student Hotel

- The Student Hotel (TSH) is 'an infrastructure for research'. Michel Handgraaf would actually call TSH project a **field lab**, as there is a low degree of co-creation;
- In TSH, different energy-saving technologies to steer behaviour are tested in a real-life setting;
- Participants have a low degree of input, and partners are more facilitators than co-creators;
- TSH has no end-goal, and also no end-time; it will run until one of the parties withdraws;
- The outcomes of the lab will be used in other student hotels from the same chain, and also inspired other organisations to either use the results of TSH, or also set up a living/field lab.

Tips:

- The LL started out as an idea of Michel Handgraaf and the CAO of the hotel chain when they were just setting up the first hotel. Later, other parties, such as investors, became involved;
- These are allowed to give feedback, but Michel leads the research;
- Defining a win-win situation for everyone is a challenge, but important: there is always a trade-off;
- Having the right people involved and motivated is essential; TSH has a consortium of different parties which is highly successful because:
  - The living lab was initiated already at the beginning of TSH, so it was easy to connect the project to the day-to-day business in the hotel;
  - Michel can discuss everything directly with the CEO of the hotels;
  - There is open communication, ensuring that all stakes are heard and considered;
  - The contracts are vague, which can be a risk, but in this case, actually signified trust between the parties.

**Recommended literature/contact persons/ULLs:**

- Rathenau Institute;
- AMS;
- Social Lab (RVO).

## Interview 10

**Name interviewee:** Godecke-Tobias Blecken

**Date:** 18-05-2018

**Time:** 11.00 h

**Interviewers:** Janneke Remmers & Jeroen Schoonderbeek

**Background interviewee:**

Godecke Blecken is a researcher at Luleå University of Technology. His research field is Urban Water Engineering. He was involved in the research project 'Green Blue Cities'. Within this project three ULLs were set up, in Kiruna (Sweden), Innsbruck (Austria) and Zwolle (The Netherlands). He was involved in the ULL in Kiruna.

**Main points of interview:**

- ULL is a buzzword; sometimes used to obtain funding > it can be more honest to not call a project a ULL;
- Definition of ULL differs between technocratic and social scientist;
- General advice/pitfalls:
  - Citizens might not be involved that strongly, because they experience more basic concerns;
  - Find the right people;
  - Time, too little might lead to pressured decision making;
- Kiruna ULL:
  - Contact with the right stakeholders;
  - Took commitment of stakeholders during the whole project for granted;
  - Citizens more concerned with primary needs;
  - Little evaluation done;
  - Challenges about water in Kiruna:
    - Winter lasts 6 to 7 months;
    - Modelling during transition from old to new city.

**Recommended literature/contact persons/ULLs:**

- Taneha Bacchin, TU Delft, involved in ULL Zwolle;
- Literature related to Green Blue Cities.



## Interview 11

**Name interviewee:** Maarten Terpstra

**Date:** 25-05-2018

**Time:** 8.30 h

**Interviewers:** Maureen van den Brink & Rosalie Fidder

**Background interviewee:**

The Knowledge Mile is a living lab in Amsterdam, that is initiated to improve the quality of the Wibausstraat and Weesperstraat by sharing knowledge and enhancing networks. These streets face several challenges such as traffic, flooding and air pollution. Maarten Terpstra is community manager of the Knowledge Mile. The community includes 30.000 residents, 60.000 students and almost 200 organisations, hotels, museums, social and municipal institutions. The Amsterdam University of Applied Sciences, the University of Amsterdam and Amsterdam University of Arts are all located here.

The Knowledge Mile also helps with Hemelswater beer. Code Blond is the first beer that is made of rainwater. With this beer, they want to make people aware of water issues.

**Main points of interview:**

- The streets did not have a good name, since there is a lot of traffic. The goal of the project was that neighbours got to know each other when learning together. It is initiated from bottom-up and there were several ideas: getting to know all stakeholders, bring people together and experiment together;
- Besides the HvA, there is also the BIZ: this is a business association;
- They work with the following community management strategy: focus on the enthusiastic 1%, and then 9% follows. If you help this one person and facilitate him/her, then the rest will follow;
- Sometimes you just have to do things since they are fun. This often leads to other networks/projects/positive results;
- The success factor of Hemelswater beer was that it is fun;
- Choose something that you share together and give it enough time;
- Keep repeating your story/goal and make it visual. This help to keep people connected.

**Recommended literature/contact persons/ULLs:**

Other similar projects are:

- Knowledge Quarter in London;
- München;
- Maastricht;
- Moabit Berlin.

## Interview 12

**Name interviewee:** Harko van den Hende

**Date:** 25-05-2018

**Time:** 10.00 h

**Interviewers:** Maureen van den Brink & Rosalie Fidder

**Background interviewee:**

Fieldlab wants to find solutions in the neighbourhood by doing practice-oriented research. They want to bring together several stakeholders, which will help in getting a more resilient environment. In these projects learning and experimenting is important. It is initiated by the municipality and the University of Applied Sciences (HvA). Harko van den Hende is community manager of inclusive area development.

**Main points of interview:**

- The project started 6 years ago and first collaborated on district level, but currently work with the municipality of Amsterdam;
- It is theoretical wise idealistic to start from bottom-up, but in a real life setting this is often very difficult. Time and finance pressure imply that you have to be flexible with bottom-up requirements;
- The environment forces you to make certain decisions (for example speed of process), considering this you just have to start with a project to see how it works, instead of beginning with your ideal. This implies that you have to be pragmatic and work to your ideal. The best way is to start with a project, but at the same time also investigate what is best suitable for the project/area. This also includes the investigation of what the best ways of participation are;
- When you want to have co-creation, it is necessary that some actors give away some power. This creates uncertainty, which the project manager often does not like. Co-creation can have a positive effect, but you do not know this beforehand.
- When you promise as project leader some involvement/power to the citizen, you have to live up to this promise. This often fails in practise.

## Interview 13

**Name interviewee:** Ivonne Jansen-Dinks

**Date:** 25-05-2018

**Time:** 12.00 h

**Interviewers:** Maureen van den Brink & Rosalie Fidder

**Background interviewee:**

Ivonne Jansen-Dinks is the Head of Programme, Waag, through which she is involved in the Smart Citizen Lab Amsterdam. She investigates how to enhance citizen resilience regarding smart city-tech. She is specialised in using peer-to-peer technology and bottom-up participation to influence policy making.

