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Preface

This Bachelor thesis is the final step towards my Bachelor Degree in Project Development and Process Management in the Built Environment at Zuyd University of Applied Sciences in Heerlen. During my study, it became clear that my interest and passion is within the social domain of urban development; to help people, to make places healthier, greener or more sustainable. That places come alive, when taking local needs into account and not by telling people what to do and how to do it. The topic in this graduation research fits this perspective and the field of Socio-Spatial Planning (Master) which will be my further education at the university of Groningen, the Netherlands.

I hope that this Bachelor thesis and the results of the research will help the Lectureship Smart Urban Redesign in Heerlen to define the Limburg Action Lab and that it helps other living labs to get more insights in the organisation and process model of the living lab concept for urban development.

During this graduation research, I received a lot of expertise and support from academic and business professionals. In this preface, I would like to thank a few people for their help and assistance during this research.

First, I would like to thank Ms. Nurhan Abujidi and Mr. Herwin Sap of the Lectureship Smart Urban Redesign and my 1st assessor Mr. Nico Pelt for their academic support and valuable input during this research.

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Further, I would like to thank all the living lab practitioners who helped me in my research. Their contribution is highly appreciated and without their input this research would not have been possible.

In addition, my thanks goes to my parents, sister and girlfriend who encouraged and supported me during the graduation research.

Many thanks to all of you!

Stefano Blezer
Heerlen, the province of Limburg
23th of June 2017

Executive summary

Because of various developments within today's society, the urban area is becoming more transdisciplinary and more complex which results in failure of existing urban development models. A relatively new tool to organise development processes is the living lab concept. The European Network of Living Labs defines the concept as an *"user-centred, open innovation ecosystem based on a systematic user co-creation approach, integrating research and innovation processes in real life communities and settings"*.

The purpose of the graduation research is to gather more insights in the organisation and process model for living labs to define the LAL, a future living lab in de province of Limburg focussed on sustainable neighbourhood development, in a qualitative better and more efficient way. Therefore, the main research question is *How can living labs, aimed at urban development, contribute to sustainable neighbourhood development in the province of Limburg?* To find an appropriate answer, there is made use of qualitative research methods: A desktop research in combination with a case study between six living labs and by visiting the Belgium Living Lab Day conference 2017.

According to the desktop research, there are four types of living labs, based on the four types of stakeholders in living labs: Enabler-, Provider-, Utilizer- and User-driven. Furthermore, living labs can be divided into three layers; The set of actors (Macro), living lab projects sorted by methodology (Meso) and the user involvement (Micro). Next to this, both policy documents *Provinciaal Omgevingsplan 2014* and the *Sociale Agenda Limburg 2025* offer content and context to the living lab concept. In the North, the focus is on tourism, culture, logistics and agri- and horticulture. In the Middle, the focus is on working, living and recreation. And in the South, the focus is on international innovation structures and national green structures within rural and urban areas. The second policy document offers chances to enhance the user involvement and bottom-up participation.

The case study provides the experiences formula - a new practical tool - for the organisation and process model of living labs. *Empathy in (end-)users, student involvement, visibility & accessibility, long-term vision & leadership, stakeholders' expectations, financial & political sustainability, networking structure, process & results* and *communication* turn out to be important themes within the organisation and process model for living labs focussed on urban development.

However, discussion remains about funding models, political commitment, the user involvement strategy and the use of utilizers, such as private companies, within living labs focussed on urban development. Further research should, therefore, be focussed on one of these four topics to improve the experiences formula.



Belgian Living Lab Day conference 2017;
brainstorm session about the main
problems of the living lab concept.

Source: Organisation Belgian Living Lab
Day conference 2017

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Exposition of students' results in the living lab Kerkrade-West during the academic year 2016 – 2017 of the Zuyd University of Applied Sciences.

Source: Stefano Blezer

Chapter 1. Introduction

This first chapter provides background information, the problem statement, the main research questions and objective, the boundaries of the research and a short reading guide.

1.1 Background information

The Lectureship Smart Urban Redesign (SURD) seeks to introduce the Limburg Action Lab (LAL), a future living lab in the province of Limburg (the Netherlands) to support sustainable neighbourhood development. The LAL seeks to improve the built environment on a neighbourhood-scale by implementing short-term acupunctural interventions for long-term sustainability, in which inhabitants feel they have ownership of their “own” built environment. This in social, political, economic and ecological ways. In the academic year 2016 – 2017, there has been a project for 4th year students of the Bachelor of Built Environment. This project took place in Kerkrade-West (south of Limburg), in collaboration with the local municipality, housing association, Zuyd University of Applied Sciences, inhabitants and entrepreneurs. Next to this, they had a local workshop with an international setting to design interventions to improve the public space in Kerkrade-West. These designs are now in development.

The Lectureship SURD considers it important to participate with students to focus on strategic development and stimulate the transition process of sustainable urban development in the region. Therefore, they started researching the organisation and process model of the living lab concept to improve their activities in the region. Because of my interest and passion for the social domain and bottom-up participation in urban development, I have chosen to accept the challenge to do research at the organisation and process model of the living lab concept for my own educational institution.

1.2 Problem statement

There are six (technological) developments, which increase the popularity of the living lab concept (discovered in the pre-phase of the Bachelor thesis). These are the Participation community, Climate change, Demographic shifting, Top-down versus Bottom-up strategy, Economic crisis and the more Digital world. Because of these developments, the traditional ways to urban development, finance- and organisation models cannot be used in a multidisciplinary-used built environment. The living lab concept is one of the tools to organize and to run through the development process. Although, it is not yet discovered how to use the living lab concept in the most efficient way to urban development.

1.3 Research questions and objective

The main research question is: *How can living labs, aimed at urban development, contribute to sustainable neighbourhood development in the province of Limburg?*

The overall main objective in the research is to gather more insights in the organisation and process model of living labs to define the LAL in a qualitative better and more efficient way.

With the main research question and main objective in mind, the following research-questions are set up in consultation with the Lectureship SURD:

1. What is the role of living labs in the urban development process?
2. What context in the province of Limburg is relevant for the introduction of the living lab concept?
3. What is the point of view of (inter)national partners of the living lab concept and what are the experiences with this concept?
4. What kind of experiences formula, based on the success- and fail factors, can be drawn in response to the experiences with the living lab concept?
5. Which best practise can be drawn for the LAL, according to this experiences formula, and how should the LAL be defined?

1.4 Boundary line

In the pre-phase and during the research there have been made different boundaries to have a good process during the research. In this paragraph, important boundaries are summed up:

- The role of living labs as starting point by keeping a broad literature review of the living lab concept to gather a broad view of existing literature and (stakeholders)-roles. Furthermore, only two available living lab definitions are used which are the ones of the European Network of Living Labs (ENoLL) and Seppo Leminen.
- The research focusses on the living lab concept for urban development and not product development.
- The research focusses on the living lab concept for implementation in the province of Limburg (South-, Middle- and North-Limburg) within the Netherlands. Therefore, the context of the province of Limburg is analysed by using the policy documents *Provinciaal Omgevingsplan 2014 (POL2014)* and the *Sociale Agenda Limburg 2025*.
- The research will make use of benchmark living labs on international scale. Living labs which have been used are Citilab and Public fab labs in Barcelona, Suurpelto Urban Living Lab in Espoo, Maastricht-LAB in Maastricht, Urban Management Fieldlabs in Amsterdam and the living lab in Kerkrade-West of the Lectureship SURD.
- The focus in the research is on the organisation and process model of living labs. For example, the juridical and financial aspects are not part of the research scope.

1.5 Reading guide

In chapter 1, background information, the problem statement, main objective, research questions and the research boundaries are provided. In chapter 2, the research methodology is described per chapter of the bachelor thesis. In chapter 3, the existing literature of living labs is examined. Next, the relevant context of the province of Limburg in relation to the implementation of the living lab concept is described in chapter 4. In chapter 5, the international point of view and the experiences of the living lab concept are presented. Then, these are captured within the experiences formula for living labs in chapter 6. Chapter 7 provides the research advice to the LAL, a general answer to the main research question, recommendations for further research and discussion points resulting from the graduation research. At last, a short personal reflection to the graduation research is given in chapter 8.

Chapter 2. Research methodology

To find appropriate answers to the research questions, there is made use of desktop research, a case study between six living labs in Europe and group brainstorming at the Belgian Living Lab Day conference 2017. In this chapter, the research methodology is described per chapter of this bachelor thesis.

2.1 Theoretical framework

Chapter three is the theoretical framework in which the existing literature of living labs is reviewed. The first research question *What is the role of living labs in the urban development process?* is answered by desktop research. The living lab concept is a relatively new concept, so the definition, characteristics, research dimension, typologies and the research paradigm are examined. There is made use of scientific articles, the ENoLL-website, ENoLL-documents and the book *Tactical Urbanism: Short-term Action for Long-term Change* of Mike Lydon and Anthony Garcia. The found literature is especially based on research of Dimitri Schuurman, Seppo Leminen, Pieter Ballon and the ENoLL organisation.

Dimitri Schuurman is a living lab researcher and senior researcher at the research group for Media, Innovation and Communication Technologies at Ghent University. Furthermore, he is team lead user experts at the *imec.livinglabs*. At last, his PhD thesis included the exploration of the value of living labs to structure user contribution and manage distributed innovation (Ghent University, 2017). Thereby, he was one of the speakers at the Belgian Living Lab Day conference.

Seppo Leminen is principal lecturer at the Laurea University of Applied Sciences and Adjunct professor in the School of Business at Aalto University in Finland. His research and consulting interests include living labs, open innovation, value co-creation and capture with users (S. Leminen, 2013).

Pieter Ballon is director of the IMinds living lab research and is secretary of the ENoLL organisation. He is specialised in living lab research, business modelling, open innovation and mobile telecommunications (IMec, 2014). Pieter Ballon was also one of the speakers at the Belgian Living Lab Day conference.

The European Network of Living Labs (ENoLL) describes itself as the international federation of benchmarked living labs in Europa and worldwide. It is founded in 2006 and is well placed to act as a platform for best practise exchange, learning and support, and living lab international project development (ENoLL, n.d.).

The *Tactical Urbanism: Short-term Action for Long-term Change* book is written in 2015 by Mike Lydon and Anthony Garcia. Both authors started the firm The Street Plans Collaborative in 2009. The firm is known for advancing innovative practices to test and implement projects for a range of public, private and non-profit clients. They publicised four open-source guides (Tactical Urbanism volumes) and the Tactical Urbanism book which made them stewards of the Tactical Urbanism movement (Street Plans Collaborative, n.d.).

2.2 *Relevant context in the province of Limburg*

In the fourth chapter the relevant context in the province of Limburg, for implementing the living lab concept, is described. The second research question *What context in the province of Limburg is relevant for the introduction of the living lab concept?* is answered by using the policy documents “Provinciaal Omgevingsplan 2014” and “Sociale Agenda Limburg 2025”. Thereby, I have brainstormed twice with three employees of the province of Limburg: Peter Boonen, Bert Hesdahl and Ellen Laeven. Mr. Peter Boonen is the team leader of the Sociale Innovation program in the province of Limburg. Mr. Bert Hesdahl is a fellow worker within the Social Innovation program with experiences in user involvement. At last, Ms. Ellen Laeven is also working within the Social Innovation program and collaborates with Ms. Nurhan Abujidi on the living lab concept.

In the fourth chapter, the municipalities, educational institutions, vision, ambition & themes, lifestyles and other demographical context of the province of Limburg are examined. These are important by implementing the living lab concept in the province of Limburg, according to the research outcomes of chapter three.

2.3 *(Inter)national experiences with the living lab concept*

The fifth chapter provides answers to the third and fourth research question: *What is the point of view of (inter)national partners of the living lab concept and what are the experiences with this concept?* and *What kind of experiences formula, based on the success- and fail factors, can be drawn in response to the experiences with the living lab concept?* To find these answers, there is made a case study between living labs by conducting semi-structured interviews using the Harmonization Cube methodology. This method is developed to assess the performance of living labs according to the relevant dimensions and characteristics of living labs. It makes use of six categories to investigate the living lab concept: User Involvement, Service Creation, Infrastructure, Organisation & Governance, Innovation Outcomes and Methods & Tools (Schumacher, 2012).

- *User Involvement* refers to the motivation of users, the access to (large) groups of users, the variety - or participation of users.
- *Service creation* is about the technical, digital, physical or interactive services used during the process of the living lab.
- *Infrastructure* is about the basic facilities needed for the operation of the living lab.
- *Organisation & Governance* is about the organisation structure and stakeholder roles in the living lab.
- *Innovation Outcomes* refer to the results of the living lab which can be knowledge, services, products or Intellectual property rights.
- *Methods & Tools* refer to the used methods and tools to get insights and knowledge about the user and his experiences.

