REWAISE
Resilient Water Innovation for Smart Economy

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VALUE IN WATER
VALUE FROM WATER
VALUE THROUGH WATER

REwaise
Resilient Water Innovation for Smart Economy

Value
IN
Water

Value
FROM
Water

Value
THROUGH
Water

Living Lab Methodology and Online Handbook

Index

"

With Living Labs
we value water
as a vital vector
to generate
new **resources**,
wealth and
health

**Frank
Rogalla**

Project
Coordinator
AQUALIA

About The **Toolkit**

The REWAISE Living Labs target to demonstrate in real-life, large scale operational environment the technological innovations to extract the value in, from and through water, contributing to a **secure smart water supply** for the European society.

The REWAISE Living Lab **methodology and online handbook** aims to provide the core theoretical background on the value of Living Labs and offer hands on guidelines on setting up and running efficiently Living Lab constellations.

The preselection of the existing tools and toolkits will support the development of the **REWAISE** Living Labs and enable the running of impactful pilots. This entails the selection of design-based process from the problem analysis to the ideation of a solution, the development of a prototype and its experimentation in a real-world context.

The main goal of the first internal edition of the **REWAISE** Living Lab handbook is **to clarify the typology of Living Labs and provide support to mature the co-creation labs** in establishing a sustainable path for them.

The different chapters of the handbook reveal information **on the value of Living Labs**; the essentials on **setting up a Living Lab**; the importance of **real-life experimentations in Living Labs** and **hints and tips under the Build my Living Lab** section.

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The Value of Living Labs

> **"**
>
> Living Labs are increasingly facilitating new ways to stimulate innovation.
> They offer the possibility to catalyse how innovation can be carried out, focusing on user communities supported by information technology. [2]
>
> **Maurice D. Mulvenna**
> 2011

> **"**
>
> Living Lab services can lead to an increased visibility, a shortened development process, improved products, and an enhanced learning and understanding about innovation processes and user involvement.[3]
>
> **Anna Ståhlbröst**
> 2013

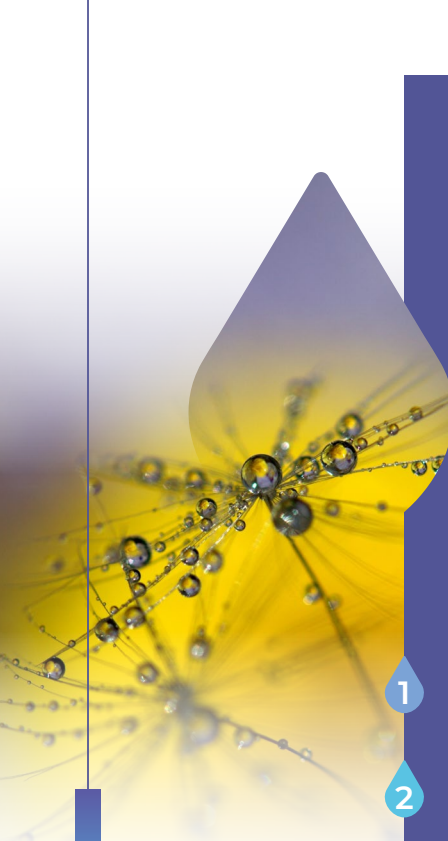## What is **Open Innovation** and a **Living Lab**?

Figure 1
Closed versus Open Innovation: Isomäki, Atte (2018). **Open Innovation - What It Is and How to Do It.** VIIMA - A Hype Innovation Company.

According to the European Commission, the basic premise of Open Innovation, is to open up the innovation process to all active players so that knowledge can circulate more freely and be transformed into sustainable products and services for all. This means that innovation can no longer be the result of predefined and isolated activities but rather the outcome of a complex co-creation process that involves knowledge flows and absorptive capacities from all actors involved across the entire economic and social environment (European Commission, 2016).

Closed Innovation

— Corporate Limit

◊ Internal Idea

Open Innovation

– – Corporate Limit

◊ External Idea

External Collaboration

Alternative Market

MARKET

In the case of **REWAISE** Living Labs, the engagement of external stakeholders is essential for the better uptake of the Living Lab paradigm and buy in from the external supporters and host organisation (all quadruple helix stakeholders).