**Main points of interview:**

- Find the drive! Do not try to involve people that do not want to be involved; focus on the 1% that is really enthusiastic, 9% of others will follow. The other 90% might hear from you, but will most likely never become involved;
- Work together: never try to set up a project by yourself, always find others that want to help and support you;
- Join existing infrastructure; do not set up something new, but see who are already working on your topic in your area, such as clubs, meeting groups, et cetera. Do not force them in a top down manner to work with you, but think along with them, using your own expertise;
- Everyone is an expert within their own field and life;
- Co-creation means giving the participating enough space to do so.

## Interview 14

**Name interviewee:** Håkon Iversen

**Date:** 29-05-2018

**Time:** 10.30 h

**Interviewers:** Rosalie Fidder & Janneke Remmers

**Background interviewee:**

Håkon Iversen is a civil engineer and business economist. He is one of the founders of SoCentral. He is a representative of SoCentral at Pådriv.

**Main points of interview:**

- Hovinbyen:
  - Largest transformation area of Norway > make Hovinbyen a sustainable example;
  - Oslo divided in 13 burrows, of which 4 are more of less in Hovinbyen
    - > how can individuals be involved in an efficient way? Quite difficult.
  - More people unemployed or in poverty. Time and money focusing particularly on this;
- Pådriv:
  - Aim to set up a living lab for urban development in Hovinbyen;
  - Vollebekk Fabrikker: building given to Pådriv for entrepreneurs.
    - > By simple means take advantage of creativity;
  - Larger actors can see what is done and become inspired. Then they want to be more involved;
  - Neutral player > facilitator;
- Stormwater issues:
  - Not a real issue now, but need to be prepared for the future.
- Fragmentation:
  - Solutions are really complex;
  - Come up with and integrate solutions that meet long-term objectives;
- Mobility: will change, but current regulations do not yet allow for this change > change regulations;
- Everything changes over time; that is how living labs are.

## Interview 15

**Name interviewee:** Hege Grande Fjellbirkeland

**Date:** 29-05-2018

**Time:** 12.00 h

**Interviewers:** Rosalie Fidder & Janneke Remmers

**Background interviewee:**

Hege Grande Fjellbirkeland has been an inhabitant of Hovinbyen for the past 6 years. She has been involved in Pådriv since september 2017, both as an individual and through her profession.

**Main points of interview:**

- Hovinbyen:
  - New term for many people;
  - Is in east side of Oslo, associated with less income and laid-back/relaxed;
  - Not many meeting places. 1 cafe in a park with kindergarten, basketball court/ice skate rink > people want more meeting places;
  - Demographic composition:
    - Mixed cultures and religions;
    - Difference in who lives where (connected houses or apartments);
    - Old generation used to live in Hovinbyen, now more families live there;
  - Lots of schools and kindergartens, but kids from same street assigned to different schools;
  - Ideas for Hovinbyen:
    - Tour along stream, develop this/make it bigger > Hovinbyen stream festival;
    - Cycle/walking path Bjerkke circle around Hovinbyen;
    - Transport above the ground instead of subway > possibly more connection;
    - Bersil groups want to end up at a meeting place > more meeting places. In a big city people want to feel connected;
- Connectedness to Hovinbyen:
  - People do not really know it, are not exposed to it;
  - Needs marketing > create identity (already trying to create sustainability identity);
  - How to get them to connect with Oslo, Hovinbyen and their local area? Why should they feel connected to Hovinbyen? > create something special.  
> difficult, because new term;
  - No identity at the moment not a problem. In future when projects are realised, new actors might want to get involved;
- Pådriv:
  - Oslo Innovation Week;
  - Connects people and projects;
  - New way of cooperating, no money involved, just interest and the same goal;
- Public Transport:
  - Really good: 2 metro lines and lots of busses, both very often;
  - Inhabitants take public transport to work;

Stormwater issues:

Stream runs through or aside of properties. When it rains heavily, the water does not drain, because the sewer system is blocked by leaves and sand. The runoff leads to damage and flooding. Own alert and response system.

## APPENDIX B. ANSWERS TO QUESTIONNAIRES

*In total 5 citizens filled out the questionnaire. Some gave answers in Norwegian; we have not translated these. We have only included the questions they have answered. We also deleted some questions when they were irrelevant.*

**This is a short overview of the 5 citizens who filled out the questionnaire:**

Citizen:	District:	Lived there since:
A	Ensjo	2017
B	Hasle - Sinsen	2011
C	Hasle - Sinsen	2006
D	Hasle - Sinsen	2013
E	Bjerke - Refstad	2012

### Citizen A

Experience in Hovinbyen

*How would you describe Hovinbyen?*

In transition

*What do you think of Hovinbyen/What is your experience of living in Hovinbyen like?*

I live in Lille Tøyen, which has a very rural feel despite being so central. Other parts which are being rapidly built up can seem somewhat soulless.

Development of Hovinbyen

*In your opinion, what kind of challenges does Hovinbyen have in its development?*

Dramatic growth in people in a short period of time. Local employment.

*What kind of development projects are currently taking place in Hovinbyen?*

Building of flats, workplaces and innovation spaces.

*What is your opinion on these projects?*

I am not comfortable about all the new builds popping up in such a short time.

*Who are involved in these projects? And what is your role in them?*

I am only involved with Ensjøyen/Tiedemannsbyen (I live there), and an innovation space in Vollebekk as a mentor.

*Do you think your involvement influences the end result of the development of Hovinbyen? Please explain your answer.*

No, I haven't got a influence to change.

*Would you like to change the way in which you are involved now? If yes, how? If no, why not?*

Unsure

Connection to other districts/Oslo itself

*Do you feel connected to the other districts of Hovinbyen? Please explain.*

I haven't got much connection to the other areas as I have only lived in Oslo for 6 months.

*What would make you feel more connected?*

Time and more involvement

*Who could/should ensure this?*

I feel that this responsibility lies with me.

*Do you feel connected to Oslo itself? Please explain.*

I am starting to feel a belonging in the local areas and within the innovation sector.

*What would make you feel more connected?*

Getting involved with more happenings, events and discussions.

