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Living Labs: A Creative and Collaborative Planning Approach

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Introduction

On a rainy afternoon in November 2020, in the midst of the coronavirus pandemic, a group of inhabitants of the Hegewarren area, located in the province of Friesland, in the northern part of the Netherlands, gathered in an online workshop; they were accompanied by residents from neighbouring villages and by representatives of water sports, nature conservation, and agriculture organizations active in the area. Despite

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the lack of a physical environment, the team of facilitators warmed up the atmosphere with an ice-breaker that led to a screen full with virtual colourful sticky notes about each participant's feelings and expectations. Afterwards, the participants shared their knowledge and interests about the area, therefore making each other aware of their different perspectives. Over the following months, with help from the team of facilitators, experts in engineering and landscape architecture, the participants created, compared, analyzed, and refined alternative solutions for the future of the area. These alternative solutions, together with supporting arguments, were to be later presented to the decision-makers who would then decide which, if any, was both attractive and financially feasible.

This short vignette about the first co-creation workshop of the Hegewarren Living Lab provides a tangible example of the practice of co-creation in the water infrastructure and spatial planning domain (in this Chapter referred to as 'planning'). At the initiative of the Province of Friesland, the Hegewarren Living Lab was developed to provide a 'safe environment', in which different stakeholders could explore alternative future scenarios for the Hegewarren polder (Fig. 15.1), a low-lying, flat tract of peat meadow land that faces severe challenges such as soil subsidence, CO_2 emission, difficult water management of the quays and nature destruction. However, this is just one of the many examples of Living Labs (LLs) that emerge today as a promising planning approach for addressing 'tangled problems' through "experimentation on suitable scales and with multiple stakeholders" (Borgström-Hansson, as cited in McCormick & Hartmann, 2017, p. 4).

The growing adoption of LLs in the planning domain, and in the public sector as a whole, comes as a reaction to the many claims about the benefits of LLs that stem from the private sector, where they have been extensively used in open innovation (Chesbrough, 2003) and user-oriented innovation (von Hippel, 2005). According to Molinari (2011, p. 133) a LL can be considered as a multi-stakeholder platform "comprising different stakeholders, who perceive the same problem, realize their own respective interdependencies, and come together to agree on the best action strategies for solving it". LLs hold a promise for bringing to light innovative solutions for the numerous existing 'wicked'

Fig. 15.1 Panoramic view of Hegewarren polder (*Source ©Siebe Swart* https://www.siebeswart.nl/)

challenges (de Roo et al., 2012; Liedtke et al., 2012; Zivkovic, 2018) that communities face. However, their potential as a planning method has only recently started gaining attention. Consequently, and given the fundamental differences between product—and planning-oriented LLs, "the conceptual and methodological understanding of living labs remains focused on technology-based innovation processes rather than socio-spatial research questions" (Franz, 2015, p. 55).

Other researchers (Bergvall-Kåreborn & Ståhlbröst, 2009; Følstad, 2008) have argued that current theories and methodologies, methods and tools, as well as analyses and reflection on LL practices are limited. This is further substantiated by Leendertse et al., (2016, p. 403) who stated that "literature on actual implementation and experiences in a project context is very scarce". Reflecting these arguments, Rosado et al., (2015, p. 181) argued that there is a:

"need for more specific descriptions of the practice of running a living lab, i.e. how to organize a living lab's activities, how to involve different

stakeholders, ways of collaboration, co-ordination, etc., combined with a more conceptual concern with the possibility of reconciling the interest of these different stakeholders".

Therefore, in this Chapter we aim to position LLs as a creative and collaborative planning method. To elaborate LLs as a planning method, we first provide a theoretical overview of LLs, looking at their interpretation, their characteristics, and typology. This chapter is based on a review of relevant literature in the field of LLs and co-creation. The following section discusses LLs as a planning method, and is based on a literature review, empirical research in relation to the planning of water infrastructure and spatial development projects that adopted a LL or a co-creative approach, as well as our own experiences in observing and joining LLs.

While striving for clear steps and a flowing text in this section about LLs as a planning method, we also wanted to provide empirical substantiation. Therefore, we have chosen to use text boxes to illustrate the practice-oriented aspects of using LLs as a planning method. These text boxes provide illustrations from the empirical research we carried out in three projects in the Netherlands—the Overdiepse polder, the Essenburg Park from Rotterdam, and the Hegewarren LL. The latter is an ongoing project, in which the first author conducted participant observation over a period of one year. This method helped to gain a deep insight perspective into the LL's organization and procedures, to understand the evolution of the process, the roles of the different stakeholders and the way their interactions shaped the process; it also laid the foundation for subsequent interviews. As a basis for this case, a rich source of information consisted of the 'thick description' of the meetings and project documentation. The first two case studies were based on an analysis of planning documents and 15 in-depth, semi-structured interviews with key players. In the final sections, we reflect on the use of LLs as a planning method and conclude with recommendations for the application of LLs as a method in the water infrastructure and spatial planning domain.

Theoretical Aspects of Living Labs

Given their increasing popularity in various fields, both in the private and the public spheres, the concept of LLs has now morphed into a buzzword. To the proliferation of LLs in the European context have contributed the many streams of funding that encourage, or even demand the application of such an approach (Voytenko et al., 2016). Furthermore, the growing appeal of LLs stems from their use and study environments, various forms of experimental governance, user-centric research methodologies, multi-stakeholder platforms and collaborative experimental approaches. In theory, a LL resembles an almost 'magical concept' (Pollitt & Hupe, 2011), that fills a gap by contrasting the traditional, siloed and expert-driven approaches that are no longer deemed suitable as a response to the complex and 'wicked challenges' of our society.