The deliverable D9.1 - Stakeholder mapping and societal contexts in each Living Lab – includes a visual and preliminary overview of each interviewed **REWAISE** Living Lab's quadruple helix ecosystem, highlighting the essential contacts for:

1 Organisations that the **REWAISE** partners already have a connection with or know;

2 Actors that were mentioned during the interviews conducted under WP9.1;

3 Actors that were added to the stakeholder database through the questionnaires.

In addition, host organisation examples and core stakeholders have been mapped for Midlands, Vigo and Skåne Living Labs under the initial Living Lab mapping canvas interviews. The stakeholder maps in WP9 are now in an initial stage and will be periodically updated and improved alongside with **REWAISE** project.
By using the open innovation scheme, the developed solutions are aimed to be made **scalable and replicable** to other municipalities and utilities across Europe and the world, fostering the **transition towards resilient and smart water services**.

In this context, Living Labs operate as **intermediaries/orchestrators** among citizens, research organizations, companies & government agencies/levels.

Living Labs are open innovation ecosystems in **real-life environments** using **iterative feedback processes** throughout a **lifecycle approach** of an innovation to create **sustainable impact**.

They focus on **co-creation**, rapid **prototyping and testing** and **scaling-up** innovations & businesses, providing (different types of) joint-value to the involved stakeholders.

Within a **wide variety of types of Living Labs** and their implementation, they all have **common characteristics** (**building blocks**).

Benefits
of using the Living Lab methodology

1 CO-CREATING INNOVATION/SOLUTIONS

2 MASTERING THE VALUE CHAIN OF THE GIVEN PROJECT

3 IDENTIFYING KEY STAKEHOLDERS

4 UNDERSTANDING THE BUSINESS OF KEY STAKEHOLDERS

5 RECOGNIZING THE VALUE CREATED FOR THE STAKEHOLDERS

6 DEVELOPING MANAGEMENT CAPABILITIES TO CREATE VALUE FOR THE STAKEHOLDERS

7 PROVIDING STRATEGIC INTELLIGENCE TO GUIDE STAKEHOLDERS INTO VALUE CREATION

8 KNOWLEDGE TRANSFER TO IMPROVE VALUE FOR STAKEHOLDER

The **REWAISE project**, water specific Living Labs contribute to:

A water-smart society

Establishing a common framework of digital innovations to support alternative water management.

⬥ Living Lab projects will help to evaluate the WP3 objectives, by experimenting the common digital platform. The main goal is to establish a common framework of digital innovations that support alternative water management strategies, optimizing existing infrastructure and giving insights in decision making to different stakeholders (operators, authorities, consumers, citizens) in the value chains (urban, rural, industrial, agricultural).

New business models

REWAISE will create new market niches for alternative products obtained in the project and also attract investors to the innovative processes and services in water-smart activities.

⬥ Beyond available governance models of Living Labs, WP8 is specifically supporting this action.

New governance methods

The project will redefine the governance models and provide recommendations that can remove unnecessary legal barriers to innovation in Europe.

⬥ Besides available governance models of Living Labs, T9.3 is specifically supporting this action and already Deliverable 9.1 addressed information about the governance profile of each Living Lab.

Social engagement

REWAISE's nine Living Labs are based on an understanding of their social context toward water-smart communities.

⬥ During the next phase of the **REWAISE** project, the Competency groups (Task 9.2) will extend the learnings beyond D9.1.

Water Living Lab type of activities have been previously mapped within the **Atlas of EU Water-oriented Living Labs** publication by Water Europe and categorized them by water demand zone as:

1. Living Lab Research platforms

2. EU Network platforms

3. Living Lab Project platforms

Figure 2
Water Living Lab type of activities

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They are collectively called as, Water-Oriented Living Labs (WoLLs) and are defined as: real-life, water oriented and demo-type and platform-type environments with a cross-sector nexus approach, which have the involvement and commitment of multi-stakeholders (including water authorities) and a certain continuity (good chance to continue to their existence), and provide a "field lab" to develop, test, and validate a combination of solutions), which include technologies, their integration as well as combination with new business models and innovative policies based on the value of water. Further categorisation of water Living Labs is discussed under chapter 7.3 – Transformation to water specific tools.
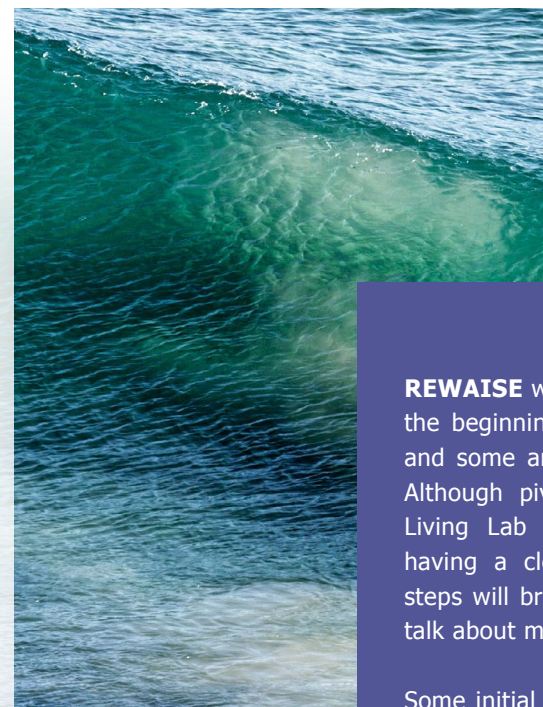
REWAISE water Living Labs are mostly at the beginning of their Living Lab journey and some are still at the initiation stage. Although pivoting between the different Living Lab models is possible anytime, having a clear strategy from the initial steps will bring better results whether we talk about micro, meso or macro level.

Some initial tools and toolkits collected at the end of the handbook are suggested to help setting up the strategic plan for the **REWAISE** Living Labs.

What a
Living Lab is **not**?

Is a Living Lab a real laboratory?

A Living Lab, in contrast to a traditional laboratory, operates in a real-life context with a user-centric approach. The physical and/or organisational boundaries of a Living Lab are defined by purpose, scope, and context. The scope, aims, objectives, duration, actor involvement, degree of participation, and boundaries of a Living Laboratory are open for definition by its participants. A Living Laboratory could thus be established on a street, in a house, within an organization, or include a whole city or industry, depending on the project.
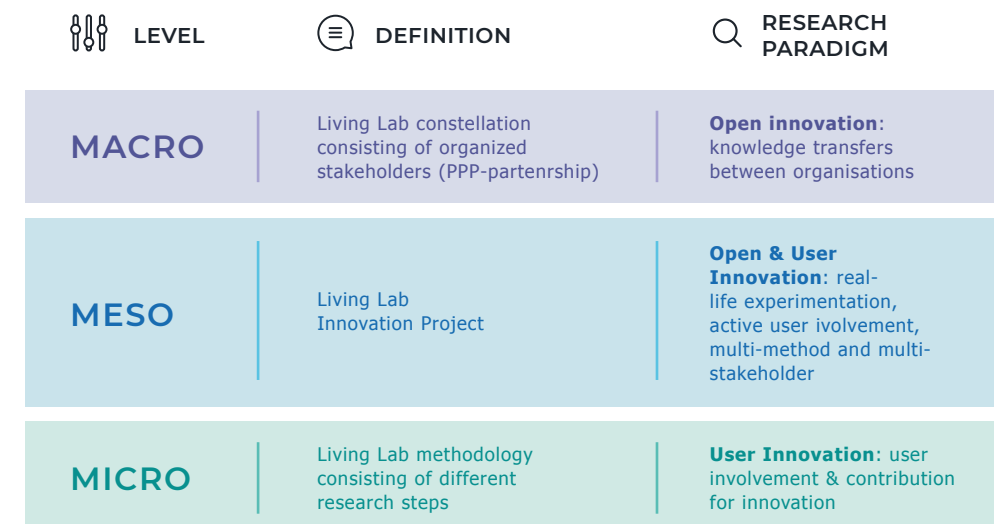
Are Living Labs testbeds?

Living Labs are often confused with early testbeds. The main difference in their philosophy is to turn users, from being traditionally considered as observed subjects for testing modules against requirements, into value creation in contributing to the co-creation and exploration of emerging ideas, breakthrough scenarios, innovative concepts and related artefacts. Hence, a Living Lab rather constitutes an experiential environment, which could be compared to the concept of experiential learning, where users are immersed in a creative social space for designing and experiencing their own future. Living Labs could also be used by policymakers and users/citizens for designing, exploring, experiencing and refining new policies and regulations in real-life scenarios for evaluating their potential impacts before their implementations.

Is a Living Lab a project, methodology or research paradigm?

It is important to make a difference between Living Lab research, a Living Lab project and Living Lab constellations.