*Who could/should ensure this?*

Me

Mobility in Hovinbyen

*In general, do you think this will work? Why (not)?*

Yes I do. It seems like the individual inhabitants are motivated to make a difference.

*Do you have any recommendations regarding this plan?*

Create clear cycle paths, forbid bike riding on the pavements and more frequent public transport in rush hours.

Water issues in Hovinbyen

*Do you experience specific issues related to water (e.g. flooding)?*

None

## Citizen B

Experience in Hovinbyen

*How would you describe Hovinbyen?*

En bydel som endres fra lager og industri til bolig- og leveområde med mange kontor-arbeidsplasser

*What do you think of Hovinbyen/What is your experience of living in Hovinbyen like?*

Det er mange lokale tilbud, og kort vei til Oslo sentrum. Jeg kan gå til byen, eller ta bane/buss.

Development of Hovinbyen

*In your opinion, what kind of challenges does Hovinbyen have in its development?*

Jeg tror den største utfordringen er å ivareta følelsen av åpent og grønt område, at ikke bygningene blir for høye og står så tett at vi mister følelsen av "drabantby". Mye av det som er flott i drabantbyen Lambertseter er avstanden mellom bebyggelsen, og der kan barn og voksne få igjen ro og fred. Og så er jeg engstelig for hva eldre barn/unge ungdom skal få til av livsutfoldelse uten voksenkontakt/voksenkontroll. tenåringer trenger steder der de bl.a kan flørte uforstyrret. Slik som skogholt ga rom til tidligere. Jeg er redd alle grønne lunger/uforstyrrede plasser bygges igjen (av Vålerenga FK og andre!)

*What kind of development projects are currently taking place in Hovinbyen?*

Jeg bryr meg litt her og der. Ingen spesielle.

*What is your opinion on these projects?*

Liker at det bygges boliger i Hovinbyen og at vi får et godt sted å leve.

*Who are involved in these projects? And what is your role in them?*

Jeg er nabo.

*Do you think your involvement influences the end result of the development of Hovinbyen? Please explain your answer.*

Når naboer reagerer på uvettig utbygging, som f.eks rundt Valle Hovin, håper jeg politikerne stigger de krevende og økonomistyrte markedskreftene. Men jeg ser at det ikke er lett. Utbyggere tjener mer penger på å bygge høyere og tettere, men det gir oss IKKE bedre forhold for verken oss som allerede bor her eller nye naboer som skal flytte inn.

*Would you like to change the way in which you are involved now? If yes, how? If no, why not?*

Ja, jeg skal gjerne ha en røst som blir hørt!

Connection to other districts/Oslo itself

*Do you feel connected to the other districts of Hovinbyen? Please explain.*

At Hovinbyen er knyttet til Oslo er jo selvklart! Vi har gangavstand og veeeldig gode kommunikasjonsforbindelser. Men området Hovinbyen er digert. Det er dessuten nå fortsatt områder med lager og industri, og da er det temmelig unaturlig å være integrert med dette når jeg ikke arbeider der. Jeg føler at utsagnene over virker urimelige eller uvensentlige.

*What would make you feel more connected?*

Hvis det skal bli bedre forbindelse så kan det bli flere gang- og sykkelveier.

*Who could/should ensure this?*

Kommunen

*Do you feel connected to Oslo itself? Please explain.*

JA! Jeg er født og oppvokst i Oslo, og god offentlig kommunikasjon samt kort avstand gjør at min familie valgte Hasle og Hovinveien som bosted.

*What would make you feel more connected?*

Det eneste som bekymrer meg er hvis det bygges store, høye, ruvende bygg som sperrer utsikten til fjorden og Oslo Sentrum

*Who could/should ensure this?*

Kommunen

Mobility in Hovinbyen

*In general, do you think this will work? Why (not)?*

Ja, det tror jeg. Det virker jo allerede!

*Do you have any recommendations regarding this plan?*

Pass på at gang- og sykkelområder er trygge, og at de går dit folk vil forflytte seg. Daglig forflytning mellom bosted og skole, barnehage, arbeidssted. Buss og bane må gå ofte nok, "rullende fortau", og gå slik at folk slipper bytte.

Other problems/challenges

*Do you experience any other problems/challenges not mentioned before? If yes, what challenges?*

Jeg er bekymret for ungdom. Kanskje flere møtesteder for dem, for uorganisert samvær, for å kunne se kino, klatre, skate, spille ballspill, øve i korps og kor, rimelige kafeer og sunne gatekjøkken.

*How do you think these challenges can be solved? By whom?*

Spørre ungdom hva de trenger og tror de trenger. Spørre f.eks Nattevandrerne hva de ser ungdom trenger på fredags- og lørdagskveldene. Overføre penger til organisasjoner med driftsgaranti, for det

er så ofte det gies prosjektmidler, og da slutter alt når prosjektperioden er over.

Politikerne må gi penger til drift.

*Would you like to be involved in the process of finding and implementing solutions for these challenges? If so, how?*

Ja

Water issues in Hovinbyen

*Do you experience specific issues related to water (e.g. flooding)?*

Nei, det virker som bekkene og dammene som er laget er godt dimensjonert.

*Who do you think should solve this, how?*

Byplanleggerne må få kompetanse slik at det kan fortsettes med god planlegging med tanke på f.eks store mengder regn.

*(How) would you like to be involved in this?*

Ja, jeg støtter dette

## Citizen C

Experience in Hovinbyen

*How would you describe Hovinbyen?*

It has become a part of the city and has its own offers and services.

*What do you think of Hovinbyen/What is your experience of living in Hovinbyen like?*

Simple - close to what the city offers, work, kindergarten, leisure facilities and nature. It is social with all meeting places like the park and local shops and restaurants.

Development of Hovinbyen

*In your opinion, what kind of challenges does Hovinbyen have in its development?*

High prices. It may seem that there are too few big apartments. I am afraid the consequences might be an unstable neighborhood. Some of the building complexes have a design and a height that leaves the sun out for much of the year.

*What kind of development projects are currently taking place in Hovinbyen?*

Tiedemanns fabrikk, Obos (not started), Peters kvartalet

*What is your opinion on these projects?*

High prices and little space between the buildings.

*Who are involved in these projects? And what is your role in them?*

I don't understand the first question. I'm just a neighbour.