The Origins of Living Labs

One of the first uses of the concept of a 'living laboratory' was by Bajgier et al., (1991, p. 701) to describe the potential of urban neighbourhoods as learning environments for students who are interested in solving real-world issues. Later it was further developed by William J. Mitchell from MIT Media Lab who was interested in investigating the application of smart home systems in day-to-day human activities (Eriksson et al., 2005). Subsequently, the concept has spread rapidly all over the world and gained popularity in various domains as a new innovation approach—see Box 15.1.

Box 15.1 Early example of a LL as a planning method.

In 1993, Rijkswaterstaat introduced the Infrastructure Laboratory (InfraLab), described as an approach to experiment with interactive and open planning procedures aimed at a speedy and creative development of new and innovative solutions for infrastructure projects. In the InfraLab,

traffic planners worked directly with user communities and other stake-holders to define transport problems and their solutions (Evans et al., 1999; van den Brink, 2009; Woltjer, 2000).

"In Europe, the concept attracted interest and led to a number of scattered experimentations" (Dutilleul et al., 2010, p. 63). A milestone was reached in 2006 when the concept was officially introduced during the Finnish presidency of the European Union (EU) through the Helsinki Manifesto. In the same year the European Network of Living Labs (ENoLL) was founded, a "European platform for collaborative and co-creative innovation, where the users are involved in and contribute to the innovation process" (European Commission, 2006, p. 4). Seen as a starting point for "a new European R&D and Innovation System, entailing a major paradigm shift for the whole innovation process" (Molinari, 2011, p. 131), this represented the approach taken to tackle Europe's declining economic competitiveness and increasing societal challenges (Dutilleul et al., 2010). The widespread emergence of LLs in a large variety of domains is reflected in the evolution of ENoLL, which initially consisted of 19 LLs from 15 EU member states and today has over 150 active LL members worldwide. However, the popularity (and fuzziness) of LLs is also emphasized by the numerous definitions and applications, which will be explored in the following sub-sections.

What are Living Labs?

Living Labs can be included in the larger category of real-world laboratories (Schäpke et al., 2018) together with other types of experimental approaches such as urban living labs, design labs, city labs, smart city initiatives, innovation hubs, community-based initiatives, social innovation labs and other niche experiments. Given the relative novelty of the concept, the numerous applications it has in practice, and the various perspectives that are taken to research it, there is no widely accepted definition of a LL (Leminen, 2015a). Based on our literature search, Table 15.1 presents the most relevant definitions of water infrastructure and

Table 15.1 Overview of LL definitions relevant to the water infrastructure and spatial planning domain

References	Living Lab definitions	Key characteristics
Frissen and van Lieshout (2004)	"Consciously constructed social environments in which the uncontrollable dynamics of everyday life are accepted as part of the innovation environment which enables designers and users to co-produce new products and services"	Environment Innovation Users Co-production
Ballon et al., (2005, p. 3)	"An experimentation environment in which technology is given shape in real life contexts and in which (end) users are considered 'co-producers'"	Environment Technology Real-life context Co-production
Lama and Origin (2006, p. 6)	"User-centric research methodology for sensing, prototyping, validating and refining complex solutions in multiple and evolving real life-contexts"	Research methodology User-centric Real-life context
Bergvall-Kåreborn et al., (2009, p. 4)	"User-centric innovation milieu built on every-day practice and research, with an approach that facilitates user influence in open and distributed innovation processes engaging all relevant partners in real-life contexts, aiming to create sustainable values"	Milieu User influence Open innovation Real-life context
Pallot et al., (2010, pp. 2–3)	"An open innovation ecosystem frequently operating in the context of competitiveness clusters and public development agencies within social innovation environments engaging local authorities in territories such as cities, agglomerations, regions"	Ecosystem Open Innovation Social innovation Geographical territories

(continued)

Table 15.1 (continued)

References	Living Lab definitions	Key characteristics
Westerlund and Leminen, (2011, p. 20)	"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"	Physical regions/virtual realities/interaction spaces Public–private-people partnerships Collaboration Real-life context
Dell'Era and Landoni (2014)	"A design research methodology aimed at co-creating innovation through the involvement of aware users in a real-life setting"	Research methodology Co-creation Innovation Real-life setting
European Network of Living Labs (2015)	"User-centred, open innovation ecosystems based on a systematic user co-creation approach integrating research and innovation processes in real life communities and settings"	Ecosystem User-centred Open innovation Co-creation Innovation Real-life setting

spatial planning practice.

Table 15.1 substantiates the findings of Leminen (2015a) who identified that there are three layered streams of LL studies: LLs as a context, LLs as a method, and LLs as a conceptualization. Accordingly, this chapter strives to contribute to the second stream of studies and, based on the key characteristics of LLs, we define a LL as an iterative, experimental and user-centric planning method in which multiple stakeholders co-create innovative solutions for planning issues (see also the keywords in Table 15.1).

Unsurprisingly, the numerous definitions and wide-ranging utility of LLs indicate not only their versatility, but also a main drawback of the LL concept. The many definitions and interpretations are not necessarily a bad thing in itself as it highlights the multiplicity of approaches for dealing with various kinds of challenges. However, a problem is that LLs have come to mean many different things to many different people, from various domains. Consequently, in the search for consistency and unifying features, the attention of academics and practitioners moved towards identifying the key characteristics of LLs.

The first characteristics stem from the term itself. 'Lab' comes from laboratory, and even though in the case of planning it does not refer to a traditional type of laboratory—with chemical substances, test tubes, funnels, and varied types of flasks—but refers to a *real-life setting* in which *experimentation* (such as innovative integrated spatial designs) is encouraged, and where room for failure is provided. Another key feature of LLs is the involvement of *multiple stakeholders,* from public institutions, private stakeholders, academics and research institutions, NGOs, individuals and groups of citizens. From this inclusive engagement derives the core feature of LLs, *co-creation*; this refers to "any act of collective creativity that is experienced jointly by two or more people […] where the intent is to create something that is not known in advance" (Sanders & Simons, 2009, p. 27), and which "highlights the potential impact of collaborative interaction on the ability to foster new and innovative solutions to intractable problems" (Puerari et al., 2018, p. 804). Consequently, two other main features of LLs, which result from the multi-stakeholder collaboration, are *innovation* and *learning*.