I have chosen to carry out semi-structured interviews, because of the flexibility of this type of interviewing. This type of interviewing gives the opportunities to the interviewer to ask more specific and deeply and for the interviewee to bring creativity and openness during the interview. Beforehand, there is only made a questionnaire as guidance for the interview. Interviewing is a qualitative research methodology which is used to find answers to the “why and how” - questions (De afstudeerconsultant, 2017).

Because the living lab concept was completely new to me, I have brainstormed with five employees of the bachelor of built environment at the Zuyd University of Applied Sciences in Heerlen to set up my interview questions (Table 1). During the brainstorm sessions, the six categories of the Harmonization Cube methodology were centred.

Name of employee:	Function:
Mr. R. Boiten (Reinoud)	Teacher of the PDPM specialisation
Mr. H. Sap (Herwin)	Living lab practitioner and teacher of the Bouwkunde specialisation
Mr. L. Teunissen (Leo)	Teacher and internship coordinator of the PDPM specialisation
Mr. H. Verreussel (Han)	Teacher of the PDPM specialisation
Ms. I. Kaelen (Ilse)	Teacher of the PDPM specialisation and MSc in Organisational and strategical theory.

Table 1: Employees of Zuyd University of Applied Sciences, who participated in brainstorm sessions.

In the graduation research is made use of experiences of six living labs throughout Europe. Three of them were found during desktop research (theoretical case study) and three of them were found interesting during the graduation research (practical case study). Table 2 (next page) provides an overview of the benchmark living labs.

Citilab was the first living lab in Spain initiated in 1997. It has become one of the most important in Europe and focusses on social cohesion. The Public fab lab is a worldwide leading living lab, because it is the only successful case of fab labs funded and run by a city council (Mila Gascó, 2016). Mila Gascó made a case study research between these two Spanish living labs by using the Harmonization Cube methodology. The Suurpelto Urban Living Lab is a living lab focussed on urban development and therefore considered as interesting to look at. Soile Juujärvi and Kaija Pessa did research to find the lessons of the Suurpelto Urban Living Lab.

MaastrichtLAB (M-LAB) is a good case study living lab because it has the purpose of finding innovate ways to urban (re-)development. In addition, it is displayed in the same context as the LAL will be. The interview at M-LAB took place with Mr. Sven Cimmermans, internal project leader of M-LAB. This function means that the person is employee of the municipality of Maastricht, but focusses on the activities of the living lab concept. Ex-internal project leader Mr. Tim van Wanroij considered Mr. Cimmermans suitable for the interview for my research, despite his recently entrance (February 2017).

The Urban Management Fieldlabs (UMFs) are also good to look at, because they are focussing on a broad way of neighbourhood issues to improve the built environment. It uses the same collaboration form as the living lab of the Lectureship SURD, which is a close collaboration between the University of Applied Sciences and the municipality. The interview at the UMFs took place with Ms. Anna De Zeeuw. She is the Fieldlab coordinator of the Nieuw-West district and considered as suitable for the interview, because she has the most experiences within the living lab concept of all the Fieldlab coordinators. Furthermore, she is an employee of the University of Applied sciences in Amsterdam which means she has a schools' perspective. This links with the conduction of the graduation research which is carried out for an educational institution (Zuyd University of Applied Sciences Heerlen).

At last, it is important to look at the living lab in Kerkrade-West which takes place to improve the public space in Kerkrade-West in collaboration with local stakeholders and the municipality. The living lab is initiated by the Zuyd University of Applied Sciences and the municipality of Kerkrade. The interview took place with Ms. Nurhan Abujidi and Mr. Herwin Sap. Ms. Abujidi is the main initiator of the living lab Kerkrade-West and lector at the Zuyd University of Applied Sciences in Heerlen. Mr. Sap is co-initiator of the living lab Kerkrade-West and employee of the Zuyd University of Applied Sciences. Because of experiences in Ms. Abujidi's past with neighbourhood development and her current function, she is considered as suitable for the interview. Also, Mr. Sap is considered as suitable, because of his function and experiences within the living lab Kerkrade-West.

Name of living lab:	Location:	Theoretical / practical:
Citilab	Barcelona, Spain	Theoretical
Public fab labs	Barcelona, Spain	Theoretical
Suurpelto Urban Living Lab	Espoo, Finland	Theoretical
MaastrichtLAB	Maastricht, the Netherlands	Practical
Urban Management Fieldlabs	Amsterdam, the Netherlands	Practical
Living lab Kerkrade-West	Kerkrade, the Netherlands	Practical

Table 2: Overview of the benchmark living labs used in the graduation research.

The brainstorm sessions, interview guides and full interviews with M-LAB, UMFs and the living lab Kerkrade-West are found in the appendices booklet which is available separately from the bachelor thesis. A compact list of the appendices is given in chapter 10.

2.4 Experiences formula of the living lab concept

In chapter six, the nine themes of the experiences formula are explained. The themes resulted from the real-life experiences within the six benchmark living labs. Besides the interviews at M-LAB, UMFs and the living lab Kerkrade-West, I visited the Belgian Living Lab Day conference on the 9th of May 2017. It was the first Belgian Living Lab Day event and aimed at bringing together participants who are active or interested in living labs. It was hosted in the Atrium of Brussels and different speakers told about the living lab landscape and their own experiences. Included in these speakers were Mr. Dimitri Schuurman and Mr. Pieter Ballon (page 4).

Furthermore, the themes are completed with information of Ms. Lisa Broekaar and Mr. Theo de Bruijn. Ms. Broekaar is project leader in local democracy and community participation. She is involved in projects about citizens initiatives and the role of the local government in this perspective (Lisa broekaar, 2017). Mr. de Bruin is professor at the Saxion University of Applied Sciences and co-founder of the Master of Urban and Area Development (MUAD) in which he operates as lector (Bruijn, 2017).

2.5 *Advice & discussion*

In chapter seven, the advice is divided into two parts: the research advice and the general conclusion. In the research advice, the LAL will be defined within the three-layer model of Mr. Dimitri Schuurman and within the typologies and stakeholder roles in living labs found by Mr. Seppo Leminen. In the general conclusion, an answer to the main research question *How can living labs, aimed at urban development, contribute to sustainable neighbourhood development in the province of Limburg?* is given, based on the collected information within the research boundaries. At last, the seventh chapter provides recommendations for further research and discussion points resulting from the graduation research.

Chapter 3. Theoretical framework

In this third chapter, the origin, definition, characteristics, research dimension, typologies and research-paradigm of the living lab concept are examined.

3.1 Origin of the living lab concept

He is called the father of the living lab concept: William J. Mitchell; MIT-Dean and professor, architect and urbanist. He was interested in how people could be involved more actively in the urban development, planning and city design (M. Mulvenna, B. Bergvall-Kareborn, S. Martin, J. Graeme Wallace, B. Galbraith, 2010). He started a living lab at the MIT to observe and record the routine activities and interactions of the everyday home life of voluntary research participants. This living lab had the original focus on testing and adapting modern technologies based on the daily home environment. It also relied on technical infrastructure to gather data for analysis (A. G. Robles, T. Hirvikoski, D. Schuurman, L. Stokes, 2016).

The living lab method is referred to the Scandinavian participatory design movement in the 1960s and 1970s, the European social experiment with Information Technology (IT) in the 1980s, and the Digital City projects since the 1990s. In Scandinavia, trade unions and workers in the design of IT application started the ideology of corporation and participation. They started with user participation in system development, and later they introduced the facilitation of trial use situations, as part of the design process. This connected the hand-on experiences with the design of future applications. In the 1980s various social experiments with IT started all over Europe. These experiments took place outside the laboratories and therefore had less physical isolation, less procedural standardisation and longer-lasting treatments when compared with experiments inside laboratories. So, researchers started to use these social experiments as a test and implement methodology for developing ICT. In the 1990s the digital city concept made his entry. This concept refers to initiatives that were taken by cities related to digital representation, digitally related economic development and urban regeneration and the access of the internet for citizens. This approach of gathering a large amount of information was important to the city and its operation (A. G. Robles, T. Hirvikoski, D. Schuurman, L. Stokes, 2016).

Since William J. Mitchell started the idea of citizen involvement, a lot of research communities started to develop this further in Europe. Because of collaboration-projects from Barcelona, Helsinki and Manchester, a small number of living labs started the ENoLL. The cities agreed to establish a European Network to exchange knowledge on living labs. The ENoLL supports the evolution and the uptake of the living lab paradigm throughout Europe and worldwide (ENoLL, 2017).

3.2 Definition and characteristics

There are a lot of living lab definitions available in the literature. This is also recognized by researchers in 2015: “Urban living labs have different goals, they are initiated by various actors, and they form different types of partnerships. There is no uniform Urban Living Lab definition.” (Voytenko, McCormick, Evans, & Schliwa, 2015).

First, living labs 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, 2016). According to the ENoLL (2016), living labs operate as intermediaries among different stakeholders to create value, rapid prototyping or scale up innovation and businesses. Second, living labs are defined as “physical regions or virtual realities, or interaction spaces, in which stakeholders form public-private-people partnerships (4Ps) of companies, public agencies, universities, users, and other stakeholders, all collaborating for creation, prototyping, validating, and testing of new technologies, services, products and systems in real-life contexts” (S. Leminen, 2015).

Based on the two given definitions and further desktop research [(S. Leminen, 2015); (Wallin, 2014); (Voytenko, McCormick, Evans, & Schliwa, 2015); (ENoLL, 2016)] on the living lab concept, the characteristics of the living lab concept can be summed up as:

- **Living lab activities take place in real-life environments, -communities -settings and are geographical embedded;**
- **Living labs form Public-private-people partnerships (4Ps);**
- **Living labs hold user-involvement and multiple stakeholders’ participation;**
- **Living lab stakeholders have multiple roles**
- **Collaboration, co-creation, experimenting and learning between stakeholders is essential**
- **Living lab research is multi-method oriented**
- **Leadership and ownership is important**
- **Evaluation and refinement is important**

Schuurman, De Marez and Ballon (2015) shows that the characteristics of the living lab concept can be divided into the three-layer model (see Figure 1). This model places the living lab concept between open innovation and user innovation. Open innovation refers to the firm’s perspective and examines the financial benefits of engaging in process. The user innovation refers to the perspective of the (end-)user (D. Schuurman, L. De Marez, P. Ballon, 2015).

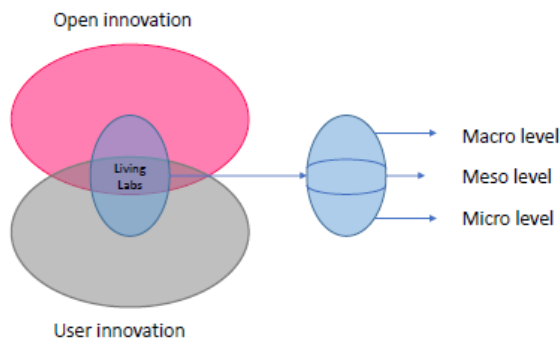


Figure 1: Schematic view of the three-layer model (Own design Stefano Blezer based on Schuurman, De Marez and Ballon (2015)).

The three layers are the Macro, Meso and Micro level. The Macro level is about the set of actors and stakeholders that are organized to enable innovation. The Meso level refers to the different projects within a living lab 'sorted' by the methodology. And the Micro level is about the user innovation and user involvement to the living lab. It refers to the best process and activities to interact with users and their contribution for innovation (D. Schuurman, L. De Marez, P. Ballon, 2015).

3.3 Research-dimension

Ballon, Pierson and Delaere (2005) shows that six types of Test and Experimentation Platforms (TEP's) exist: Prototyping platforms, testbeds, field trials, living labs, market pilots and societal pilots. Living labs are diverse to prototyping platforms, field trails and testbeds by their "experimentation zone". Living labs are not test moments for mass-production or new technology. Living labs are diverse to societal - and market pilots by launching a product. Market pilots are projects to test new products with limited end-users to make final adjustments before the commercial launch. Societal pilots are projects whereby products are used to result in social innovation. Furthermore, the living lab concept is an experimentation environment in which technology is given shape in real life context and in which (end-)users are considered as "co-producers".

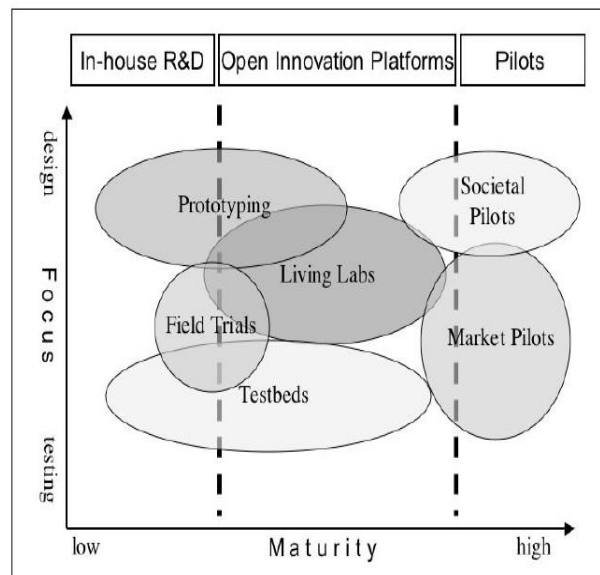


Figure 2: Conceptual framework of TEP's (P. Ballon, J. Pierson, S. Delaere, 2005).