*Do you think your involvement influences the end result of the development of Hovinbyen? Please explain your answer.*

Not at this level.

*Would you like to change the way in which you are involved now? If yes, how? If no, why not?*

Yes, I would like to be able to influence more directly in projects. E.g. reference group or something similar.

Connection to other districts/Oslo itself

*Do you feel connected to the other districts of Hovinbyen? Please explain.*

Yes, much has happened over the last five years. The industrial areas on Økern and Ensjø are gone. Previously, these areas were a wasteland after closing time. Public communication has become much better, so it's easier to get around.

*What would make you feel more connected?*

I feel connected

*Do you feel connected to Oslo itself? Please explain.*

Yes. It's walking distance to Grünerløkka. I can take public transportation all over the city whenever it suits me.

Mobility in Hovinbyen

*In general, do you think this will work? Why (not)?*

Yes, because during the last few years it has become easier to walk, cycle and use public transportation in Oslo.

*Do you have any recommendations regarding this plan?*

Remember the people who live in this city. Build for the people and for a good local environment. Do not forget to involve the city's local people and other important stakeholders. Get out in the field and see how things work and talk to people.

Other problems/challenges

*Do you experience any other problems/challenges not mentioned before? If yes, what challenges?*

Rental housing and unstable neighbourhood.

*How do you think these challenges can be solved? By whom?*

Yes, by our by our authorities



*Would you like to be involved in the process of finding and implementing solutions for these challenges? If so, how?*

If I get the opportunity - yes.

Water issues in Hovinbyen

*Do you experience specific issues related to water (e.g. flooding)?*

No

## Citizen D

Experience in Hovinbyen

*How would you describe Hovinbyen?*

Nytt moderne område fullt av liv

*What do you think of Hovinbyen/What is your experience of living in Hovinbyen like?*

Meget positivt, familievennlig, grøntområder, bra matbutikker og restauranter

Development of Hovinbyen

*In your opinion, what kind of challenges does Hovinbyen have in its development?*

Bevare grønt arealer som allerede idag eksisterer

*Do you think your involvement influences the end result of the development of Hovinbyen? Please explain your answer.*

Absolutt, jeg er opptatt av lokalmiljø og at dette skal være tilpasset alle aldre. Er opptatt av mangfold spesielt når det kommer til utvikling av tomter til boliger

## Citizen E

Experience in Hovinbyen

*How would you describe Hovinbyen?*

A good mix of people living there, both when it comes to age, different phase in life and different cultures and religions. Also a mix of small houses and buildings with apartments. Lots of industry, (but things are changing).

*What do you think of Hovinbyen/What is your experience of living in Hovinbyen like?*

I love the green areas where people can meet, the little stream (Borrebekken) running through Hovinbyen and the fact that people living here are "relaxed" and laid back. I miss more cafés, a bakery, cultural offers like concerts & festivals. I wish there were more interaction between the residents here, more happenings, common work-out-groups, etc. In the area I live there are lots of people in the same phase as I am...this has made it easy to get to know neighbours and others. :)

Development of Hovinbyen

*In your opinion, what kind of challenges does Hovinbyen have in its development?*

Interacting with the residents - and making the resident feel included in all the decisions made on behalf on their area.

*What kind of development projects are currently taking place in Hovinbyen?*

Building lots of new appartements in the Vollebekk area, Pådriv, Vollebekk Fabrikker, Power cables are put in the ground instead of in Power poles. the Oxer tower in Kabelgata is transforming into a culture centre. Økern senter might become transformed into Oslos biggest waterpark, etc.

*What is your opinion on these projects?*

Thumbs up!

*Who are involved in these projects? And what is your role in them?*

I don't know who's involved in the different Project, but I have taken part in a workshop concerning Vollebekk Fabrikker and is connected to Pådriv.

*Do you think your involvement influences the end result of the development of Hovinbyen? Please explain your answer.*

I think the voice of everyone involved development projects influences the end result in one way or another. My involvement has probably influenced in an indirect way. :)

*Would you like to change the way in which you are involved now? If yes, how? If no, why not?*

Yes, i could get more involved in my areas "vel" to make more happenings in my neighbourhood, On the other hand since I am involved in Pådriv, I once in a while get the opportunity to take part in different workshops concerning Hovinbyen, etc. Also via social media I read about possibilities to take part in different forums to influence the decision making of the area i live. (Ex. Bjerke bydel, Groruddals-satsingen, etc.)

Connection to other districts/Oslo itself

*Do you feel connected to the other districts of Hovinbyen? Please explain.*

No. I only feel connected to Vollebekk area. (This is where i do my grocery shopping, where my kids go to kindergarten and where my friends (neighbours) live. The other areas are not "on my way" to work or "on my way" to anything for that matters... Also the public transport in my area is so good that I never "need to" visit the other areas.

*What would make you feel more connected?*

Maybe if Hovinbyen got a certain identity, something to be associated with. In one way I feel more connected to Groruddalen than Hovinbyen.....

*Do you feel connected to Oslo itself? Please explain.*

Yes and no. I have lived and worked in Oslo for many years now, and I am becoming a Oslo-girl, but I grew up in a small community outside of Oslo, and I am struggling to feel the same connection to Oslo/Hovinbyen/Vollebekk as I did with the area I grew up.

Mobility in Hovinbyen

*In general, do you think this will work? Why (not)?*

Yes, i do, at least cycling and public transport. Hovinbyen is close to the city centre, where a lot of the residents work. If cycling and public transport makes it easier and quicker to get around than by car, people will use it even more, than today...(I must say that the current public transport and cycling possibilities are good)

Other problems/challenges

*Do you experience any other problems/challenges not mentioned before? If yes, what challenges?*

Interaction between the different cultures and religions.

*Would you like to be involved in the process of finding and implementing solutions for these challenges? If so, how?*

Yes, take part in diff. workshops etc,

Water issues in Hovinbyen

*Do you experience specific issues related to water (e.g. flooding)?*

First i love the fact that we have a stream running through our neighbourhood!

Yes! Flooding is a problem in my neighbourhood. Both because we have a stream running through our neighbourhood, and because we are located at the lowest point in our area.