The aforementioned characteristics are becoming increasingly important in identifying LLs because there are many examples of collaborative initiatives that do not use the terminology, but fulfil all the criteria of a LL (IIIEE at Lund University, 2015). In the case of such initiatives, the extent to which each of the main characteristics is found may vary. However, to be considered a LL, each of the features should at least be present to some extent—see Box 15.2. This flexibility in terms of the degree of specific characteristics allows for a wide variety of LL and a need for the development of typologies based on different aspects.

> **Box 15.2 The case of Western Harbour in Malmö.**
>
> The Malmö western harbour project, which set itself the very ambitious goal of being a 100% energy renewable neighbourhood, does not wear the LL name, but fulfils all its criteria: it took place in a real-life context, it had numerous design competitions that demanded experimentation, exploration and entrepreneurship, and used collaborative working methods (IIIEE at Lund University, 2015).

For example, Leminen et al. (2012) proposed four types of LLs based on the type of stakeholder who drives the activities and plays the most active role in the innovation process: *the utilizer-driven, the enabler-driven, the provider-driven* and *the user-driven LL*. Similarly, when considering LL as an environment, Ståhlbröst and Holst (2012, p. 6) identified five main types:

> "*research LLs* focusing on performing research on different aspects of the innovation process; *corporate LLs* that focus on having a physical place where they invite stakeholders to co-create innovations; *organizational LLs* where the members of an organization co-creatively develop innovations; *intermediary LLs* in which different partners are invited to collaboratively innovate in a neutral arena; *a time limited LL*, as a support for the innovation process in a project".

The latter refers to the situation in which the LL closes when the project ends.

An interesting categorization is proposed by Neef et al. (2017), who identified two main types: *Product Oriented Labs,* which stem from the open innovation paradigm and where the main goal is innovation, and *Urban Transition Labs,* which stem from the transition management paradigm and where the main goal is to facilitate a transition in, for example, sustainability, the lab being considered a niche in inducing transitions (Geels, 2005).

A relevant typology of LLs related to the planning field is proposed by Marvin et al. (2018) who defined three ideal types of Urban Living Labs: *strategic, civil* and *grassroots.* Extrapolating this typology to the more generic category of LL in the water infrastructure and spatial planning domain, we consider the following three types of LLs: 1. *strategic*, which are led either by the national government or by large private actors and operate on a large scale, sometimes with multiple projects under one umbrella; 2. *Civic*, which are led by regional or local authorities, higher education and research institutes or local companies, and focus on economic and sustainable development on the regional and local scale; 3. *Grassroots*, which are led by members of civil society, communities, NGOs, or groups of residents, and focus on specific issues through micro-projects or single issues projects (Marvin et al., 2018; McCormick & Hartmann, 2017).

Box 15.3 LL typologies reflected in practice.

An example of a *strategic LL* is SmartwayZ.NL, an umbrella programme for eight sub-projects, in which the Dutch Ministry of Infrastructure and Water Management, Rijkswaterstaat, the provinces of North-Brabant and Limburg, numerous municipalities, companies and knowledge institutes work together towards improving accessibility and promoting innovation in the field of mobility.

An example of a *civic LL* is the Hegewarren LL, initiated by the Province of Friesland, the waterboard and the Smallingerland municipality, and uses the Hegewarren polder as a lab for exploring different future alternative scenarios in response to the spatial and environmental challenges that peat areas are facing.

An example of a *grassroots LL* is the Essenburg Park project from Rotterdam; this started with a group of inhabitants who wanted to improve the sustainability prospects of the neighbourhood and prevent

> the build-up of an old railway area by transforming it into a publicly accessible green space with a natural water retention area. Initially, this started as a civic initiative, but it later gained the support of the Rotterdam city council and municipality, of the waterboard and of local health and educational institutions, all of whom worked together on defining and implementing the development plan, and who still continue to work together on the maintenance of the park.

From the increasing number of studies related to LLs, there seems an increasing trend in considering LLs as a 'magic recipe' for experimentation and development of innovative and creative solutions for the numerous environmental and societal challenges that communities are facing. However, beyond their attractiveness, LLs pose many practical and operationalization challenges because "a wide variety of activities are carried out under the umbrella of living labs, and they feature many different methodologies and research perspectives" (Leminen, 2015b, p. 29). Therefore, more attention needs to be given to the practical aspects of LLs as a planning method, because they play an important role in practicing co-creation and experimentation with multiple stakeholders. For this reason, the next section describes the method itself, including the 'ingredients' and the 'how' aspects of a LL as a planning method. We look at the 'living lab way of working' (Steen & Van Bueren, 2017) by emphasizing the phases of a LL, the conditions that make a LL successful, and the main roles played by a LL's stakeholders.

Living Labs as a Planning Method:

There are numerous studies that propose different stages of a LL. For example, in relation to ICT design, Pierson and Lievens (2005) proposed that an LL has four phases: contextualization, concretization, implementation, and feedback. Another LL staging is proposed by Malmberg et al. (2017) who identified three main phases: exploration, experimentation and evaluation. A more detailed explanation of a 'living lab way of working' was provided by Steen and Van Bueren (2017), who identified

eight phases of a LL: initiation, plan development, co-creative design, implementation, evaluation, refinement, dissemination, replication.