Figure 2 shows the conceptual framework made by Ballon et al. (2005). The horizontal axis (maturity) shows the market readiness for market-implementation. On the vertical axis, the research focus is given. The research can focus on design which means how products should look or on testing which means how products work properly in technical terms. The last scale gives the degree of openness of the research, ranging from in-house realisation & design to pilot projects.

William J. Mitchell argued that the living lab concept has diverse benefits for the business sector. By using the (end-)user in the development process, before implementing new products or services, the sector can ensure highly reliable market evaluation and reduce the technology and business risk.

Next to this, the living lab concept offers the opportunity to share resources and therefore less venture capital is needed by SME's, micro-organisations and start-ups. At last, it is also beneficial to larger companies, because they have access to a broader base of ideas by using the (end-)user in the development process (M. Pallot, B. Trousse, B. Senach, D. Scapin, 2010).

Authors' view

During the graduation research, I read and learned a lot of living labs and its activities. Since then, I criticise the conceptual framework of Ballon et al. (2005). I would rather say that living labs cover the entire spectrum of the framework instead of only the "centre". In this perspective, it can be assumed that the other types of TEP's are covering parts of the living lab concept. For example, one of the projects of the Montréal living lab focusses on bringing future working spaces closer to the peoples' home environment. It launched a prototype of the future working space and it seemed to contribute to sustainable mobility in the city of Montreal and, therefore, to a better urban environment with more social cohesion and better air quality (because people drive less to their work). The living lab aims to start 300 co-working spaces, as it is called, to see the benefits on a larger scale (Spela Zalokar, 2017). So, in this case, I think that the living lab combines prototyping, field trials, market pilots and societal pilots.

3.4 Stakeholders roles and typologies

Leminen, Westerlund and Nyström (2012) argue that the living lab concept consists of four types of stakeholders which are the enablers, providers, utilizers and users. Based on the actor who is driving the activities in the living lab, there are four types of living labs which are enablers-driven, providers-driven, utilizers-driven and users-driven. In addition, they explain that:

Enablers are public actors, non-governmental organisations or financiers, such as municipalities. Living labs initiated by enablers are typical public projects for societal improvements. This type of living lab is built around a certain regional-development program. Mostly, educational institutions push the development work closer to the user and their daily lives. Meanwhile, companies fail to see the value of participating in this type of living lab, because it focuses on enablers objectives and creates value for the enablers.

Providers provide other stakeholders in the living lab with their products or services. Mostly, providers are private companies that enter the living lab to co-develop new products, services or solutions to their own business needs and focus on long-term results. They aim at promoting research and knowledge creation to find solutions for specific problems. Providers-driven living labs focus on improving the everyday life of users in a way that the resulted innovation benefits to all stakeholders. Sometimes, educational institutions are providers because they provide the living lab with expertise for research.

Utilizers are often companies who want to develop and test their new products and services in the living lab. Utilizers use living labs as a strategic tool to collect data for their own business.

Therefore, living labs initiated by utilizers are linked to the strategy of the firm’s product development. The utilizer organises living lab activities around itself to ensure its central position and guides the knowledge and co-creation to ensure it yields information, which is useful for themselves. Utilizers-driven living labs are short-term, because the company strives for rapid results and information (*take it and use it* - strategy).

Users are the end-users of a product or region which the living lab is focussing on. This type of living lab is established by user communities and focusses on solving the users’ everyday life problems. These living labs form around a specific problem or region and are often long-term, because they are built up around user communities. The activities in users-driven living labs are informal and the users do not manage the network or its operations. This is often done by providers who influence users and their actions. Furthermore, the bottom-up strategy is used in the living lab. At last, other stakeholders in the network provide information, guidance or equipment to collect data or information about the users which may can be used in further developments or resulted innovation.

Table 3 provides an overview of the four types of living labs.

Characteristics	Type of living lab			
	Utilizer-driven	Enabler-driven	Provider-driven	User-driven
Purpose	Strategic R&D activity with pre-set objectives	Strategy development through action	Operations development through increased knowledge	Problem solving by collaborative accomplishments
Organisation	Network forms around a utilizer, who organizes action for rapid knowledge results	Network forms around a region or funded project	Network forms around a provider organisation(s)	Network initiated by users lacks formal coordination mechanisms
Action	Utilizer guides information collection from the users and promotes knowledge creation that supports the achievement of pre-set goals	Information is collected and used together and knowledge is co-created in the network	Information is collected for immediate or postponed use; new knowledge is based on information that provider get from the others	Information is not collected formally and builds upon users’ interests; knowledge is utilized in the network to help the user community
Outcomes	New knowledge for product and business development	Guided strategy change into a preferred direction	New knowledge supporting operations development	Solutions to users’ everyday-life problems
Lifespan	Short	Short/medium/long	Short/medium/long	Long

Table 3: Characteristics of the four types of living labs (Leminen, Westerlund, & Nyström, 2012).

Seppo Leminen (2013) discovered the coordination and participation approach in diverse types of living labs. The coordination approach within living labs can be top-down or bottom-up. The participation approach can be “exhalation-dominated” and “inhalation-dominated”. The top-down coordination refers to an authoritarian, hierarchical innovation approach and the bottom-up coordination refers to an innovation approach in which ideas and needs are collected for developments on shared objectives. The second dimension refers to the participation approach to innovation. Exhalation-dominated means it does not fulfil a need of the driving actor, but rather the requirements of other stakeholders.

Inhalation-dominated means it is initiated and targeted at fulfilling the need of the driving party by engaging other stakeholders in innovation activities (S. Leminen, 2013). Figure 3 shows the framework made by Seppo Leminen in 2013.

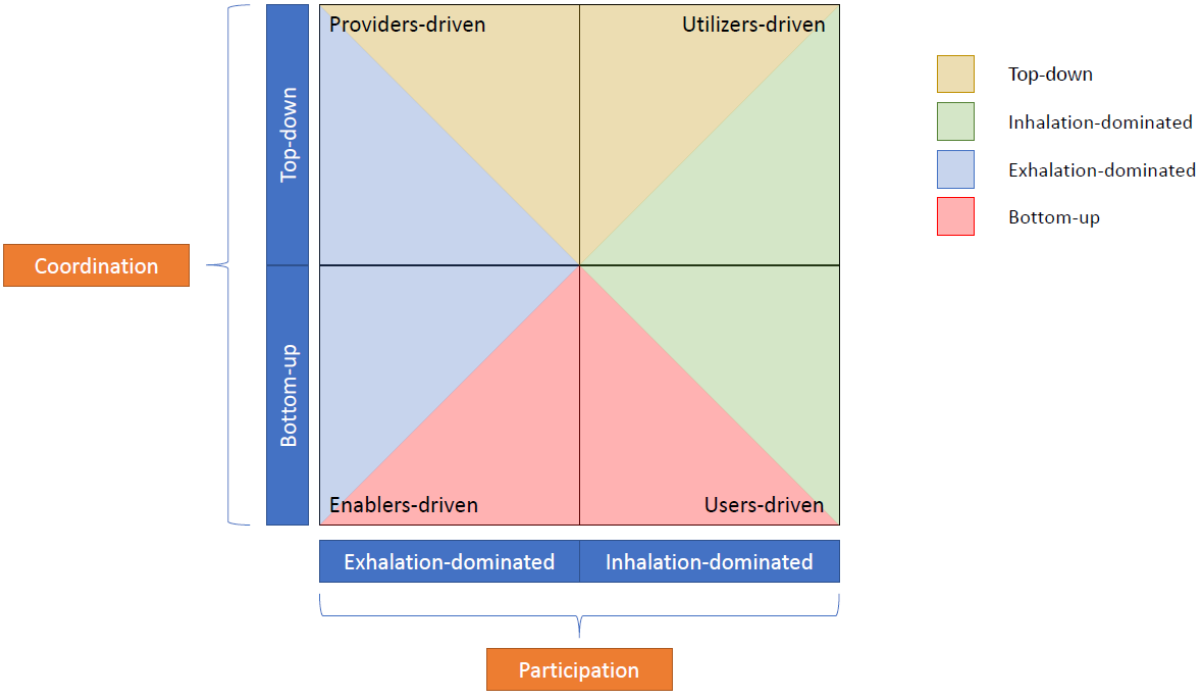


Figure 3: The Coordination and Participation mechanism in the living lab concept (Own design Stefano Blezer based on Seppo Leminen (2013)).

Authors' view

I was asking myself which place in the mechanism-framework of Seppo Leminen (2013) is the most ideal situation. At the beginning, I thought the centre was the best place, because it combines all the different typologies, stakeholders and activities in which everyone would benefit from the outcomes. During the research, the living lab experiences made clear that stakeholders' expectations are very important during the living lab process, to be transparent and conflict less. So, by now, I think that the centre spot is the most chaotic point to be: Everyone is involved, everyone thinks he is leading, everyone thinks he is centred and everyone thinks he will benefit from the outcomes. If this happens, the process of the living lab is not transparent and conflict less.

After all, I think that there is no best or worst point in the mechanism-framework, but that clear stakeholders' expectations in the beginning will contribute to the living lab process and its outcomes, regardless of the typology.

3.5 Tactical Urbanism paradigm

According to Ms. Abujidi, Director of the Lectureship SURD, the built environment can be transformed by three different philosophies: Strategic Urbanism, Tactical Urbanism and the Do-It-Yourself (DIY) Urbanism. Strategic urbanism focusses on the long-term strategy in a place. It, often, consist of XL-projects to intensify urban life. Tactical urbanism is an approach to neighbourhood building and activation using short-term, low-cost, and scalable interventions and policies. It includes a broad range of stakeholders; governments, citizen groups, individuals and business people. It also uses an open and iterative process, efficient use of resources and the creative potential of social interaction (Lydon & Garcia, 2015, p. 2).

Lydon and Garcia (2015) explain that DIY urbanism blends a spirit of entrepreneurial activism with public art, design, architecture, engineering, technology and notions of progressive urbanism. The difference is that not all DIY urbanism is tactical urbanism, and not all tactical urbanism is DIY urbanism. For example, Yarn Bombing (Figure 4 and 5) is DIY urbanism, because it does not intend to instigate long-term change, such as revising an outdated policy. Also, DIY urbanism is sometimes an expression of the individual.



Figure 4: Yarn Bombing (Knit graffiti) on benches in San Francisco (A Knitting Blog, 2015).

In this graduation research, I assume that the living lab concept, and particularly the LAL, uses the Tactical Urbanism paradigm for urban development. This because Ms. Abujidi told me that she wants to make use of short-term actions for long-term changes, the involvement of the (end-)users and local stakeholders and combining the bottom-up and top-down vision of inhabitants and the municipality.



Figure 5:

Left: Squid Tree in San Mateo (DIY-Urbanism; expression of the individual) (Watt, 2013);

Right: Guerrilla crosswalk (Tactical Urbanism; slow down traffic for safety) (Lydon, Tactical Urbanism Volume 2, 2012)

For starting a Tactical Urbanism project, the Tactical Urbanism book refers to the *Design Thinking* movement of the brothers Kelley. They define the process as combining empathy for the context of a problem, creativity in the generation of insights and solutions, and rationality in analysing and fitting various solutions to the problem context (Lydon & Garcia, 2015, pp. 172-173).

Experiences have shown that the five-step Design Thinking process is valuable for producing successful Tactical Urbanism projects. Furthermore, Both the Design Thinking movement and Tactical Urbanism paradigm recognize that the design, like city-building, is a never-ending process. The five steps are (Lydon & Garcia, 2015, pp. 172-208):

1. Understand for whom you are planning or designing. This can be done by talking to local stakeholders to gain personal experiences. This will also contribute to attract like-minded people.
2. Identify a specific opportunity site and clearly articulate the root causes of the problems that need to be addressed. This is done in three steps: choosing a project area (scale down to scale up), doing place-based history research and define the main problem(s) (The five whys).
3. Brainstorming about project ideas. All ideas should be considered as long as they use the knowledge and experiences gained from step 1 and the challenges and opportunities of step 2. First, the group-constellation should be considered. Second, define what to do (vanity metrics versus actionable metrics¹) in the project. And third, define how to do it (sanctioned or unsanctioned²).
4. Plan a project response that can be carried out short-term and low-cost. Use the 48x48x48 process. This process links the immediacy of a 48-hour intervention with two additional and subsequent time scales: 48 weeks (short-term) and 48 months (medium-term). Furthermore, the project-funding, project-schedule, project partners, materials and permissions are needed.
5. Use the Build-measure-learn process to test the project and gather feedback. This has two values: the process and the results. Both can create awareness, demand and the realisation of change in a region. For unsanctioned project the implementation is used for everyone in a region to use, observe or critique. For sanctioned projects the implementation gives cities, municipalities or politicians the opportunity to communicate this into current plans, initiatives of policy.