*How often and to which degree do you experience this?*

Difficult to say how often = everytime there is heavy rain. And to a very high degree! We have contacted Oslo kommune several times to get them to look at det drainage of the different roads, everytime there is heavy rain we are out in our street to "save" our house and property from the flood, and we have even made "sandbags" to be prepared for the next flood. :)

*Who do you think should solve this, how?*

Oslo kommune...?

*(How) would you like to be involved in this?*

Don't necessarily need to be involved in this, apart from my/our voice being heard in the process of "solving" the problem!

## APPENDIX C. RECOMMENDED HANDBOOKS/LITERATURE

### Handbooks:

Publisher	Reference
AMS	van Bueren, E. M. & Steen, K. (2017). <i>Urban Living Labs: A living lab way of working</i> . Amsterdam Institute for Advanced Metropolitan Solutions, third edition.
GUST (Lund University)	Mccormick, K., & Hartmann, C. (2017). <i>The Emerging Landscape of Urban Living Labs: Characteristics, Practices and Examples</i> . Lund University.
Making Sense	Balestrini, M., Bejtullahu, S., Bocconi, S., Boerwinkel, G., Boonstra, M., Boschman, D.J, ... Woods, M. (2018). <i>Citizen Sensing: A Toolkit</i> (1st ed.). Making Sense
SmartIES	Ståhlbröst, A., & Holst, M. (2012). <i>The Living Lab Methodology Handbook</i> . Vinnova.
SubUrbanLab	Friedrich, P., Karlsson, A., & Federley, M. (2013). <i>Boundary conditions for successful Urban Living Labs</i> . SubUrbanLab.
U4IoT	Malmberg, K., Vaittinen, I., Evans, P., Schuurman, D., Ståhlbröst, A., & Vervoort, K. (2017). <i>Living Lab Methodology Handbook</i> . Zenodo. Retrieved from <a href="https://zenodo.org/record/114632">https://zenodo.org/record/114632</a>
URB@Exp	Scholl, C., Ablasser, G., Eriksen, M.A., Baerten, N., Blok, J. Cörvers, R., ... Zimmermann, F. (2017) Guidelines for Urban Labs, URB@Exp project 2014-2017, JPI Urban Europe.

### Literature:

- Baccarne, B., Schuurman, D., Mechant, P., & De Marez, L. (2014). The role of urban living labs in a smart city. In ISPIIM Conference Proceedings (p. 1). The International Society for Professional Innovation Management (ISPIM).
- Evans, J., & Karvonen, A. (2011). Living laboratories for sustainability: exploring the politics and epistemology of urban transition. In H. Bulkeley, V. Castán Broton, M. Hodson, and S. Marvin (Ed.) *Cities and low carbon transitions* (pp. 126-141). London: Routledge
- Higgins A., Klein S. (2011). Introduction to the Living Lab Approach. In: Tan YH., Björn-Andersen N., Klein S., Rukanova B. (Ed.) *Accelerating Global Supply Chains with IT-Innovation*. Springer, Berlin, Heidelberg (pp. 31-36). Springer & ITAIDE
- Schaffers, H., & Turkama, P. (2012). Living labs for cross-border systemic innovation. *Technology Innovation Management Review*, 2(9): 25-30.
- Schuurman, D., Lievens, B., De Marez, L., & Ballon, P. (2012). Towards optimal user involvement in innovation processes: A panel-centered Living Lab-approach. In *Technology Management for Emerging Technologies (PICMET), 2012 Proceedings of PICMET'12*: (pp. 2046-2054). IEEE.
- Steen, K. & van Bueren, E. (2017). The defining characteristics of urban living labs. *Technology Innovation Management Review*, 7(7):21-33.
- Veeckman, C., Schuurman, D., Leminen, S., & Westerlund, M. (2013). Linking living lab characteristics and their outcomes: Towards a conceptual framework. *Technology Innovation Management Review*, 3(12):6-15.
- Voytenko, Y., McCormick, K., Evans, J. & Schliwa, G. (2016). Urban living labs for sustainability and low carbon cities in Europe: Towards a research agenda. *Journal of Cleaner Production*, 123:45-54.

## APPENDIX D. LIST OF CONTACTED ULLS OR SIMILAR PROJECTS

For this project we contacted 45 different experts or (ULL) projects in total. We have conducted 15 interviews. Furthermore, other people provided us with relevant information and/or websites via e-mail as well. Some people did not have the time or redirected us to other people (in total 7 people), while others did not reply at all (15 in total).

The most relevant ULLs, including the ones we investigated further, are given below:

ULL	Website
Amsterdam Rainproof	<a href="https://www.rainproof.nl/">https://www.rainproof.nl/</a>
Amsterdam Smart Citizens Lab	<a href="http://waag.org/nl/project/amsterdam-smart-citizens-lab">http://waag.org/nl/project/amsterdam-smart-citizens-lab</a>
Buiksloterham	<a href="https://buiksloterham.nl/">https://buiksloterham.nl/</a>
City Lab Apeldoorn	-
City Lab Leiden	<a href="http://www.stadslableiden.nl/">http://www.stadslableiden.nl/</a>
Code Blond Bier	-
ENERGY & WATER – Greater Copenhagen Living Lab	<a href="https://enoll.org/network/living-labs/?livinglab=energy-amp-water--greater-copenhagen-living-lab#description">https://enoll.org/network/living-labs/?livinglab=energy-amp-water--greater-copenhagen-living-lab#description</a>
FieldLab Oost	<a href="http://www.hva.nl/urban-management/fieldlabs/fieldlab-oost/fieldlab-oost.html">http://www.hva.nl/urban-management/fieldlabs/fieldlab-oost/fieldlab-oost.html</a>
Food Village (Amsterdam Noord)	<a href="http://www.creativecitylab.nl/food-village-in-amsterdam-noord-het-lab-heeft-een-haalbare-business-case-opgeleverd">http://www.creativecitylab.nl/food-village-in-amsterdam-noord-het-lab-heeft-een-haalbare-business-case-opgeleverd</a>
Green Blue Cities (Kiruna)	<a href="https://jpi-urbaneurope.eu/project/green-blue-cities/">https://jpi-urbaneurope.eu/project/green-blue-cities/</a>
Green Blue Cities (Zwolle)	<a href="https://jpi-urbaneurope.eu/project/green-blue-cities/">https://jpi-urbaneurope.eu/project/green-blue-cities/</a>
Healing Gardens	<a href="https://www.healinggardenswur.nl/">https://www.healinggardenswur.nl/</a>
MK:Smart/MKInsight	<a href="http://www.mksmart.org/">http://www.mksmart.org/</a> <a href="http://mkinsight.org/">http://mkinsight.org/</a>
Rain Sense	<a href="https://www.ams-institute.org/solution/rain-sense/">https://www.ams-institute.org/solution/rain-sense/</a>
Smart City Living Lab	<a href="https://slimstestad.nl/">https://slimstestad.nl/</a>
Stockholm Living Lab	<a href="https://www.sics.se/our-offer/sics/stockholm-living-lab">https://www.sics.se/our-offer/sics/stockholm-living-lab</a>
Strijp S	<a href="http://www.strijp-s.nl/nl/home">http://www.strijp-s.nl/nl/home</a>
The Knowledge Mile	<a href="http://knowledgemile.amsterdam/">http://knowledgemile.amsterdam/</a>
The Student Hotel Living Lab	<a href="http://www.energybehavior.com/the-student-hotel.html">http://www.energybehavior.com/the-student-hotel.html</a>