Based on the 'living lab way of working' proposed by Steen and Van Bueren (2017), and the insights emerging from our empirical research of the three cases, we propose the following five phases when using LLs as a planning method: initiation, preparation, co-creative design, evaluation and link with decision-making, and feedback. In the sub-sections below we will refer to the empirical base by giving illustrations from the cases studied.

Phase 1: Initiation

Start from an idea or a problem

The adoption of LL as a planning method is usually triggered by complex, tangled problems that cannot be solved with the traditional, siloed approaches (see Box 15.4), but that demand cross-level and cross-sectoral collaborative approaches that show "explicit appreciation of complexity and uncertainty, likelihood of surprise and need for flexibility and adaptive capacity" (Kemp et al., 2005, p. 17). According to Steen and Van Bueren (2017), not only a problem, but also an idea can trigger the adoption of a LL approach.

Box 15.4 Example of triggers for a LL initiation.

Being situated in a peat area, the starting point of the Hegewarren LL was a mix of tangled problems: soil subsidence, CO_2 emissions, difficult water management, and nature destruction, for which solutions can only be explored through cross-sectoral and cross-level collaboration.

In the Essenburg Park project from Rotterdam, the trigger of the co-creation process was the neighbourhood residents' idea of transforming the old railway area into a publicly accessible park with a natural water retention area.

- **Attract others to work together**

In the initiation phase, a key role is played by the initiator, the person or organization who identifies a problem or comes up with an idea. The initiator is usually a public or private organization in the strategic and civil LL, and an individual or a group of individuals in the case of the grassroots LL. In this phase, the initiator makes the problem known to other potential key stakeholders—public actors, private actors, citizens or groups of citizens, and knowledge institutions—with the aim of gaining their support for a collaborative approach, for adopting a LL method, and for creating a partnership that has the capacity to set up the LL (see Box 15.5). The initiator needs to make sure that key stakeholders, which are usually also those that bring various kinds of resources to the LL in the later stages, show a high degree of commitment towards a 'LL way of working', which involves a high degree of openness, transparency, and trust. The persons or organizations that show interest in the initiative, even if not interested in being directly involved, can play the role of 'advocates' who support and spread the word about the initiative. When the support of key stakeholders for a LL approach is gained, the process moves to the preparation phase.

Box 15.5 Sparking connections with partners.

In the Essenburg Park case, the civic initiatives first gained the support of different neighbourhood actors (the Delfshaven borough, the Recreation and Sport department) and they later approached and gained the support of the coalition of political parties that wanted to create a new park in Rotterdam. Furthermore, they established informal interactions with the civil servants and the municipal councillors by inviting them to take a walk through the area to experience it.

In the Overdiepse polder project, the farmers from the polder first gained the support of the provincial deputy who manifested visionary leadership and decided to give them the space to come up with a different kind of solution from the one proposed by the government; further, it was essential that they had the support of an informal government group composed of high-level politicians, searching for exemplary projects that could put the new water policy into practice.

Phase 2: Preparation

- **Identify and select participants**

In the case of the grassroots LLs, which have a strong bottom-up nature and emerge from a particular community in response to a very local problem, the participants do not usually need to be 'recruited', but 'naturally' join the LL when they hear about it from their neighbours, colleagues, friends or family, and if they resonate with the problem/idea and feel that they can make a contribution.

By contrast, in the case of the strategic and civic LL types, the initiator needs to identify and assemble the network of potential LL participants. They do this together with the initial 'allies', who have "the vision, the energy, and the social skills to connect to diverse individuals and groups" (Krebs & Holley, 2004, p. 48) and act as 'webbers' (Heikkinen et al., 2007) or 'network weavers' (Hagman et al., 2018; Krebs & Holley, 2004). A way to identify the relevant web or network is to undertake a stakeholder analysis to identify the 'target communities', the stakeholders who are affected or have an interest in the problem (Gouillart & Hallett, 2015; Steen & Van Bueren, 2017).

The identification of the potential LL participants needs to be done by adopting an inclusive approach, therefore ensuring their diversity in terms of skills, knowledge, and resources; this is thought to be an essential condition for fostering creativity and innovation through interdisciplinary interaction. The identification of the potential LL participants can be done in various ways; one of these is by brainstorming about the different types of stakeholders and then grouping them in categories—as exemplified in Box 15.6.

Box 15.6 The identification of LL participants.

In the Hegewarren LL, the Province of Friesland, the waterboard and the Smallingerland municipality as initiators, undertook a stakeholder analysis and identified the stakeholders from the area, those from the vicinity areas, but also those that had an interest in the area. The identification was done by brainstorming about the different relevant actors for the

area; these were then grouped into categories such as political actors, decision-makers, agriculture actors, recreation and tourism actors, water sector actors, nature conservation actors.

Particularly in the case of the strategic or civil LLs, after a list of potential LL participants is created, discussions about the participation space in relation to how many stakeholders can be included, which participants will be invited, what roles will they play, and what will they bring to the LL, can begin. An interesting technique to provoke such discussions and to make the step from the stakeholder analysis towards a participation strategy, is the 'rings of influence' model—see Fig. 15.2—which was also used in the Hegewarren LL case. It is a bulls-eye diagram that consists of four quadrants referring to four categories of actors—influencers, decision-makers, end-users, and suppliers—and of four concentric circles, each referring to the degree of the actors' involvement. This diagram can be used for three different types of analysis aimed at identifying the role that actors currently have, the role that they may want to have in the LL, and the role that the initiator would like them to have.

An important aspect to be taken into account is related to the number of participants. Although participants' diversity and inclusivity are desirable because it can enhance the 'collective creativity', a too large group of participants may lead to a less effective co-creation process. For this reason, filtering the potential participants is essential, since "getting the right people and the right chemistry is more important than getting the right idea" (Catmull & Wallace, 2014, p. 74).