¹ This is the tension between participation online at a certain moment (vanity metrics) and the real-life participation after the ideation phase (actionable metrics) (Lydon & Garcia, 2015, p. 182).

² Unsanctioned projects are associated with quickly and low-cost implementation. Sanctioned projects with legitimacy, funding and months for implementing (Lydon & Garcia, 2015).

3.6 The role of the living lab concept

The theoretical framework brings different conclusions related to the first research question *What is the role of living labs in the urban development process?* The conclusions are summed up as:

- The living lab concept is gradually evolved through various historical developments between 1960s and 1990s (Scandinavian participatory design, the European social experiment with IT and the Digital City projects). However, the experiment of William J. Mitchell at the MIT is often associated with the start of the living lab concept.
- Because of the very wide range of activities within living labs it is impossible to give one uniform definition of the living lab concept.
- The living lab concept is different to other types of TEP's, according to the research, which makes them ideal for combining the open innovation and user innovation. This is also seen by Schuurman, De Marez and Ballon (2015), who indicates that living lab consists of three different layers; the open innovation (Macro), the open- and user innovation (Meso) and the user innovation (Micro).
- Four types of stakeholders within the constellation of living labs are discovered: the enablers, providers, utilizers and users. Based on the actor who is driving the activities of the living lab, four types of living labs are possible which are the enabler-driven, provider-driven, utilizer-driven and user-driven variant.
- *Role 1:* Living labs can be used for urban development. The concept is then used as an experimentation-zone and organisation model to tackle urban issues following the Tactical Urbanism paradigm. This urban development paradigm uses short-term action to instigate long-term changes in the public space.
- *Role 2:* Living labs can be used for product development. The concept is then used as a strategic tool to improve business activities or development processes. This role is mainly used by businesses to reduce different development risks.

In this research, the role of living labs for urban development is used and not the role for product development. This choice is based on the requirements of the lectureship SURD and the connection with the Project Development and Process Management specialisation.

Chapter 4. Relevant context in the province of Limburg

In this chapter, the municipalities, educational institutions, vision, ambition and themes, lifestyles, shrinking shrinkage, leaving youth and the Sociale agenda Limburg 2025 of the province of Limburg are discovered.

4.1 Municipalities

The province of Limburg is the most southern province of the Netherlands and consists of thirty-three municipalities within three regions (South-, Middle- and North-Limburg). The capital city of the province is the city of Maastricht which is in the south-region. Furthermore, the province of Limburg contains 1.117.000 inhabitants (CBS, 2017). Figure 6 shows the municipalities per region.

South-Limburg		North-Limburg	
Municipalities:	Inhabitants (CBS, 2017)	Municipalities:	Inhabitants (CBS, 2017)
Vaals	9.632	Mook en Middelaar	7.755
Simpelveld	10.741	Gennep	17.085
Gulpen-Wittem	14.508	Bergen	13.090
Eijsden-Margraten	25.123	Venlo	100.371
Maastricht	122.533	Peel en Maas	43.316
Meersen	19.040	Beesel	13.388
Valkenburg a/d Geul	16.518	Venray	43.291
Voerendaal	12.482	Horst aan de Maas	41.675
Heerlen	87.406		
Kerkrade	46.023		
Landgraaf	37.465		
Brunssum	28.448		
Onderbanken	7.869		
Schinnen	12.960		
Nuth	15.425		
Beek	13.388		
Stein	25.064		
Sittard-Geleen	93.555		

Middle-Limburg	
Municipalities:	Inhabitants (CBS, 2017)
Weert	49.100
Nederweert	16.793
Maasgouw	23.757
Leudal	36.140
Roermond	57.010
Roerdalen	20.686
Echt-Susteren	31.943

Figure 6: The number of inhabitants per municipality per region in the province of Limburg (Own design Stefano Blezer, 2017).

4.2 Educational institutions

Educational institutions are found in the South- and North-region. In the South-region the Zuyd University of Applied Sciences in Heerlen, Maastricht and Sittard, Hotel Management School in Maastricht and Maastricht University are found. In the North-region the Fontys Hogeschool Venlo and HAS Hogeschool Venlo are found which focus on Agri- and horticulture. The Middle-region has easily access to the educational institutions to the North and South.

There are also important international educational institutions beyond the borders of the province of Limburg. Around the South-region the RWTH Aachen (Germany), University of Liège, University of Hasselt and the Hogeschool Hasselt PXL (Belgium) are found. Around the North-region the University of Eindhoven (TU/e), Fontys Hogeschool Eindhoven and Nijmegen University are found.

Figure 7 on the next page shows the locations of the different educational institutions with respect to the province of Limburg.

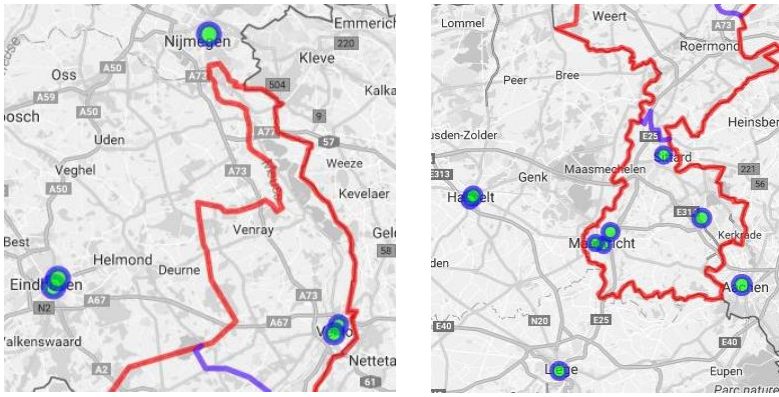


Figure 7: Educational institutions in the province of Limburg and abroad within in acceptable travel distance of 50 kilometres. Left: North-region of Limburg; Right: South-region of Limburg. (Own design Stefano Blezer, 2017).

4.3 Vision, ambition and themes

The vision, ambition and themes of the regions of the province of Limburg are merged into Figure 8. It shows the opportunities, (inter)national and regional network structures, main activities and main themes (Provincie Limburg, 2014).

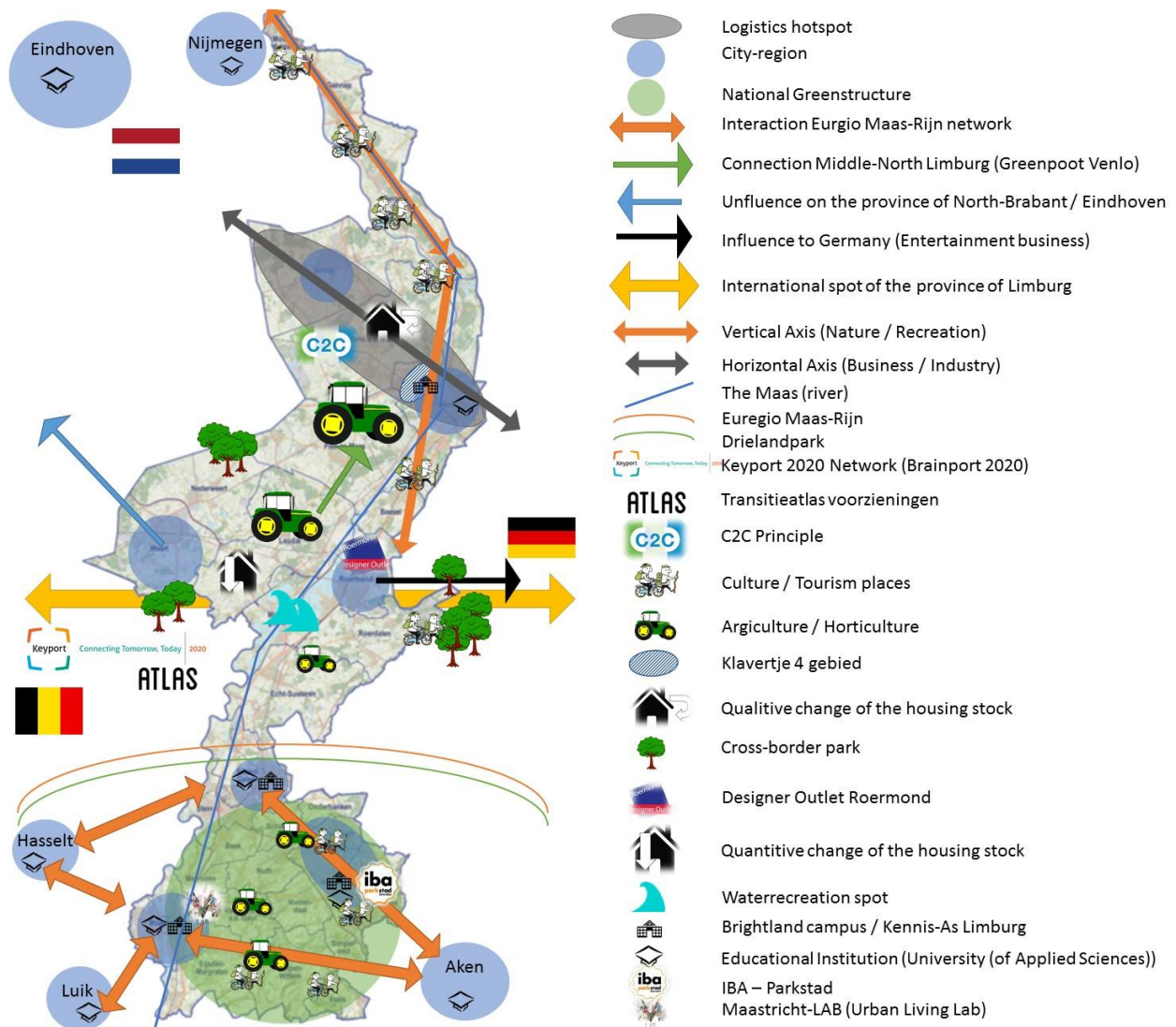


Figure 8: Vision, ambition and themes within the province of Limburg based on the policy document Provinciaal Omgevingsplan 2014 (Own design Stefano Blezer, 2017).

The North-region is marked by the vertical and horizontal axis, respectively the nature & culture axis and the business & logistic axis. Next to this, the region has one of the four campuses (Greenport-Venlo) of the Kennis-As Limburg, is market leader in the C2C-principle and has a lot of (inter)national relationships.

The Middle-region is focussing on shopping and entertainment around the city of Roermond and on Living and working around the city of Weert. Furthermore, it connects to the Greenport Venlo network, offers four cross-border nature parks, water recreation spots and is part of the Keyport 2020 network, which is part of the Brainport 2020 network.

The South-region has the most international position. The presence of highly regarded educational institutions are merged in the Euregio Maas-Rijn network. Next to this, the region is marked by the distinction of city-regions within national green structures, which offer opportunities for culture and tourism. Furthermore, it has the other three campuses of the Kennis-As Limburg, the urban living lab Maastricht-LAB and the IBA-Parkstad³ phenomenon.

4.4 Lifestyles

Existing research about the context of the province of Limburg gives information about the quantity, such as the housing stock. To get more insights in the qualitative data, such as needs and wishes of the citizens, the province of Limburg did research to the lifestyles in the province. The research made use of the Brand Strategy Research model (BSR), in which the lifestyles of people are divided into four colours: Red, Blue, Green and Yellow (Provincie Limburg, 2016).

The research made use of 11.175 participations divided in every municipality. This number was an average response of 139% to the pre-set target. The research shows that the municipality in North-Limburg are close to each other on the extrovert-introvert axis, but are very diverse on the ego- versus group-focus axis. Furthermore, the municipalities within the vertical axis (paragraph 4.3) are indicated as green and in the horizontal axis are blue or yellow. Exceptions in this are Mook en Middelaar and Genneep. The municipalities in Middle-Limburg are more diverse in the extrovert-introvert axis compared to the North-region which indicates to a mix of "open" and "closed" people. Next to this, Roermond has blue people and Weert has green people. South-Limburg shows a mix of all types of lifestyles within its municipalities. Exceptions in this trend are Maastricht and Onderbanken (SmartAgent en Fakton, 2015). The results of the research are found in Figure 9.

³ IBA-Parkstad is the Internationale Bau Ausstellung in the Parkstad region (Heerlen, Kerkrade, Landgraaf, Brunssum, Voerendaal, Simpelveld, Nuth and Onderbanken) in South-Limburg. IBA is a concept to find innovative solutions to urban challenges. Originally, the concept is born in Germany which proves that IBA's can contribute to re-invent the urban area. IBA itself does not built anything, but organises the process to improve the region. IBA-Parkstad is active from 2013 until 2020 (IBA-Parkstad, 2017).