# APPENDIX E. SOCIETAL EVALUATION

## Introduction

*"... ethical evaluation requires a weighing or ranking of the different impacts, so that, e.g., an animal rights activist might consider any exploitation of animals inadmissible, while a more utilitarian view might accept that substantial human benefits outweigh minor harms inflicted on animals."* (Mepham, 2000, p. 169).

Within every field of research, ethics plays an imperative role in decision-making. For example: Who should be included in our research? Which angles should we take? Also in our research, we encountered ethical considerations. This document will outline some of these. First, we will introduce our research goal, questions and results. Then, we will delve deeper into ethical issues, after which we will share ethical considerations within the setup of our research.

### The Urban Living Lab approach: Summary of our research

Climate change is a 'wicked' problem. This means, among others, that it cannot be solved by experts only. Citizen participation could help in dealing with this problem. One way to enhance this participation is through an 'Urban Living Lab' (ULL). Our project investigates the best practices for setting up such a lab. The outcomes are applied to adaptive storm water solutions in Hovinbyen, a district in Oslo which is currently being developed from an industrial to a blue-green area. The ULL approach is a relatively new concept. There is no consensus on the exact definition of a ULL; many scholars and institutes have proposed their own definition and defining characteristics (Interview 2; Interview 3; van Soest, 2017; Steen & van Bueren, 2017; Voytenko et al., 2016). It has also been argued that within each project a specific definition has to be determined (Almirall et al., 2012; Interview 2). Based on literature and our own research, we have coined the following definition for the current research:

*An Urban Living Lab is an approach to innovation and learning by engaging all stakeholders, who will form public-private-people partnerships; co-create and test new technologies, services, products, systems and/or discourses in a real-life urban setting; and critically reflect on the whole process, challenges and results.*

Thus, a ULL is a method to explore innovative solutions. Central are the engagement of stakeholders, who co-create. Even though the stakeholders may have different roles, there is no hierarchical structure and everyone's input is valued equally. The experimentation does not take place in a laboratory, but in a real-life setting. This will make final implementation of the innovated product easier. Lastly, evaluation and learning are important: ULLs should not be one-off project, but the lessons learned should be transferred to other situations.

To operationalise this definition, the characteristics of ULLs are often considered. These are:

- Urban real-life setting;
- Participation;
- Co-creation;
- Experimentation;
- Innovation;
- Learning process;
- Evaluation.

### Set-up and outcomes of the research

To guide our research, we defined the following research question: *how can a ULL be set up in a quick manner, while being of good quality and involving several groups within the society?* The main normative assumption behind this question is that a ULL *should* have certain characteristics (quickly, of good quality, and involving several groups within society). These assumptions were agreed upon by our group and the commissioners, and mainly stemmed from the commissioners' wishes. To answer our research question, we conducted a literature review, and interviews with experts on a) citizen participation, b) ULLs, and c) Hovinbyen. An overview of these can be found in the Appendix. Our results consist of recommendations for managing a living lab, divided into three phases: initiation,

implementation, and finalisation. We also included recommendations that are important throughout the process. The conclusion of our research is that ULLs are highly context-specific, so working on a local scale is imperative for a successful ULL.

### Values & Bias within our Research

Science occurs within a context of our personal, cultural and social values. This can influence our research and the choices we make within the research. These are all normative moments (van Koppen, n.d.). The next section will, thus, explicitly state some of the choices we made, and explain why we made them.

A substantial part of the research has been determined by the commissioners, who are interested in Urban Living Labs in Hovinbyen, Oslo. The goal is to determine how ULLs can be set up quickly and of good quality, whilst also appealing to different groups of society. For this reason, we decided to target ULLs that were in a further stage of their development, and specifically investigate how different groups were included and reached. Experts were selected on the basis of their knowledge on ULLs and citizen participation, for example through their academic research. We also interviewed an expert regarding Hovinbyen, who was connected to the New Water Ways<sup>1</sup> project, and an inhabitant of Hovinbyen, who told us more about her experience in the neighbourhood. Moreover, an online questionnaire was emailed to six<sup>2</sup> contacts of the commissioner, who also were involved in Hovinbyen's development. We reached all the people related to Hovinbyen via our commissioner, who has a network in the area. He selected them on the basis of their expressed interest. In total, we conducted 15 face-to-face interviews. Within this entire process of expert-selection, our values of what we deemed to be a 'suitable' project for our research, determined whom we requested for an interview. 'Suitable', in our case, meant being in a later stage of the process or finalised; having some form of online presence through which we could find the ULL; and, preferably, addressing climate or stormwater issues. This has resulted in a specific group of participants in our study, whom all had specific experiences. The values thus determined the outcomes of our research.

We decided to conduct semi-structured interviews to gain more insight in the process of the ULL. Every ULL is context-specific, and has opportunities and challenges related to this. Thus, one generalised survey is impossible to conduct. When conducting semi-structured interviews, being aware of one's own values are again of high importance: you might accidentally express certain biases or preferences, through for example a facial expression. This can influence the interviewee's answer, and thus the final results. We avoided this as much as we could by always interviewing in pairs, and de-briefing together afterwards to ensure that we both had the same interpretation of the interview results.