- **Create the LL core – process design & management structure**

In addition to identifying the potential LL participants, the preparation phase is essential because then the initiator, who usually takes the role of the manager, together with key partners needs to identify the goals of the LL, identify the key resources and skills needed, create a working plan, envision the division of roles and responsibilities among key stakeholders, and design a management and communication system that will
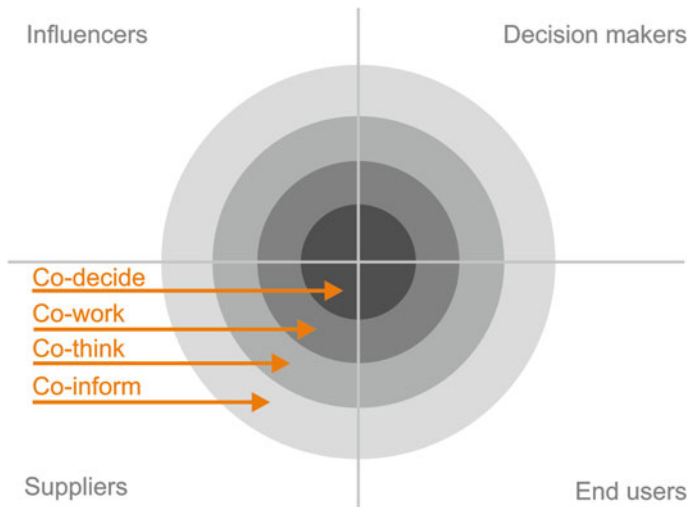
Fig. 15.2 Rings of influence model (*Source* Adapted with permission from www.publiec.nl)

allow the transparent spread of information and open dialogue within the LL. For all of this, the initiator and the key stakeholders need to dedicate enough time, because "whereas product design is self-evident in innovation processes, the design of the process is often forgotten, even though this activity proves crucial for the LL activities" (Steen & Van Bueren, 2017, p. 40). Based on the empirical research conducted, we observed that the design and management of LLs need to be flexible as they can be influenced by many factors, both internal and external—see Box 15.7.

Box 15.7 Flexibility in the face of external conditions – the case of the Hegewarren LL.
Flexibility needs to be a key element in the design and management of a LL, because there are many conditions, both internal and external, that can influence its evolution. For example, the planning of the Hegewarren LL started at the end of 2019, but the COVID-19 pandemic determined the transformation of the LL into a digital one, with exclusively online

> meetings between the management 'layers' and with online co-creative workshops.

While in the grassroots LL the stakeholders take on roles and responsibilities and the management structure develops more organically; in the case of the strategic and civic LL, it needs to be designed in the preparation phase and develop onwards. Therefore, depending on the complexity and focus of the LL, its management structure may consist of different layers (see for example Box 15.8), which ensure the division of roles and responsibilities throughout the LL's existence (Steen & Van Bueren, 2017). In such a case, the communication arrangements between these different management layers is very important; they need to be constantly updated in line with developments in the LL. A key role in communications is played by the core team members, and especially by the initiator, who are part of all the management layers, therefore ensuring the dual-flow of information.

Box 15.8 Management structure.

In the Hegewarren LL, the province of Friesland, together with the waterboard and the Smallingerland municipality were initiators. The LL management structure consisted of a core team made of actors from the province of Friesland (the lead actor), an extended team made of the core team actors, and further actors from the province, from the waterboard, and the Smallingerland municipality, and an advisory team comprising LL and co-creation practitioners and researchers.

While the grassroots LL tends to have a very low degree of formalization, in the strategic or civic LL, where multiple public or private organizations:

> "are involved, there should be agreements in the form of 'contracts' that clearly specify the roles, tasks, and responsibilities are desirable as this brings clarity, raises institutional commitment and willingness to cooperate, whilst eliminating possible disagreements about responsibilities" (Rădulescu et al., 2020, p. 15).

In the case of strategic and civic LLs—which tend to be more techno-centric due to their more top-down, expert-led initiation (Garavaglia, 2020)—it is crucial for both the evolution and the outcomes of LLs to alleviate potential power asymmetries and to create a 'safe environment' for all participants. A way to deal with such aspects is by having the design and delivery of the co-creation activities to be carried out by an independent team of facilitators (Steen & Van Bueren, 2017). For this reason, in the preparation phase the management should 'bring in' such professionals, and provide them with enough information and creativity space to successfully craft the backbone for the co-creative design phase.

Phase 3: Co-Creative Design

The co-creative design phase is the central part of the LL methodology. The length of this phase may depend on the complexity of the problem or idea that triggered the LL's inception.

- Plan and design the co-creative sessions

The number of co-creative sessions depends largely on the scope of the LL, on the complexity of the problem, but also on the number of participants. However, a series of co-creative sessions usually starts with a kick-off meeting; this is essential for making the problem clear to all participants, for communicating pre-defined conditions, for discussing the co-creation process, and for collaboratively defining the ground rules that will guide the co-creation activities—see Box 15.9. Defining the ground rules collaboratively is very important because it helps to bring all the participants to agree on a set of shared values and modes of interaction.

> **Box 15.9 Co-creation workshops in the Overdiepse polder.**
>
> The farmers from the Overdiepse polder took part in a series of co-creative sessions for creating alternative plans for the polder. The co-creation

sessions were designed and facilitated by an independent team of facilitators. The co-creation sessions had a results-oriented approach, so they were focused on doing, rather than on talking, and each focused on a specific subject: how to treat the people who wanted to leave the polder, the damage and compensations in case of high water levels.