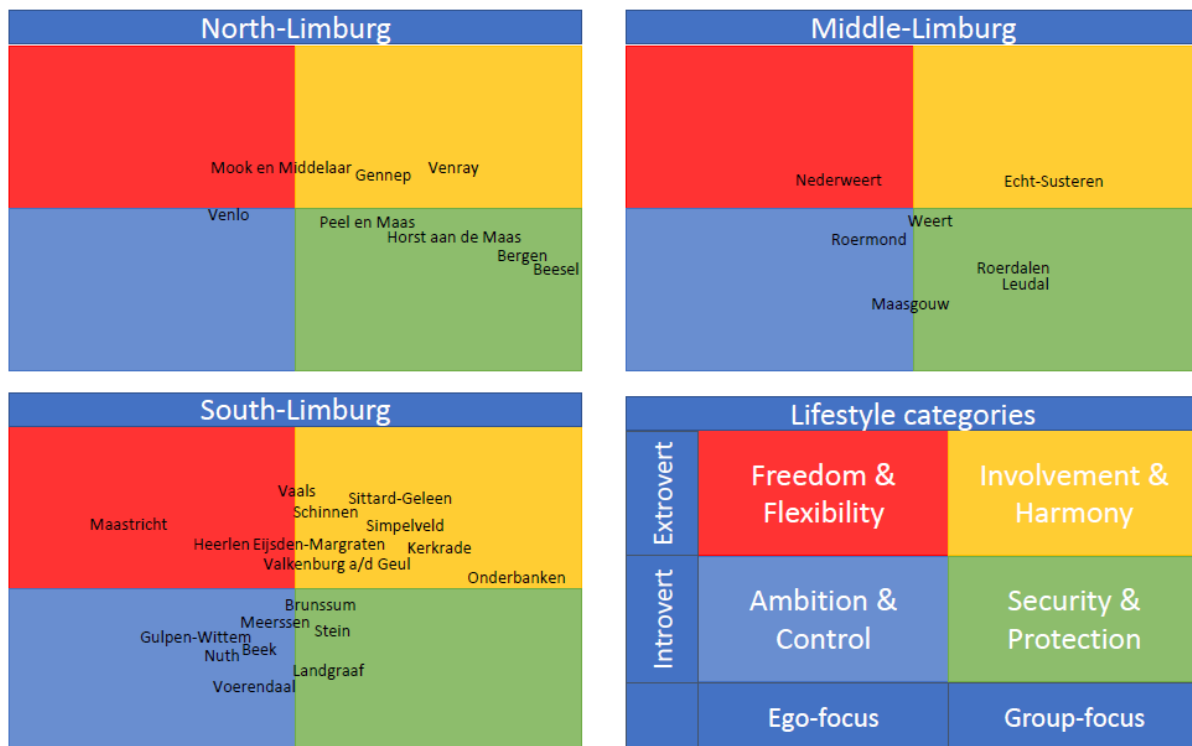


Figure 9: Lifestyle typologies in the three regions in the province of Limburg (Own design Stefano Blezer, 2017 based on (Provincie Limburg, 2017)).

The province of Limburg expects that, in the next few years, the green lifestyle will decline and the yellow lifestyle will grow. The blue and red lifestyle remain on the same level. This, because of demographic shifting and social-economic trends (SmartAgent en Fakton, 2015).

Authors' view

The different lifestyles of people indicate which type of (end-)users are involved in the living lab concept. For example, a living lab in Roermond must consider that blue people are involved. The research, mentioned above, is focussed on municipality-level, but needs refinement to neighbourhood-level. Thereby, it is important to do research what the influence is of different lifestyles to the living lab concept: Should the organisation of the living lab concept be based on the involved lifestyle or should the living lab concept embrace or reject different lifestyles?

According to the BSR-test, I am a blue coloured person. I am ambitious and aim at a successful career. Therefore, my decisions are well considered and I use my analytical skills and assertiveness to achieve this.

4.5 “Shrinking shrinkage” and the “leaving youth”

Two trends in the province of Limburg causes demographic shifting. First the population is shrinking. Until 2040, the South-region must deal with 16% decline of population and the Middle- and North-region with 4% (Rijksoverheid, 2015). In 2005, the population prognoses of Limburg were 1.050.000 inhabitants in 2025. Today, it shows that the population in 2025 will be around 1.114.000 inhabitants. Dagblad de Limburger (2017) (primary source: PBL, CBS) shows that this has to do with more foreign people coming to Limburg for working or living and less inhabitants moving out to Belgium or Germany.

In addition, the average age of the population is getting higher. This is the result of the Baby boom generation and the higher life expectancy, because of medical development (BTSG Bibliotheek, 2016).

Next to this, an important trend in the province of Limburg is the “leaving youth” to the Randstad, because there are better chances on the labour market. This is also recognized by the head demographer of the CBS Mr. J. Latten: *“It is important to keep well-educated young people in the province of Limburg. You have to ensure that the knowledge level in the province of Limburg remains as it is.”* (Dagblad de Limburger, 2017; own translation).

Surprisingly, there is no difference between the Randstad and the province of Limburg in case of employment opportunities on international scale according to IBA Parkstad (2015). It describes a research of the *Atlas voor Gemeenten*⁴ to available jobs within acceptable travel distance (45 minutes car driving). Limburg offers 300.000 available jobs on national scale and 1.200.000 jobs on international scale. It is important to mention that these results are too positive. For example, some people are not compatible to work abroad because of the language barrier or that jobs are not similar due to the tax systems abroad. However, the research outcomes are promising to the province of Limburg.

4.6 The Social Agenda Limburg 2025

The province of Limburg agreed in 2015 to start the *Sociale Agenda Limburg 2025*. This policy document expresses the ambition to make Limburgers healthier, wealthier and more vital. The ambition: *“Together we want to achieve a trend interruption in the healthcare and participation of Limburgers in 2025. We want healthier and happier Limburgers who look out for each other and start initiatives”* (Provincie Limburg, 2016; own translation). To achieve this, it stimulates bottom-up participation and experimentation within two programs: *Limburg Akkoord* which focusses in economy development and the *Sociale Innovatie en Participatie* which focusses on social cohesion and participation of citizens. Therefore, a subsidy of 32 million euro is agreed to stimulate and facilitate these initiatives (Provincie Limburg, 2016).

During a brainstorm, Mr. Peter Boonen admits that the *Sociale Agenda Limburg 2025* is the starting point for living labs in the province of Limburg. In addition, Mr. Bert Hesdahl mentions that motivate and keep motivated the (end-)users in bottom-up initiatives is the hardest part of the process (Boonen & Hesdahl, 2017). Therefore, they start a tour within the province of Limburg in June 2017, whereby they will visit various places to stimulate citizens to create awareness and to start bottom-up initiatives.

⁴ In the *Atlas voor Gemeenten* the fifty biggest municipalities in the Netherlands are compared with each other on fifty parameters. It also provides rankings in which municipalities can see their relative position, both on national and international level (Atlas voor Gemeenten, 2017).

4.7 Context of Limburg versus the living lab concept

The examined context of the province of Limburg brings different conclusions related to the second research question *What context in the province of Limburg is relevant for the introduction of the living lab concept?* The conclusions are summed up as:

- The thirty-three municipalities of the province of Limburg are the theoretical enablers of living labs. The found educational institutions are the theoretical providers within living labs. The overview map of the vision, ambition and themes gives an indication of the utilizers and providers of living labs, such as companies or networks. At last, the (end-)users have different lifestyles which are red, blue, green or yellow. It is important to be aware of this typology when involving them in living labs.
- The overview map (Figure 8) gives an overview of the vision, ambition and themes within the three regions of the province of Limburg. In North-Limburg the focus is on Tourism, Culture, Logistics and Agri- and Horticulture. In Middle-Limburg the focus is on working, living and recreation. At last, in South-Limburg the focus is on international innovation structures and the combination of cities, villages and national green.
- The *Sociale Agenda Limburg 2025* is an important policy-document for living labs. The program strives for healthier, wealthier and more vital Limburgers. It stimulates bottom-up initiatives and active participation within (urban) issues. Furthermore, the program connects initiatives within the province of Limburg to learn from each other and meet each other. Also, it provides a subsidy of 32 million euro in total to support bottom-up initiatives and participation.

Chapter 5. (Inter)national experiences formula with the living lab concept

This chapter provides the case study results. First, an analysis of the benchmark living labs in Barcelona, Finland, Maastricht, Amsterdam and Kerkrade-West is given. Second, the theoretical stakeholder-roles are compared. And third, the theoretical typologies of the benchmark living labs are presented.

5.1 Experiences from Citilab and Public fab labs in Barcelona, Spain

Citilab is a centre for social and digital innovation. It exploits and spreads the digital impact on creative thinking, design and innovation emerging from digital culture. It is a mix between a training centre, a research centre and an incubator for business and social initiatives and started with the idea that digital technologies are a way of innovation focussed on citizens by individual interest (Citilab, 2017).

A Public fab lab is a space where local stakeholders join to develop social innovation initiatives with the support of a laboratory for digital fabrication. The aim is to spread the basics of fabrication to everyone and to develop projects for social return in the neighbourhood. In the living lab, three projects were activated in three city districts. Furthermore, the strategy of the network forms around three programs. The pedagogical program to embed fabrication into the educational institutions. The family program to closer the gap between student's learning and fabrication by bringing it to their homes. The social innovation program to connect the different projects to its surroundings for learning (Mila Gascó, 2016).

The User Involvement in Citilab was based on individual interest, such as musicians in the musiclab. In the Public fab labs, it was based on shared interest with people including different professions or backgrounds from partnering organisations. The Service Creation in Citilab is an individual contribution to innovation, stimulated by open working places. In the Public fab labs, it is a collaborative process for innovation or prototyping. Both living labs have an external building. At Citilab, it was located outside Barcelona and at the Public fab labs within the city districts. Both living labs were Public-Private-Partnerships, supported and financed by the government. Leadership is taken by organisations or communities per project-theme. The process is more important than the results in both cases, because empowering people to participate and to make them realize they can innovate is more important than single results, like products. At last, the open innovation methodology and digital (fabrication) tools were used. Open innovation means the invitations of problem solvers to reinvent products, services or business models that contribute to the survival of organisations (Mila Gascó, 2016).

5.2 Experiences from Suurpelto urban living lab in Espoo, Finland

Suurpelto is an area of 325 hectares of park and forest in Espoo which was designed for 15.000 new inhabitants. The Great Recession has slowed down the development process, which was started by the city of Espoo. They created a vision of the area in collaboration with land owners and construction companies. It also made investments in infrastructure and in the cooperation between stakeholders. Because of the delay, a lot of other stakeholders became involved in this project.

The university started to join the project which changed the focus of development towards promoting research and knowledge creation, based on the local needs. During a panel discussion between eight stakeholders of the living lab four themes were discussed: networking among living lab actors, experimenting as a bottom-up approach, students as innovators and long-term development (S. Juujärvi, K. Pessa, 2013).

- Networking among living lab actors

The stakeholders agreed that co-creation and collaboration is important. Single stakeholders can do what they want, but together it is possible to make things happen. Next to this, the educational institutions played a crucial role in the networking process: they organized network sessions, local events and provided development methods that sped up the urban development. In contrast to this, students are limited by their curriculum, learning objectives and temporary involvement. In addition, some inhabitants felt they were used for data collection for educational objectives and that it was for no value for them.

- Experimenting as a bottom-up approach

Experiences show that surveys remain superficial and that inhabitants do not like this method of data collection. Therefore, new methods were used, like local events, meetings, workshops and health consultation hours. The stakeholders agreed that small-scale experiments that draw on the needs of users are the most effective way to advance innovative products, services and social innovations.

Business partners were not interested in involving the living lab, because it was too small for investments. Also, city officials were not interested to produce area-based services despite the project followed city-guidelines. In contrast, enterprises and non-governmental organisations were anticipating on the growth of population and therefore interested in developing user-friendly products or services.

- Students as innovators

Students played a crucial role during the process, because of the pedagogical approach of the university which is learning by developing in projects. However, forcing their participation can do more harm than benefit. Less-motivated students should do routine tasks and highly-motivated students can play a key role in interaction between stakeholders, because they own novel knowledge to innovation. Thereby, students are potential entrepreneurs whose ideas should be fostered in the living lab by providing tools to develop their idea or start their business.

- Long-term development

Urban development is a process of years, so it is important to do things on the long-term. The city employed a community coordinator and students could do internships on regular base. Participation on the long-term is more rewarding for inhabitants, because they invest a lot of time in research, but do not benefit from the outcomes on the short-term. Thereby, it is possible to create and accumulate knowledge to make the development work more effective, efficient and attractive by covering healthcare, wellbeing and recreation.

5.3 Experiences from Maastricht-LAB in Maastricht, the Netherlands

M-LAB is announced in the structure vision 2010 and established by the municipality in 2012 for experimenting to new urban developments which refer to new ways of thinking, working, doing and organising urban challenges. In phase one (2012-2014), eight experiments were chosen top-down including bottom-up involvement. In its second phase (2014-2016), M-LAB chose fourteen bottom-up projects to facilitate. Since then the Stadmakers-network is formed as a connection-tool between municipality and the city inhabitants. In 2017, M-LAB started its third phase with the focus on developing a “broedplaatsen”-policy⁵.