### Ethical considerations for the management of Urban Living Labs

When setting up a ULL, several ethical dilemmas might be encountered. To summarise these, we constructed an ethical matrix (Table 1). It is based on Mephram (2000). As "a framework for rational ethical analysis"<sup>3</sup> (Mephram, 2000, p.165), the matrix is aimed at helping policy-makers in decision-making (ibid).

Table 1: an ethical matrix of Urban Living Labs, based on Mephram (2000).

:Respect for	Wellbeing	Autonomy	Justice
Inhabitants/local community	Right to responsible (innovation (privacy, equity	Right to be involved/ participate; to have a voice	Right to a 'fair' process: open, transparent
Tool/theory	AREA framework	Public Participation	Communication and trust building
Ecosystem and physical environment	Right to be maintained/no harm	Right to be included in consideration	Right to fair treatment: no exploitation

Since every ULL is context-specific, one should actually construct an ethical matrix on a case-by-case basis. Table 1 can serve as an example for this. It includes two groups that will always be present: a local community, since the ULL takes place in an urban real-life setting; and the ecosystem, also since the ULL happens in real-life. We expanded the framework to include 'tools'; these are methods we discovered in (ethical) literature or through our interviews, which can serve to help understand the

<sup>1</sup> This is the umbrella project that our research is part of.

<sup>2</sup> Of which five replied.

<sup>3</sup> The matrix is based on the "four principles approach" by Beauchamp and Childress (1994; in Mephram, 2000), which Mephram (2000) has summarised into the three principles of wellbeing, autonomy, and justice. It applies these principles to different interest groups (those who are impacted by the development/topic which is under consideration).



ethical consideration. For the rest of the ethical evaluation, we would like to focus on two pressing ethical issues that we as a group also had several discussions about:

1. How to innovate responsibly in a real-life setting?
2. How to ensure that participation is ethical (every relevant stakeholder is and feels included)?

The debate below is meant to start this discussion and explain some of our main considerations when we, as researchers, discussed the ethical aspects of ULLs.

#### Innovation in a real-life setting

The outcome of a ULL is a new technology, service, product, system and/or discourse (please, see our definition above). Technology, however, how innocent it might seem, is not ethically neutral in its use: “We should never forget that the very same technology, that is by definition ethically neutral, ... can be developed and used in dramatically different ways” (Brusoni & Vaccaro, 2017, p. 223). Thus, users give the technology a new value and implication within society. For example, facial recognition software in a smartphone could protect the phone by locking it when it does not see the face of the owner. Yet, could also be used to ensure that someone is watching an advertisement between online video clips by only playing when it detects someone looking at the screen.

As Brusoni & Vaccaro describe it: “[G]iven the intrinsic ethical neutrality of technologies per se, values play a central role in this discussion. Individual and organizational values shape how technologies (product, services, procedures) are understood and practiced.” (ibid) Thus, the outcome of the ULL (e.g. a new technology) might have unpredicted or undesired implications. Useful literature to guide this discussion are theories on Responsible Research and Innovation (RRI) from the field of Science and Technology Studies (STS).

A useful framework for analysing ethical issues regarding innovation is the ‘AREA framework for RRI’ by Owen (2014; in Stahl et al., 2017). This encompasses four stages of ethical deliberation: Anticipate, Reflect, Engage, Act (Stahl et al., 2017). These are necessary to ‘proactively address’ the issues (ibid, p. 369). Thus, a major part of this discussion revolves around the anticipation of certain problems, in order to respond to them before it is too late. Several, more specific ethical issues from ICT are relevant for our discussion, and can be analysed using the framework:

#### *Privacy*

Privacy is an important right related to the well-being of individuals. Within ICT, it has an obvious connection to innovation (Stahl et al., 2017). However for ULLs, it is also important to take into consideration. In one of the cases we investigated in our research, The Student Hotel (TSH), energy and water use of individual rooms were measured and used for research on energy-saving behaviour. There is a tension between data gathering and privacy. In TSH, it was important to allow the participants to give consent and explain to them clearly what would happen with the results. Within a ULL, data gathering can seem innocent (e.g. having inhabitants of Hovinbyen measure the flooding of Borrebekken, a stream in the region), however, the outcome can still have an impact on the individual (e.g. higher insurance costs, or depreciation of the quality of the house when the degree of flooding becomes public). Using the AREA framework, stakeholders could deliberate together on other potential implications of their ideas, reflect on these, and eventually combine an action to it.

#### *Responsibility*

Also within ICT discussions, responsibility plays a large role (Stahl et al., 2017). One of the key characteristics of a ULL is co-creation with a low degree of hierarchy. This means that in general, not one specific person is responsible for the ULL. However, it is important to think about (final) responsibility in case the ULL results in some negative side-effects. For example, what if a ULL that organises a festival accidentally results in pollution of a nature area, which no one feels responsible for? What if air quality measurements result in the depreciation of a neighbourhood? Even though ULLs do not have one single leader, it is important to consider such responsibility in advance. Again, the AREA framework could provide an agenda for the discussion.

### Equity

A point not often raised with regards to ethical innovation in the field of ICT, but relevant for our research, is that of equity. Who is allowed to use the results? Who will benefit most from this? A representative from Amsterdam Smart Citizens Lab discussed this with us in an interview: she gave the example of Google wanting their Google Maps-streetcars to also measure air quality. It seems like a nice idea on the surface, however, as she points out, those cars mainly drive on the busier roads. That means that these busy areas will receive more measurements. Is this fair to people living in more rural communities? This shows that expanding such research is not simply always beneficial for everyone, or even desirable (Interview 13).

A method to enhance Responsible Innovation even further, is proposed by Jassanoff (2003); by increasing public participation in decision-making, the process can become more inclusive and ethical. The next section will deliberate further about public participation, with regards to Urban Living Labs.

### Participation: ensuring inclusion

The role of citizen participation is a largely-debated topic within ethics (Irwin, 2011; Jassanoff, 2016; O'Neill, 2001) and beyond (Interview 12). Delgado, Kjølberg and Wickson (2011) define a framework to understand the discussion regarding public participation (PP). They conceptualise five different areas of tension, three of which are especially relevant to the current discussion:

#### Why to include?

The fundamental question regarding PP is: why should PP be initiated? Drawing on the work of Stirling (2008), Delgado et al. propose three rationales for PP: “instrumental, substantive and normative” (Delgado, Kjølberg and Wickson, 2011, p. 830). The instrumental rationale sees PP as a way to attain a certain goal, substantive PP as a way to achieve substantive change, and normative PP as “the right thing to do” (ibid). This means there are several arguments in favour of PP, with different implications for the rest of the process (e.g. stakeholder selection<sup>4</sup>, thematic discussions, etc.). For ULLs, it can be useful to consider these reasons as well; often, their rationale will fall under the instrumental and substantive arguments.