The subsequent co-creative sessions can take many forms, such as workshops, design charettes or brainstorming sessions, in which stakeholders collaboratively and interactively come up with ideas, construct alternative scenarios, and engage in discussions about their potential benefits and challenges. Co-creation in water infrastructure planning and spatial development usually requires technical knowledge about the technical design of waterways and business models. For this reason it is good to create special sessions in which professional experts can offer detailed information to the participants. However, the complex technical aspects need to be synthetized and explained in plain language so that everyone can understand and follow the discussions. In the end, the co-creative design phase usually results in commonly ideated, designed, and supported alternative plans for solving the issue(s) that triggered the LL. This happens when the activities carried out in this phase transform potential conflicts or divergent perspectives of the participants into a joint and shared vision—see also Box 15.10.

Box 15.10 Co-creative design phase in the Hegewarren LL.

The start of the Hegewarren LL co-creative design phase was marked by a digital kick-off meeting (whose recording can be viewed here: https://www.youtube.com/watch?v=90uYa7Y_wa0) in which the goal of the LL and the way of working in a LL were explained, and questions could be asked. Based on invitations, but also on the reactions and interest shown by the participants that were present in the kick-off meeting, 17 participants, representing inhabitants and neighbours of the Hegewarren polder, and cross-regional stakeholders, were selected to take part in the co-creation process.

In the first workshop, the participants were presented to each other and they introduced their perspectives and interests regarding the area; in this way, 'local' knowledge and initial ideas about the area were

collected, and each participant could get a grasp of the others' interests and perspectives. In the second workshop, the initial ideas were translated, with the help of a professional team of urban planners, into building blocks, which could then be used to construct five alternative scenarios. In the next workshops, ideas were further elaborated, combined and developed with the help of professional experts, architects and engineers, therefore leading to the formulation of five development scenarios for the area. In addition, the LL participants were offered more in-depth knowledge about relevant themes (e.g., water management, recreation and tourism, nature, agriculture) through a series of lectures given by experts.

Furthermore, an intermediary evaluation step was embedded towards the end of the co-creative design phase, therefore allowing for supplementary input and refinement of the future scenarios for the polder.

Communication was realized through a website (https://toekomsthegewarren.frl/), periodical newsletters and informal discussions between the participants and the facilitators and professional experts.

The co-creation sessions are usually (perceived as) intensive and can last 3–4 h. In planning the sessions, therefore, attention also needs to be paid to details such as the location and the layout of the room. In strategic or civil LLs, even when the initiator has enough meeting or conference rooms available at its headquarters, a neutral location is preferable so that power asymmetries are not further enhanced and a 'safe environment' is created. For the same reasons, supporting participants' equality throughout the process is essential and to this aim the setting of the co-creative sessions can play an important role. According to Haataja et al., (2018, p. 40), "a functional way to communicate equality is to position the participants in an open circle", maybe with everyone sitting at the same table, including the facilitators, therefore having no physical divisions between the participants.

- Perform 'temperature checks'

The co-creative sessions and their evolution can turn out to be unpredictable for both the facilitators and the participants. For this reason, the facilitators need to perform regular 'temperature checks' during the co-creative sessions to assess how the participants feel about the process

and see if there are things that need to be done differently (monitoring). Such moments also create opportunities to enhance the feeling of trust between the participants and the facilitators. The 'temperature checks' can take the form of interim evaluation moments embedded in the co-creative design phase; this may lead to iterative loops and to the refinement of both the co-creation process and the co-created 'product'.

- Adopt a flexible attitude

Trying to facilitate and foster innovation and performing 'temperature checks' may bring uncertainty to the process. Consequently, while a thorough planning of the co-creation process must be in place, the facilitators, the experts and the participants must adopt a flexible attitude because activities in a LL do not follow a clearly defined path, and creativity comes with some degree of uncertainty. In addition, the initiator, the facilitator, the experts, as well as the key stakeholders, need to be highly sensitive to the evolution of the process, and be prepared to dedicate more time and resources to this phase if needed. At the same time, they need to openly communicate these aspects with the participants, especially because their participation in the LL is on a voluntary basis. Therefore, it is not only the 'product' of the LL that is co-created, but also the process.

- Communicate openly and transparently

Throughout this phase, but also throughout the entire LL process, open and clear communication between the LL participants, the management and the team of facilitators and experts is essential. For this reason, a communication system needs to be created and clearly made known to all those involved—for example, in the form of a website or periodical newsletters that keep track of the LL progress. Furthermore, enough opportunities need to be created for more informal, small-scale discussions, therefore ensuring that all participants' ideas and wishes are heard. Essential for communications in planning-related LLs is that the organizer and facilitators keep in mind that the participants are usually

representatives of a much larger group—more formally (as representative of a community organization, NGO, etc.) or more informally (as a 'proxy' of the larger group of residents, farmers, etc.). Communication about the project and planning process, as well as formal participation processes, require careful attention so that engagement with the larger community and stakeholder groups evolves well. In addition, not all aspects discussed within the LL sessions can be communicated to the larger group. Therefore, agreements about the confidentiality of specific aspects need to be explicitly agreed on with the representatives at the start of the process. This is in order to prevent potential tensions and conflicts that may lead to mistrust and may spoil the creative mindset.

Phase 4: Evaluation and Link with Formal Decision-Making

"Evaluation is a core component of the LL approach" (Steen & Van Bueren, 2017, p. 66) that marks the end of the actual 'doing' in the LL. Despite its importance, evaluation is considered a very vulnerable part of the LL method; it usually receives less attention than the preceding co-creative design phase, and often it is not done (Verhoef & Bossert, 2019) because carrying out evaluations is seen as a challenging and time-consuming task. Evaluation is essential for reflecting not only on the 'product' of the LL, but also on the process. This helps those involved to internalize the experience of being part of a LL and transform it into a resource that can be used in similar future planning situations.

Furthermore, in LLs related to the planning domain, evaluation acts as a linking pin with the decision-making process that can lead either to the formal blending in of the LL 'product' and therefore to its development and implementation, or to its failure to gain political support.