M-LAB wants to involve everyone in the city to collaborate. This is done with an open call for initiatives at the beginning of phase two and the Stadmakers-network. The network brings together citizens and experts to co-create and share ideas. M-LAB does not per se focus on specific target groups in the city. Surprisingly, students are not interested in participating which may be the effect of the education courses in Maastricht.

The Service Creation starts with initiatives that must meet four criteria to ensure that projects contribute to the long-term vision for urban development of the municipality. M-LAB uses three infrastructure-tools which are an (flexible) external building, the Stadmakers-network and Social Media. These three contribute to the accessibility, visibility and scalability of M-LAB. *“I want to underscore the power of Social Media. People read messages, click on them, talk about them and share them with their friends. Social Media is very important for the accessibility and scalability of activities of M-LAB.”* (Cimmermans, 2017; own translation).

The organisation of M-LAB consists of a core-team and different project-teams. The core-team exists of two internal project leaders who are employees of the municipalities and two external project leaders who are business professionals. In combination with the external building, M-LAB is partly places outside the municipality in both institutionally and physically domain. The political and financial commitment to the living lab is ensured by implementing M-LAB in the municipal structure vision 2010 and the use of the stimulation program *Creatieve industrie*. The innovation outcomes are, mostly, new knowledge and learned lessons which are publicised in *kennisrapporten*. These are shared during meetings or workshops. Scholl and Kemp (2016) found that the activities of M-LAB are built upon three pillars: Connecting, acting and learning. They should build new coalitions, implement local activities and it should create a broad knowledge structure (C. Scholl & R. Kemp, 2016). For example, ex internal project leader Mr. van Wanroij is experimenting how the working method of M-LAB could be implemented in the municipality working method.

⁵ Broedplaatsen are, mostly, buildings which are empty, because of a mismatch in the supply and demand of m² floor area. The new policy should focus on reducing the vacancy rate of buildings in Maastricht.

5.4 Experiences from Urban Management Fieldlabs Amsterdam, Netherlands

The UMFs are three geographical places in three city districts in Amsterdam which are Nieuw-West, Oost and Zuid-Oost. The living lab is initiated in 2013 by the Amsterdam University of Applied Sciences (HvA) in collaboration with the municipality to tackle public space related issues on neighbourhood-scale and takes scientific research as starting-point. In phase one, (2013-2016) researchers and the municipality introduced nine project proposals of which four were initiated. Since 2017, its second phase started.

The UMFs involves as much inhabitants as possible within their project area which varies from very broad to activity-specific (children or elderly people). Also, students can organise activities or bring their creativity. The disadvantage of student involvement is seen in the temporality. Furthermore, Ms. De Zeeuw adds: *“It is important to empathize yourself in the experiences of the user. Therefore, you should make activities actual and understandable by using actual topics, using appetizers and move to their neighbourhood.”* (De Zeeuw, 2017). During the process, the living lab uses digital - and interactive tools to communicate with inhabitants. They also use the BOOT-locations⁶ and focus on the long-term. Their project duration is two to four years which makes it possible to build up neighbourhood relations and to accumulate gathered knowledge and lessons. These, all, contribute to the visibility and accessibility of activities.

Ms. De Zeeuw also expresses that it is important to collaborate with public organisation. *“It is very important to use local public organisations in your living lab. These organisations know the inhabitants more personal, have insights in the actualities on neighbourhood-scale and, therefore, can easily use their connections to scale up and share activities.”* (De Zeeuw, 2017).

The core team of the living lab consists of 3 municipal employees and 6 HvA-lectures (respectively 1 and 2 per Fieldlab). Within the HvA, one is responsible for the organisation and one for the content of activities. The political support is given by the municipality and the financial commitment is given by every stakeholder. 50% is given by the municipality and the HvA and the other 50% should be given by project specific organisations (project-teams). The results of the UMFs are diverse. It is new knowledge to improve the urban environment or an (physical) interactive app for the inhabitants. The results are shared in digital and interactive ways. Next to this, projects must comply to seven criteria to contribute to the local situation and governance. Furthermore, it tries to operate as critical dialogue between theory and practise for stakeholders. And, at last, the UMFs want to empower inhabitants and citizens to think about and to come up with methods to improve the urban and public space.

⁶ BOOT-location (Buurtwinkel voor Onderwijs, Onderzoek en Talentontwikkeling): Small locations in the city districts of the UMFs which are run by students of the HvA (De Zeeuw, 2017).

5.5 Experiences from the living lab in Kerkrade-West, the Netherlands

The living lab Kerkrade-West is initiated by the lectureship SURD of Zuyd University of Applied Sciences in Heerlen. During the living lab two activities took place: an interfaculty project on three locations and an international design workshop. Within these activities, local stakeholders were invited to join and to start the dialogue for urban development by using the Tactical Urbanism paradigm.

All types of inhabitants within the project areas are involved in the activities, because Ms. Abujidi believes that involving as much different people as possible in the living lab brings the essence of the main problem(s) in neighbourhoods. Furthermore, students are involved, because a win-win situation is created. On the one hand, education becomes more real-life, actual and interdisciplinary. On the other hand, the local community stays in contact with actualities and developments if collaboration with the “youth”. Next to this, students are neutral. Ms. Abujidi: *“Students do not have hidden agendas, do not know the people, places and organisations, and therefore are able to set up collaboration and motivation. If involving students, the whole situation is more informal.”* (Sap & Abujidi, 2017). The living lab uses three ways for operating: on-site working space for visibility and accessibility, a Facebook-page for promotion and sharing, and an interactive low-threshold setting. The exact process is yet to be optimised. Different designs of the workshop have been discussed with the municipality and local community for further implementation and are currently in development. Important in this trajectory is that the ownership stays in the hands of the initiator and that the professionals supports the realisation of the bottom-up idea. Ms. Abujidi: *“Inhabitants have to come with ideas, for example a new playground. Then, designers will design the new playground and discuss this with them. In the end, we will make this playground together, so it will be their playground.”* (Sap & Abujidi, 2017). The living lab admits two basic facilities needed: the on-site working space and funding. Simply, because they are needed to organize the living lab activities and to make them visible and accessible for citizens. The organisation is network-structured and consists of a core-team (Municipality and Zuyd University of Applied Sciences) and project teams (local stakeholders), ordered by theme, activity or region. Ms. Abujidi adds that clear expectations of stakeholders are important during the process. *“It is us who facilitated the accommodations and promotion. I think, it is the role of the municipality to facilitate this. The municipality-role is in transition.”* (Sap & Abujidi, 2017). Furthermore, the structure vision of the municipality was taken as starting point for discussion and improvement. They “led” the actions to contribute to the long-term structure vision. Through the projects and workshop, different initiatives got new attention within the municipality and different designs are in development. Furthermore, the empowerment and mind-switch of inhabitants are important for co-creation and innovation. With the use of the Tactical Urbanism paradigm and the interaction between inhabitants and professionals, the living lab hopes to contribute to community empowerment and more insights in the role-playing and interdisciplinary-character of urban development. *“it is the municipality, us and the inhabitants who have to change their way of working and thinking.”* (Sap & Abujidi, 2017).

5.6 Stakeholder roles in the Benchmark living labs

In the interviews, the interviewees were asked to split their stakeholders into the four theoretical stakeholder roles of living labs. The results are displayed in Table 4.

The municipalities are always enablers. This, because they give financial and political commitment to the living lab. In addition, they create a (long-term) vision and promote the living lab activities which makes scalability more easily. In the case of Kerkrade-West, Zuyd University of Applied Sciences is enabler too, because they give financial commitment and initiate the LAL. In the UMFs, more stakeholders were enabler, because of their funding-model and in the case of Barcelona the Ministry was enabler because of its financial support. The utilizers are mostly local companies or (social) organisations. They give place-based objectives which are used for living lab projects. Furthermore, in the case of Barcelona, they produce products or services which is in accordance with the theory that living labs are used as a strategic tool for business. In the case of M-LAB, the Stadmakers-network is a utilizer, because it combines (ex-)professionals and citizens to carry out their own project. Next to this, the real estate owners who are involved in the “Broedplaatsenbeleid” are utilizers, because they want to increase the profit-return on their real estate. There are no utilizers in the UMFs and in the living lab Kerkrade-West.

The providers are educational institutions and local entrepreneurs. Educational institutions provide the living lab with students and academic knowledge. Local entrepreneurs provide the living lab with tools to keep up operating. In the UMFs and Kerkrade-West, the municipality is provider too, because it helped to start the living lab and provided it with the necessary resources. The users are initiators, inhabitants and visitors of a place. This is due to their triple-role: they give place-based user experiences, participate in living lab activities and are empowering each other in the development process. In the case of Kerkrade-West, local entrepreneurs are also seen as users, because they want to improve the built environment in which they operate and do not want to gather information for product- or service-development for their own business.

Stakeholder roles in the benchmark Living Labs					
Theoretical stakeholder roles	Citilab and Public fab labs	Suurpelto Urban Living Lab	MaastrichtLAB	Urban Management Fieldlab	Living lab Kerkrade-West
Enablers	City Council and Finance-partners (Ministry)	City representatives	Municipality of Maastricht	Municipality of Amsterdam, Amsterdam University of Applied Sciences, Public organisations	Municipality of Kerkrade, Zuyd University of Applied Sciences
Utilizers	Private companies and organisations	Firms and non-governmental organisations	Stadmakers-network, Real estate owners (municipality)	n/a	n/a
Providers	Educational Institutions	Educational Institutions	Educational institutions and people from outside Maastricht	Municipality of Amsterdam, Amsterdam University of Applied Sciences and Real estate owners	Municipality of Kerkrade, Zuyd University of Applied Sciences
Users	Inhabitants, Initiators, Individuals	Inhabitants, Residents	Inhabitant, Visitors, the city	Inhabitant, everyone else	Inhabitants, Local entrepreneurs

Table 4: Stakeholder roles in the benchmark living labs (Own design Stefano Blezer, 2017).

5.7 Types of Benchmark living labs

In the interviews, the interviewees were asked to place their living lab within the theoretical framework of the four types of living labs and their coordination and participation axis. The results are found in Figure 10.

Citilab is a user- or enabler-driven living lab because it uses the bottom-up approach and the organisation forms around specific projects. The Public fab labs are utilizer- or user-driven, because they depend on public initiatives in combination with organisations who wants to take lead in different projects. This indication is based on the research of M. Gascó and the living lab characteristics of Seppo Leminen found in Table 3 (page 13). The Suurpelto living lab is an enabler-driven living lab (S. Juujärvi, K. Pessa, 2013).

M-LAB has evolved in its three phases. First, it was provider- and enabler-driven. It was top-down initiated with bottom-up involvement and was exhalation-dominated in its participation. In its second phase, it was user- and utilizer-driven. M-LAB was follower of initiatives of the open call. It facilitated the initiatives and let the initiators in the leading-role, so it was inhalation-dominated. In its third phase, it is placed in the middle. Mr. Cimmermans explains: *“If I look at the broedplaatsen-policy, I think M-LAB is more exhalation-dominated. But, looking at all the opportunities and facilitated projects, I rather place M-LAB phase 3 in the middle of the diagram.”* (Cimmermans, 2017; own translation). According to Ms. De Zeeuw, the UMFs are a combination of provider- and enabler-driven living labs. It is a mix of top-down and bottom-up coordination. On the one hand, the municipality and HvA are using the living lab to improve their “possessions”. On the other hand, it focusses on and involves local inhabitants and problems. Furthermore, the living lab is exhalation-dominated, because the enablers are improving the public space of the inhabitants and not fulfilling the needs of themselves.

The living lab in Kerkrade-West is enabler- and provider-driven. It is made possible by the municipality and Zuyd University of Applied Sciences. After the project areas were chosen other parties were involved. Next to this, it combines the top-down and bottom-up approach and is exhalation dominated in its participation domain. Thereby, the needs of local inhabitants are centred. At last, its ambition is to become a user-driven living lab within three years in which the users start initiatives.