#### Who to include?

Once it has been established that inclusion is desirable (and with which goal), the next step is to consider who should be included within this. Delgado et al. describe how Wynne “support[s] ... the ideal that all citizens have a role and science and technology” (ibid, p. 832). Some expanded this theory, going beyond “different types of ‘relevant’ expertise, [to] different kinds of ‘relevant’ publics” (ibid). In other words: the public is a dynamic system that “relate[s] to science in a variety of ways” (ibid), such as by being “concerned, interested, informed or none of these” (ibid). Thus, the public cannot be understood as one entity, but consists of a diverse set of people, all with different expectations and values.

Still, the answer to the above question (“Who to include?”) is not clear-cut; Delgado et al. (2011) describe how Harry Collins and Robert Evans coined the famous *normative theory of expertise*: ‘technical’ decision-making should be reserved to those who have ‘relevant expertise’, such as real-life experience (ibid). Wynne (2003) nuances this: he notes how, too often, institutions consider large-scale public issues to be ‘scientific’, framing them as topics that mainly (scientific) experts should deal with. ULLs could provide a helpful counterweight to such knee-jerk reactions, if inclusion is ensured. As one of our interviewees noted: “Everyone is an expert about their own life and experience” (Interview 13).

The theory of *deliberative democracy* can provide another angle to this debate. Deliberative democracy is a theory that states that everyone who is impacted by a certain decision, should be involved in the decision-making process. Thus, it does not matter what your expertise is, what matters is that the outcomes of the project will influence you. This can be translated to the living lab situation: everyone who might be impacted by the innovation and experimentation in the region, should be involved. However, in reality, this is of course impossible to achieve. Thus, a consensus has to be reached for a middle-ground in which the different impacted groups all are represented in the decision-making. O'Neill proposes three criteria to base ethical representation (legitimacy) on: “authorisation<sup>5</sup>, accountability<sup>6</sup> and presence<sup>7</sup>” (O'Neill, 2001, p. 497). Preferably, all three are present, to ensure maximum inclusion. For

<sup>4</sup> Instrumental PP might be more systematic and focus on certain stakeholders that are useful to include for reaching the final goal, while normative PP might focus on ‘the right’ stakeholders.

<sup>5</sup> The proxies are authorised to represent.

<sup>6</sup> The proxies can be held accountable for their decisions.

<sup>7</sup> The proxies share identity with those who they represent, and/or have certain relevant knowledge or experience.

ULLs, this might be difficult, as it can already be hard to convince stakeholders to commit (Interview 6). However, O'Neill's criteria can still be used when finding stakeholders is *not* an issue per se (such as in the Knowledge Mile; Interview 11).

#### *How to include?*

According to Delgado et al. (2011), PP is often either initiated top-down or from the bottom-up. In literature this is also known as 'invited' (through e.g. focus groups; top-down) or 'uninvited' (through protests or lobbying, e.g.; bottom-up) PP. Much related to this discussion is, again, the deliberative democracy: should we entrust it to the public sphere, or organise it institutionally?

An important consideration is invited (or top-down) PP is Irwin's "scientific citizenship" (ibid): "invited forms of PP not only predetermine who is a 'relevant' participant, but also carry implicit assumptions about *how* citizens should participate" (Delgado, Kjølberg & Wickson, 2011, p. 833-34). In other words: the initiators "impose frames and meanings on to participants" (ibid, p. 834). This means that the participants work within a limited framework, and have limited freedom to question the frames themselves. Uninvited initiatives, on the other hand allow for alternative framing: the "possibility to question and challenge the normative commitments and often implicit politics of an official framing" (ibid). Tying this back to Wynne's analysis in the previous section, again we see the role of framing with regards to inclusion; who will be included, and how, eventually will depend on the frames of the lab pioneers. ULLs aim to create an uninvited system. However, this is sometimes not possible due to lack of resources or participants that are willing to create the system. In these 'invited' systems then, it is imperative for the initiators to consider their own frames and values, and how this might impact their living lab process.

### **Concluding remarks**

To sum, Urban Living Labs can encounter several ethical challenges. The major ones that we discussed in this societal evaluation are: responsible innovation, and participation. Several methods or approaches exist to make sense of these issues. The ethical matrix of Mepham (2000) served as a convenient tool to organise these. To ensure responsible innovation, the AREA framework (Stahl et al., 2017) can be used; Anticipate, Reflect, Engage, Act with the issues, together with the stakeholders. To maximise inclusion, Public Participation theory is a valuable addition; who should be included, and who could serve as a fair representative, are widely-debated ethical issues. Expanding on Delgado et al. (2011), O'Neill (2001) and Interview 13, we conclude that every citizen who might be impacted by the project *should* be included in the decision-making, acknowledging that *in reality* this is impossible. Realising that everyone is an expert about their own life and experience, and using O'Neill's three criteria (authorisation, accountability and presence) for legitimacy, can help in deciding how to continue ethically.

At the start of this project, we all believed that ULLs were straightforward initiatives. One of the major challenges for us appeared to be discovering the best practices within a growing field of literature and experiences, and evaluate how to appeal to different groups of society. The conclusion, initially, would be a concise toolbox applicable for any ULL. This research has taught us that reality is not that simple: ULLs are highly context-specific. This means that there is no one guideline for setting up a ULL. In reality, it can be already difficult enough to attract enough stakeholders; let alone to consider how to appeal to even more, different groups, that are harder to convince initially.

We solved this realisation by changing our strategy; we first hoped to design specific ULLs for Hovinbyen. Now, we designed a few fictional concepts that could serve as an inspiration. We made recommendations instead of a one-size-fits-all toolbox.

All in all, the research has been a reminder for us that there can be a discrepancy between ideal, theoretical and abstract literature, and complex, context-specific reality, with its different limitations<sup>8</sup>.

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