Phase 5: Feedback

The feedback moment officially marks the end of a LL process. At this point, the team of facilitators, together with the initiators of the LL, need to arrange a last meeting with the LL participants to communicate what

has happened with the LL's 'product' in the decision-making process. No matter what the formal planning decision is taken, the arguments, or any considerations that led to it, need to be clearly and transparently communicated to the participants. In this way, potential frustration or disappointment in the case of a 'negative' decision can be better dealt with and can be delimitated from the perceptions about the co-creation process per se. In this way, trust and enthusiasm for other similar processes is not diminished—preventing disillusionment and 'participation fatigue' among stakeholders (Esteves et al., 2012; Hamersma et al., 2018).

Reflections on the Use of Living Labs as a Planning Method

LLs are increasingly gaining attention in the planning domain, but their application comes with great challenges due to the nature of the field, where intricate dynamics play out, resulting from the interactions of the multiple levels, sectors, and actors involved. From our experience, this is especially visible in water infrastructure planning, where neither top-down nor bottom-up approaches are able to capture and respond to the complexity exposed by water—which "is not a single, discrete aspect of the environment. It is part of a greater interconnected whole; when one considers water, therefore, one must consider all that to which water is connected and related" (McGregor, 2021, p. 155). Therefore, while LLs as a planning tool are expected to highlight "the potential impact of collaborative interaction on the ability to foster new and innovative solutions to intractable problems" (Puerari et al., 2018, p. 804), in practice their application needs more reflection, especially because as we mentioned in the introduction, the application of LLs is often focused on technological-based innovation rather than socio-spatial issues. In the following part, based on our experiences in LLs in the planning domain, we try to indicate some key points that need attention when adopting a LL approach in planning.

First, there are many cases in planning where a LL is not a planning method chosen at the outset, but more a method that organically

emerges as a reaction to the top-down initiative of an actor, situated on a higher level, which is perceived by the others as a threat—as with the cases of the Essenburg park or the Overdiepse polder. Looking back at the different cases, the initiation of a LL, both in terms of context and actors, defines the type of LL that it is going to be: strategic, civil or grassroots.

Furthermore, the initiation and evolution of a LL depend on a series of contextual conditions. For example, in the case of the Hegewarren LL, its initiation was triggered by the problems caused by the peat soil; however, it was also favoured because of a few contextual conditions, such as the new environmental law that demands more participation. The initiation was also favoured by the presence of motivated visionary leaders who are not afraid to take risks and are willing to experiment with new planning tools, such as the LL. Similarly, in the Overdiepse polder case that did not start as a LL but evolved into a co-creation process, the presence of motivated stakeholders with a pro-active attitude was essential for this evolution.

This leads us to our next point that is related to the actors involved and the roles they play. In strategic and civil LLs, the position of the public authorities is interesting as they not only initiate the process, but also act as patrons by supporting the innovation process, as webbers by selecting the LL participants, and as contributors by providing information throughout the process, therefore sometimes leading to confusion and distrust among the participants. Furthermore, a key role in a LL is played by the facilitator, whose task is to help the LL participants to understand their common objectives and perspectives, and to guide them to reach these objectives by offering them suitable ideation tools. To fulfil this role, the facilitator needs to manage the overall process, to lead the co-creative sessions, to establish the right conditions for the participants to feel safe to speak and express ideas and perspectives, to seek inclusive resolutions that work for all the participants, and to be prepared to react spontaneously to unforeseen changes. These kinds of unforeseen developments can lead to tensions, especially in strategic and civil LLs where flexibility may sometimes be at odds with the resource and time calculated approach of the initiator, or of the facilitator.

Another important aspect that needs to be kept in mind is that co-creation in a planning-related LL is not neutral: it is always developed in a political setting. Caution needs to be given to the evolution of the living labs, because they can become arenas of unequal expectations for various kinds of stakeholders, power games due to the influence and power of different actors, therefore leading to conflicts. Nevertheless, an important aspect that should not be forgotten is that the quality of the co-creation process is dependent on the history of relationships among stakeholders (Rădulescu et al., 2020). Therefore, LLs should be used carefully as they may easily become an umbrella for the same old practices due to more influential and powerful agendas and interests. However, they can also be a window of opportunity for re-designing and changing the present practices and approaches.

Finally, LLs as a planning approach provide opportunities for dealing with the challenges that the planning field faces by supporting experimentation, collaboration and learning. The non-linear, iterative nature of the creative process within a LL, marked by reflective and evaluative moments, provides the opportunity for continuous improvement through learning-by-doing and doing-by-learning, both in terms of process and outcomes within the boundaries of a specific initiative. Further, given the wide spectrum of stakeholders involved, LLs as a planning method may also be seen as a social learning opportunity. Nevertheless, when zooming out, LLs as a planning method provides the opportunity for organizational learning and even the diffusion of knowledge within the wider planning field, and may ultimately have an important contribution to sustainability transitions.

Recommendations for Using a LL as a Planning Method

Relying on the same traditional, siloed planning approaches will not get us too far. This is because it is evident that the current wicked challenges we are facing require collaborative and creative work across sectors and levels. In addition, creating or 'borrowing' concepts from other domains and using them in policy-making can be helpful, but is not sufficient.