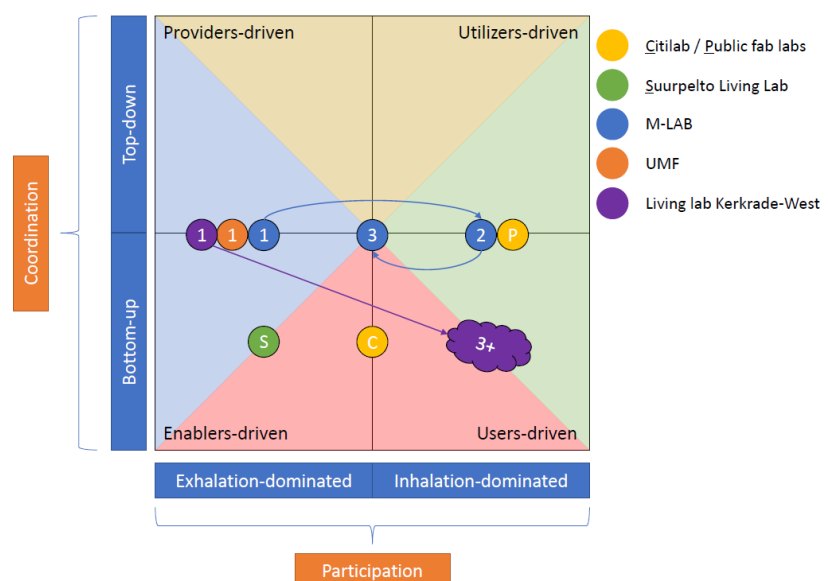


Figure 10: Typologies of the benchmark living labs (Own design Stefano Blezer, 2017).

5.8 Focal points within the living lab concept

The experiences with the living lab concept brings different conclusions related to the third and fourth research question *What is the point of view of (inter)national partners of the living lab concept and what are the experiences with this concept?* and *What kind of experiences formula, based on the success- and fail factors, can be drawn in response to the experiences with the living lab concept?* The conclusions are summed up as:

- The living lab concept is used for a wide range of activities, ordered to urban- and product development. Benchmark living lab activities also show that product development is used to contribute to urban development, but not vice versa.
- The enabler- and provider roles are, mostly, fulfilled by municipalities and / or educational institutions. This because living labs focussed on urban development are initiated by these two stakeholders. Sometimes other stakeholders are involved within these roles. The utilizer role is fulfilled by (private) organisations, and is not always needed within living labs focussed on urban development with social-return rather than financial return. At last, the user role is fulfilled by the inhabitants, visitors and initiators of living lab places or activities.
- Because five out of six benchmark living labs relate to the enabler-driven variant and (partly) handle the top-down coordination approach, the following hypothesis can be stated: *Citizens do need motivation and guidance, from top-down, to start and work out their bottom-up ideas (Hypothesis 1).*
- Because one out of six benchmark living labs (Public fab labs) relates to the utilizer-driven variant, the following hypothesis can be stated: *Living labs, focussed on urban development, do not connect with utilizers and the utilizer-driven variant (Hypothesis 2).*
- The experiences, positive and negative, with the living lab concept can be ordained into nine themes which display the parameters of the experiences formula for the organisation and process model for living labs:
 - Empathy in (end-)users
 - Student involvement
 - Visibility and accessibility
 - Long-term vision and leadership
 - Stakeholders' expectations
 - Financial and political sustainability
 - Networking structure
 - Process versus results
 - Communication

Chapter 6. Experiences formula of the living lab concept

This chapter explains the nine themes of the experiences formula, discovered in the previous chapter.

6.1 Empathy in (end-)users

The importance of empathy is recognized by the benchmark living labs and Belgian Living Lab Day (BLLD) participants. According to the case study, five measurements are used to achieve this: use of food, an actual topic, moving into neighbourhoods, involving local (public) organisations and involving students. An BLLD participant: *“If you bring food, inhabitants bring their ideas and experiences”* (Belgian Living Lab Day, 2017). Next to this, Mike Lyndon’s first step in the Tactical Urbanism process is empathizing in the local environment by gathering place-based experiences and knowledge which is also recognized by the Suurpelto living lab that development work should be based on the local needs and strengths (Lydon & Garcia, 2015) (S. Juujärvi, K. Pessa, 2013). Also, control of decisions and the feeling of being taken seriously are two crucial success factors for inhabitants to start participating (Lisa Broekhaar, 2017).

6.2 Student involvement

The experiences with student involvement are positive and negative. On the one hand, students bring their creativity and knowledge, organize activities and are neutral / do not have a hidden agenda. On the other hand, it is being discussed that students are limited in their participation because of their school context.

Furthermore, it is interesting to add that individual and contextual aspects affect the student involvement. In the case of Suurpelto it is said that there is difference between less- and highly-motivated students. In the case of M-LAB it is seen that it is hard to involve students, because of their interests and the “lack” of built environment related education tracks.

6.3 Visibility and accessibility

Visibility is important for users to see the living lab, its activities and outcomes. On-site housing contributes to the visibility and accessibility of the living lab. Users can meet there, talk about local issues, connect with each other and visit activities of the living lab in the building in a low-threshold way (M-LAB, UMFs and KW). In the case of Citilab the building was located outside of the project area and therefore it did not contribute to the visibility, accessibility, co-creation and the scalability of the living lab activities (Mila Gascó, 2016). So, it is important to go to the users within their neighbourhood.

M-LAB will have flexible housing in the future. They will be located on different broedplaatsen during phase three to stimulate to think about these places. They mix visibility and accessibility with promotion and stimulation to participate in the living lab (Cimmermans, 2017).

Next to this, visibility is also seen in communication of living lab activities. Short films or presentations are attractive and interesting for users and results will have more impact if they are visible or interactive for users, because they see the benefit of their efforts.

6.4 Long-term vision and leadership

Benchmark living labs and BLLD participants admit that long-term vision within urban living labs is important. This to accumulate students' knowledge, to tackle their short-term commitment issue and for community building on neighbourhood-scale. Thereby, urban development is a process of years, so commitment should be on the long-term.

Furthermore, the long-term perspective contains public character goals and ambitions and not that of private companies or individual interest (De Bruijn, 2017). This, is in line with Seppo Leminen's found short-term lifespan of utilizers-driven living labs and medium to long-term of other types and the benchmark living labs.

Leadership in combination with long-term vision is necessary in living labs. It guidelines the short-term project to contribute to the long-term vision. Also, it gives direction to living lab activities and it indicates how far the goal is reached during the process (De Bruijn, 2017). The benchmark living labs show that the municipality must have leadership within urban development (Suurpelto, M-LAB, UMFs and KW).

6.5 Stakeholders' expectations

A clear expectation of every stakeholder in a pre-phase of the living lab will contribute to a better process with less conflicts or problems and more transparency. This is important in all kind of activities, like role-playing, financial consequences and organisation.

6.6 Financial and political sustainability

The financial sustainability is assumed as the most difficult item on the agenda of living labs. An BLLD participant: *"Living labs are financially supported by municipalities, subsidies or funding-programs."* (Belgian Living Lab Day, 2017). In Maastricht, the municipality is responsible for the financial sustainability. In Amsterdam, every stakeholder is responsible. And in Kerkrade-West, the Zuyd University of Applied Sciences is responsible. Also, Citilab has known economic difficulties, since the Ministry chose not to invest in Citilab anymore (Mila Gascó, 2016).

Furthermore, different projects have been able to survive during M-LAB due to the political support. This is also seen in Amsterdam and Kerkrade-West, in which the municipality is part of the organisation. In contrast, the Public fab labs future was uncertain because the local government made no future-plans for living labs in their new structure vision (Mila Gascó, 2016).

"The one who is paying, is the one who is leading or wants to take lead." – Belgian Living Lab Day participant, 2017.

6.7 Networking structure

Living labs do not have any hierarchical structure, but are network-oriented. All the involved stakeholders are equivalent to each other, but carry out a different role. Next to this, the organisation consists of one core-team and more project teams. The core-team is involved in every living lab activity and consists in all the practise-cases (M-LAB, UMFs and KW) of the enablers. The project team constellation depends per activity.

6.8 Process versus results

In living labs, the process matters more than the results on the short-term. Both living labs in Barcelona indicate that innovative solutions to public challenges can be found by adopting open innovation, co-creation and new participatory approaches and methods (Mila Gascó, 2016). In Espoo, the stakeholders agreed that small scale experiments that draw on the needs of users are the most effective way to advance innovation (S. Juujärvi, K. Pessa, 2013). Also, M-LAB admits that on the first hand the process, feedback and learning are very important. Second, it wants to improve the built environment by tackling urban challenges (Cimmermans, 2017). In addition, the UMFs want to operate as critical dialogue between theory and practise to empower people to improve the urban and public space (De Zeeuw, 2017). At last, the living lab in Kerkrade-West wants to get more insights in the role-playing of urban development, to make people aware that they can make changes by participating and improve the public space (Sap & Abujidi, 2017).

Results are important on the long-term to see benefit from investments of time and money. It is possible to implement, test and learn from projects on the long term. According to Ms. A. De Zeeuw it is important to leave something physical in the neighbourhood. *“People can see it, share it and use it. These results will have more impact, because people see the benefit of their effort.”* (De Zeeuw, 2017).

6.9 Communication

Communication in living labs is done by digital and interactive tools. Examples of digital tools are Facebook, WhatsApp-groups and online-platforms. Examples of interactive tools are workshops, meetings or presentations. Furthermore, living lab practitioners point out that the timing of communication is essential for reaching as much people as possible within the target group.

At last, it is important to communicate on time. In one of the BLLD-sessions, one of the main challenges of living labs is the commitment with users. A participant stated: *“Do not wait too long with giving feedback after a kick-off meeting or project-ending. Otherwise, people will leave the living lab.”* (Belgian Living Lab Day, 2017).

“Facebook posts can be made anytime, because people read them when it fits them. In contrast, workshops should be planned in the weekend or evening, because during the day people are not available due to their job.” – Belgian Living Lab Day Participant, 2017.

6.10 Experiences formula of the living lab concept

The nine themes of the experiences formula bring different conclusions related to the fourth research question *What kind of experiences formula, based on the success- and fail factors, can be drawn in response to the experiences with the living lab concept?* The conclusions are summed up as:

- Empathy in (end-)users creates more and longer-lasting neighbourhood support for the living lab, both, on the short- and long-term. The use of food, an actual topic, moving to neighbourhoods, involving local (public) organisations and involving students are measurements used by living labs.
- Student involvement can be done in two ways: everyone at an equivalent level or handle a distinction between less- and highly-motivated students. Also, it can be mono disciplinary or multidisciplinary. Thereby, student involvement will only benefit if involving them on the long-term.
- Visibility and accessibility are found in on-site housing or working and communication (of innovation outcomes) during the process.
- Long-term vision is important for all stakeholders in living labs. On the long-term, knowledge accumulation and steering on public goals is possible. In relation to this, the leadership during urban living lab processes is taken by municipalities. It guidelines short-term projects to contribute to the long-term vision and it indicates how far the public goal is reached during the process.
- A clear view of stakeholders' expectations is needed for a transparent and a conflict-less process.
- Financial sustainability is the most difficult aspect within living labs. The benchmark living labs have all their unique way for funding the living lab.
- Political sustainability is crucial in living labs focussing on urban development: it can make or break the living lab. This, because (often) the stakeholder who gives political support also provides financial commitment.
- Living labs focussing on urban development do not operate via a hierarchical structure, but rather use a network-structure with a centred core-team collaborating with project teams per region, theme or activity.
- Both the process and results within living labs are important. On the short-term the focus is more on the process (involving stakeholders or identifying key issues). On the long-term, the focus shifts to the physical or interactive results (Implement, test and learn from projects).
- Communication takes place by using digital and interactive tools. Furthermore, the timing of communication is an essential aspect.

Figure 11 on page 36 provides a schematic model of the experiences formula.



Figure 11: Experiences formula for living labs (Own design Stefano Blezer, 2017).

Chapter 7. Advice & discussion

The seventh chapter is divided into two parts: the research advice and general conclusion. The research advice provides an answer to the fifth research question *Which best practise can be drawn for the LAL, according to the experiences formula and how should the LAL be defined?* The general conclusion provides an answer to the main research question *How can living labs, aimed at urban development, contribute to sustainable neighbourhood development in the province of Limburg?* Next to this, the recommendations for further research and discussion points are given.

7.1 Research advice

The fifth research question is answered by using the found literature (three-layer model, typologies and stakeholder roles) in combination with the results of the case study (experiences formula).

Three-layer model

The Macro-level of the LAL must contain a core-team in which the province of Limburg and the local municipality should take the responsibility for the political support (local structure vision and the Sociale Agenda Limburg 2025) and the long-term commitment. This, to ensure that short-term actions will contribute to the long-term vision, ambition and change within the public space. Furthermore, project teams must be created with local stakeholders sorted per region. In these teams, it is not necessary to involve utilizers because they are focusses on improving their own business needs and not per se the urban area. Thereby, the living lab should be financed by a combination of subsidies and equity capital, according to the benchmark living labs.

On Meso-level, the living lab projects have a duration of two to four years. This commitment is needed to contribute to long-term public goals, accumulate findings, to start community building and aligns with political elections. Furthermore, the projects should be based on the Tactical Urbanism paradigm process. Next to this, the project should, first, focus on the process of involvement and empowerment (process) and, second, on visible interventions in neighbourhoods (results). Thereby, the communication is done by using digital and interactive tools to ensure that more (end-)users can join the living lab.

At last, the living lab must use food, actual topics, on site housing or working and the involvement of local organisations to gather place-based knowledge, experiences and support, on the Micro-level. Furthermore, student involvement is useful in the process. Students can organise events, design solutions, communicate in novel ways and activate citizens to start (bottom-up) initiatives. I would advise to organise the student involvement in an interfaculty and multidisciplinary way to create and achieve more comprehensive solutions to the neighbourhood.

Another noteworthy finding related to student involvement is the awareness of being part of a living lab. For example, I was involved in the living lab Kerkrade-West for twenty weeks, but simply did not know I was part of a living lab until I started my graduation research afterwards. Also, other fourth year students did not know they were part of a living lab concept. I think that the awareness of being part of a bigger living lab (on provincial level) will contribute to the outcomes of projects. Therefore, the Zuyd University of Applied Sciences should improve the setup of their project (which is may part of the stakeholders' expectations).

Stakeholder roles

According to the research, stakeholders have multiple roles in living labs. Therefore, the advice in this paragraph is dynamic instead of static.

In political terms, the enabler-role is given to the local municipality and the province of Limburg. This by connection to local public goals and policy documents. In financial terms, the municipality, province of Limburg and other stakeholders (who give financial support) are enablers. The provider-role is given to the Zuyd University of Applied Sciences and the local municipality or organisations. They provide the LAL with the necessary tools (location and food), knowledge and research. The utilizer-role is not per se needed in the LAL, because it focusses on urban development with social return of investments rather than product development with commercial goals. It is yet to be discovered what the influence of utilizers means to the living lab concept for urban development. At last, the user-role is represented by local inhabitants, visitors or initiators of neighbourhoods, activities or ideas. These users can be Red, Blue, Green or Yellow, based on their personal character.

Typology of living lab

The living lab starts as an enabler- and provider-driven living lab. The collaboration of the Zuyd University of Applied Sciences and the municipality, on local-scale, ensures a facilitated character in which students and inhabitants get the opportunities to work out their ideas. The involvement of the province of Limburg contributes to the activation and empowerment of citizens throughout the Sociale Agenda Limburg 2025 policy. The living lab will be exhalation-dominated of participation and consists of a mix of top-down and bottom-up coordination. I guess, it will take, at least, three years to create awareness and interest in the living lab concept.

After three years, the living lab has evolved to a mix of enabler- and user-driven. The living lab will be bottom-up oriented, the needs of the (end-)users are centred and the enablers and providers contribute to work out the (end-)user initiatives. The living lab will be inhalation-dominated because the (end-)users are fulfilling the needs of themselves and receive support from other stakeholders.

7.2 General conclusion

The purpose of this research is to gather more insights in the organisation and process model of living labs for urban development within the province of Limburg, the Netherlands. The main research question *How can living labs, aimed at urban development, contribute to sustainable neighbourhood development in the province of Limburg?* is answered in this paragraph.

The living lab concept is a complex and relatively new concept, which is still under-researched by scientific researchers, to tackle urban challenges. However, this does not mean that the living lab concept is full of uncertainties and that people are afraid to start living lab concepts. I think, it only takes a lot of time and investments to get familiar with the living lab concept.

First, it is seen that the organisation of the living lab concept is divided into three layers: The Macro, Meso and Micro layer. In this model, the living lab constellation, projects and user involvement are “separated” from each other to get more structure in the living lab. Thereby, we have seen that the living lab concept consists of four types of stakeholders to combine resources, knowledge, ideas and tools to create solutions to the built environment. Based on the stakeholder who is driving the activities within the living lab, four types of living labs are available: enabler-driven, provider-driven, utilizer-driven and user-driven.

Second, it is discovered that content and context of the province of Limburg is needed in the living lab concept. The Provinciaal Omgevingsplan 2014 shows the vision, ambition and themes within the three regions of the province of Limburg. These, are needed to invite the right stakeholders and to tackle the right problems in the public space. Furthermore, the Sociale Agenda Limburg 2025 strives to healthier and more vital “Limburgers”. By connecting the living lab concept with this policy document, it is possible to link lessons and activities with each other and to investigate if issues are context crossing or not in the province of Limburg.

Last, we have seen various experiences in the organisation and process of the living lab concept on international scale, which are merged into the experiences formula consisting of nine themes: Empathy in (end)users, student involvement, visibility and accessibility, long-term vision and leadership, stakeholders’ expectations, financial and political sustainability, networking structure, process versus results and communication. These nine themes should be considered in the future living lab organisation and process.

In short, the living lab concept contributes to sustainable neighbourhood development in the province of Limburg by operating as intermediary platform between local stakeholders, local issues and local context in a way that it is scalable to other places in the province of Limburg to share initiatives and to learn from each other. It combines local creativity, (young) knowledge, neighbourhood experiences, policy and other perspectives with each other to enhance the built environment.

7.3 Recommendations for further research

The research only covers a small part of the total spectrum of living labs for urban development. The emphasis during the research was mainly on organisational and process aspects. Because this resulted in contextual data (experiences formula), there is the opportunity to gain deeper insights in, inter alia, numerical data. Further research can, therefore, be focussed on economical (funding models) and juridical (political independence) aspects of the living lab concept for urban development.

In addition, living labs focussed on urban development are highly related to their built environment context and mainly the (end-)users of the built environment. Living lab practitioners admit that the user involvement, community building and empowerment of citizens are hard to achieve but most important for living lab activities. Additional research in the field of psychological context per lifestyle can lead to higher efficiency, effectivity and more collective objectives within living labs focussed on urban development. This recommendation is resulted out of hypothesis 1: *Citizens do need motivation and guidance, from top-down, to start and work out their bottom-up ideas.*

At last, the case study points out that living labs with social return rather than financial return of investments (sometimes) do not need the utilizer-role in their constellation. Further research should, therefore, focus on the necessity and effectivity of utilizer's involvement in living labs focussed on urban development. This recommendation is resulted out of hypothesis 2: *Living labs, focussed on urban development, do not connect with utilizers and the utilizer-driven variant.*

The four recommendations for further research should improve the experiences formula for the organisation and process model for living labs focussed on urban development.

7.4 Discussion points

In this paragraph, three discussion points resulting from the research are presented.

The first one is about the **unfamiliarity with existing literature**. During the interviews, the interviewees were confronted with existing literature (four types of stakeholders and four types of living labs). Surprisingly and disturbingly enough, nobody knew the existing literature and all were interested to know more about it to understand the living lab concept more deeply. So, based on this unknownity, the results of the benchmark living lab, the categorisation of the different living lab stakeholders and the typology indication of the living labs, can be questioned.

The second one is about the **limited use of benchmark living labs**. The research and the experiences formula only covers six benchmark living labs, of which only three were practical. Unfortunately, different living labs were not interested in participating in students' research which causes the limited use of benchmark living labs. Because of this, the representativeness of the experiences formula for the organisation and process model for living labs, focussed on urban development, can be criticised.

The last one is about the **subjectivity and diversity of interviewees** during the research. In the case of M-LAB, UMFs and the living lab Kerkrade-West, only three interviews were conducted. First, the answers given in the interviews are more subjective and not, per se, objective. Second, in the case of M-LAB, Mr. Cimmermans was a relatively new (only since February 2017) internal project leader. So, it can be assumed that his answers are based on stories and opinions rather than real-life experiences within M-LAB. In contrast, Mr. Cimmermans had internship at M-LAB a few years ago. This means that he is, maybe, familiar with the evolution of M-LAB, which contributes to the answers that were given. Third, in the case of UMFs, I only spoke to an employee of the HvA of the Fieldlab Nieuw-West. So, the answers are mainly based on experiences within this Fieldlab and are given from the HvA perspective. At last, in the case of the living lab in Kerkrade-West, I only spoke to the main initiators of the Zuyd University of Applied Sciences (Ms. N. Abujidi & Mr. H. Sap). This means that their answers are based on their perspective and role in the living lab constellation.

In short, using more and diverse interviewees and organisations within the case study interviews does give a more well-founded view to the living lab concept.

Chapter 8. Reflection

Di Stefano, Gina, Pisano and Staats (2016) shows that reflection on experiences brings higher performance improvements in the learning of individuals compared to whom are simply gathering more additional experiences (Di Stefano, Gino, Pisano, & Staats, 2016). They found that employees who spent 15 minutes on reflection of the learned lessons of that day performance 23% better after 10 days than those who did not reflect (Porter, 2017). So, to learn for the future, I reflect on my graduation research in two dimensions. First by reflection on my own research approach and second by reflection on the multidisciplinary setting.

*“We do not learn from experience. We learn from reflection on experience” – John Dewey;
American philosopher, psychologist and educational reformer.*

8.1 Own research approach

First, the theoretical framework took more time than planned, because the subject *living lab concept* was unknown to me at the start of the graduation research. Because of my enthusiasm and curiosity, I was broadly interested in the concept which resulted in spending more time than planned. The next time, I will reserve more time on the theoretical framework if the subject is unknown to me to be sure that I have studied enough qualitative literature.

Which is remarkably in this is the confirmation that my enthusiasm and curiosity can bring trouble to me rather than novel additional information. In diverse projects, this has been prompted up as a weakness of my personality. Despite, I am aware of this weakness from my past, I could not prevent the mismatch of pre-planned and real-needed time.

Second, I wanted to have more benchmark living labs in my graduation research. The living lab concept is found all over Europa (and beyond). Unfortunately, different living labs were not interested in participating in students' research. Therefore, only three practical benchmark living labs (Maastricht-LAB, Urban Management Fieldlabs and living lab Kerkrade-West) and three theoretical benchmark living labs (Citilab, Public fab labs and the Suurpelto urban living lab) were available within the six-month time span of the graduation research.

This limited use of benchmark living labs is also seen as results of the long-lasting literature research. Because the theoretical framework took more time than planned, less time was left for the practical case study between living labs on (inter)national scale.

Third, I would have more closely contact (earlier and more intensive) with the province of Limburg to align my findings and conclusions with their policy and their future. This may contribute to the reality- and feasibility-grade of the outcomes of the research. This is also the result of the longer-lasting theoretical framework and due to unforeseen circumstances in the beginning of the graduation research. Nevertheless, the employees of the province of Limburg were excited and positive about the research and my initiative to brainstorm with them about the living lab concept in relation to their policy. They told me that the connection with the province and the actualities contributes to the research and the outcomes. So, in the future, I am sure I will connect with the actualities to improve my research, if possible.

At last, I have improved my English language skills throughout the graduation process. On my secondary school, I achieved English on VWO-level (Dutch: Voorbereidend Wetenschappelijk Onderzoek) and got an Anglia-certificate on AcCept Proficiency (C1) level.

Thereby, my Master's degree program is in English, so I thought it would be a great "test" for me to check my English writing skills during my bachelor thesis. Despite my past and enthusiasm, I was a little bit nervous about the fact that I would write my bachelor thesis in English. And, indeed, in the first three weeks, it took me little more time to scan and read full reports about the living lab concept. However, the more I read, the better it went. Thereby, I have learned a lot about English grammar, vocabulary and writing during the process.

8.2 Multidisciplinary setting

The graduation research makes use of a multidisciplinary setting. I made use of the knowledge of professionals within the lectureship SURD and the Zuyd University of Applied Sciences. Furthermore, I made use of the knowledge and real-life experiences of living lab practitioners in Maastricht, Amsterdam, Kerkrade-West and in Belgium. And, at last, I brainstormed and discussed with the province of Limburg, who are facing (urban) challenges in the province of Limburg and, may, see the living lab concept as a tool to improve the built environment.

The usage of this multidisciplinary approach is not only contributing to the research and its outcomes, in a way that it makes them more realistic, feasible and comprehensive, but also to the students' learning. It contributes to the personal skills of the student himself. For example, the communication skills are improved by preparing and planning meetings or the research methodology skills, including interviews and brainstorm sessions, are improved.

So, in conclusion I can say that I have learned a lot during the graduation research. On the one hand, I have discovered an interesting concept which we all will hear about in the future. On the other hand, I improved a lot of personal skills, like the English language skills, planning and communication skills and my research skills.

Word count: 16.399 (plain text)

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Chapter 10. Appendices

The appendices are found in the appendices booklet which is available separately from this bachelor thesis.

10.1 Brainstorm sessions

Brainstorm session Mr. R. Boiten (Dutch)

Brainstorm session Mr. H. Sap (Dutch)

Brainstorm session Mr. L. Teunissen (Dutch)

Brainstorm session Mr. H. Verreussel (Dutch)

Brainstorm session Ms. I. Kaelen (Dutch)

10.2 Interview guides

Interview guide MaastrichtLAB (Dutch)

Interview guide Urban Management Fieldlab (Dutch)

Interview guide living lab Kerkrade-West (Dutch)

10.3 Full interviews

Full interview MaastrichtLAB (Dutch; verified)

Full interview Urban Management Fieldlab (Dutch; verified)

Full interview living lab Kerkrade-West (Dutch; verified)