Ultimately, in attempting to bring new, innovative, and creative solutions to light, the flashy and almost magical concepts of LLs need to be carefully put into practice. In anticipation of such a turn, the present chapter has given an overview and provided insights into what LLs are, why and how they can be effectively used in the planning field. Furthermore, based on both existing literature and our own experiences, we introduced LL as a five-staged methodology, with each step having its own characteristics. However, we acknowledge that there is no blueprint for such an interactive process, and that maximum flexibility for fine-tuning and adaptation must be accommodated because each process is unique and iteratively evolving. For this reason, we conclude by outlining a few recommendations that could be useful when considering the use of LLs as a planning method:

- **Involve all relevant stakeholders and be flexible regarding the scope:** It is important to adopt an inclusive, tailor-made approach when selecting the LL participants. This is because a diverse network of actors, with varied capabilities, skills and motivations, is a determinant for the emergence of creativity and innovation as a result of interdisciplinary interactions. In the planning domain, LLs are usually place-specific and their context is influenced by the interaction of multiple actors situated on different levels and scales. Therefore, when the initiator undertakes the initial stakeholder analysis, they need to think creatively, not only about the specific location of the LL but also about the larger scope needed to come to creative solutions that include multiple challenges. Nevertheless, a fine balance needs to be maintained between diversity and the number of participants so that the LL proves to be an efficient planning tool.
- **Let the LL grow organically:** While planning tends to be pre-defined, controlled and process-oriented, LLs as a planning method offer the opportunity for organic planning processes. To take advantage of this opportunity, one should restrain from assembling the list of LL participants solely according to the results of the stakeholder analysis, which is an institutionalized tool in planning practice. Instead, selected participants should discuss if further potential stakeholders should be brought into the process if they consider their stakes are

relevant. This leads to an organically grown LL that, in opposition to traditional planning processes that rely on a pre-defined and minutiously controlled approach, increases the diversity of LL stakeholders, helps to build trust, and opens up the role of the authorities.

- **Manage expectations:** As a LL is most often a parallel process to the 'official' planning and decision-making process, the initiator of the LL needs to be transparent about the goals of the LL and about its position within the (formal) planning process. They must make it clear from the beginning that the results and solutions/plans developed within the LL might, or might not, be taken up in the decision-making process, therefore eliminating potential frustrations.

- **Genuinely listen to the participants and continuously adapt the co-creation process:** It can be very easy to dismiss peoples' concerns or requests, arguing that they go beyond the scope or length of the process. This relates to the relevance of both expert knowledge of professionals and experiential knowledge of stakeholders. LLs often (implicitly) comprise science-society dialogues, where scientist experts might be reluctant to move beyond their own perspective of a particular issue. The potential strength of a LL approach is that it provides an interface for connecting expert and experiential types of knowledge. Therefore, throughout the process it is essential to try to understand where every piece of feedback comes from, to keep an open and flexible mindset, and try to sense the participants' needs.

- **Adopt an agile management approach:** LLs do not follow the same 'recipe' as traditional projects, so they do not need to—or should not—be run like one. Using phases as presented in Sect. 15.3 to plan the LL is good as it offers a perspective and a structure of the entire process. However, conducting a LL based on a rigid pre-defined plan and on a tight time and cost approach needs to be avoided. When doing an LL, major attention needs to be paid to the insights received from the various stakeholders and to their attitude and commitment to the process. This means that those running a LL need to be willing to adapt the process based on the participants' feedback; this can lead to small or even radical changes in the design of the process and its direction.

- **Do not default back to old approaches and roles:** Adopting new ways of doing things is especially hard when there is a tension between spurring innovation and creativity and quickly delivering concrete results. Furthermore, the adoption of new, experimental, and collaborative approaches in planning emphasizes new roles to be played by the involved stakeholders. Although adopting new approaches and roles might feel overburdening, and choosing the old ones or trying to incorporate them into the LL might be tempting, this will only defeat the initial purpose of adopting a LL as a planning method.
- **Do not be afraid of taking risks and possible failure:** Experimentation involves risk taking and this may lead to failure or partial success. However, even when a LL approach does not succeed in fostering innovative ideas, it can still be a source of learning in terms of process design.
- **LLs do not represent the holy grail for dealing with wicked problems:** In the examples presented in this chapter, adopting a LL approach had an influence on the planning practice. However, this may not always be the case. To be able to maximize the potential impact on planning policy and practice, it is important to clearly define and communicate the role of the LL in the planning process, to clarify its position in relation to the formal decision-making, and to explain the role of the authorities.
- **Do not focus on terminology, just keep it simple:** LLs are a buzzword, but so are urban living labs, design labs, city labs, fab labs; they are all experimental approaches that can be included in the larger category of real-world laboratories, which present numerous similarities and therefore result in being used interchangeably. Given this large diversity of similar concepts, it is important not to focus too much on terminology, but on deciding to adopt such approaches and letting them grow organically as interaction platforms.
- **Talk the language of the participants:** Using expert jargon communication is efficient between people from the same field, but in a LL, where participants' diversity and interaction are essential, it can lead to the exclusion of non-experts. Therefore, it is important to keep language simple, to try to eliminate jargon as much as possible to make all participants feel welcome, interested and willing to engage,

because this ultimately spurs creativity and fosters the development of innovative ideas.

- **Do not focus on reaching a compromise**, even though this might be tempting in such multifarious processes, with numerous actors that represent different interests. Instead, try to foster their interaction and the exchange of the diverse types of knowledge and experiences they embody. In the end, LLs are about creating the opportunity for a co-creative process, and not about forcing the development of solutions and reaching final planning decisions. For this reason, it is important to clearly demarcate the creative process and the formal decision-making and to constantly manage potential expectations about the outcome. Finally, to highlight this separation it is important that at the end of the LL the decision-makers give feedback about their decisions and the way these have been reached.

In the search for a sustainable future development of the Hegewarren polder, the province of Friesland adopted 'a living lab way of working'. This proved not to be an easy path as there is no 'magic recipe' when working with such new and innovative planning methods in a multi-scalar, multi-level, and multi-actor setting such as the planning of water infrastructure and spatial development. Despite the challenges and the temptation of falling back on old approaches, living labs certainly represent a relevant and growing practice in Dutch water infrastructure and spatial planning; they provide a valuable way of connecting local-scale and larger-scale planning issues and solutions.

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