To allow a better conceptualisation, Schuurman (2015) developed a three-layered model, consisting of a macro-level with the Living Lab constellation, the meso-level with a Living Lab innovation project and the micro-level with the different methodological research steps. Open Innovation concepts can be used to analyse the macro level, whereas the User Innovation literature could be used on the micro level. Through co-creation, both levels merge on the meso level, resulting in useful contributions to the innovation in development.

Figure 3
The three-layered
Living Lab
model introduced
by Schuurman
(2015)

LEVEL	DEFINITION	RESEARCH PARADIGM
MACRO	Living Lab constellation consisting of organized stakeholders (PPP-partenrship)	**Open innovation**: knowledge transfers between organisations
MESO	Living Lab Innovation Project	**Open & User Innovation**: real-life experimentation, active user ivolvement, multi-method and multi-stakeholder
MICRO	Living Lab methodology consisting of different research steps	**User Innovation**: user involvement & contribution for innovation

True or False?

It has been expressed by **REWAISE** partners and **REWAISE** Living Labs that they struggle to grasp the exact meaning of the Living Lab concept and are uncertain whether their Living Lab would qualify based on the most known definitions. It was suggested to give examples where a constellation is not qualifying as a Living Lab so partners can better categorise their own cases.

For this reason, Living Lab labelling experts from the ENoLL network - Evdokimos Konstantinidis – ENoLL Chairman, Francesca Spagnoli – ENoLL Head of Projects and Capacity Building, Koen Vervoort – ENoLL Network Builder - were asked what the usual areas are where someone can have a wrong interpretation about what a Living Lab is and is not (**T: true**; **F: false**):

F Users are present to provide feedback. However, they are not an active player in the innovation loop.

T A Living Lab is not just an institution; it is an innovation ecosystem that should learn from continuous loops of failures and wins in the constant flux of generating open innovation with its stakeholders.

T A Living Lab does not create value only for one stakeholder. It is closer to a multi-value approach where the question "what's in it for me" can be answered by all the stakeholders.

F A Living Lab is something you run on the side.

T Living Labs need dedicated roles operationally and enough allocated time to make it a success.

F If we co-create, we are "Living Labbing".

T Thinking of a Living Lab as a closed system is the biggest misconception one can make in the open innovation context. The essence of Living Labs is centred around the concept of "sharing is caring". All categories of stakeholders should be involved in the process of co-design, co-developing and co-creating innovation from day zero until the end of the innovation life cycle.

F The value of the Living Lab is in the money. inclusive values for all stakeholders on a societal, economic, and environmental scale.

F A Living Lab is working locally and is linked to a physical space.

T A Living Lab is not a "cold" testbed where an actor of the quadruple helix can test a solution by engaging the other actors of the quadruple helix. It is a process where all the actors of the quadruple helix understand better the other actors and mutually exchange experiences and lessons learnt when involved in Living Lab activities.

T A Living Lab approach cannot oblige the involved actors to follow a strict plan of actions. In Living Labs, the solutions follow the normal behaviour of the experimenters.
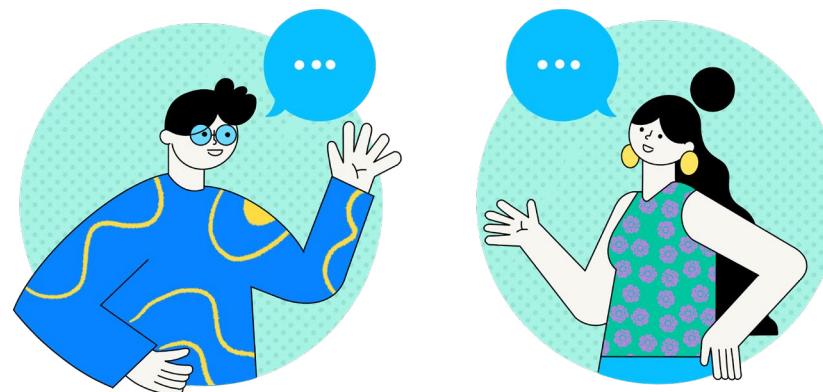
Typologies of **Living Labs** and **Quadruple Helix Engagement**

Living Labs bring experimentation out of companies' Research & Development (R&D) departments to real-life environments with the participation and co-creation of users, partners, and other parties. The study of Leminen et al. (2012) discusses Living Labs as **four different types of networks** characterized by open innovation:

Utilizer-driven
Provider-driven
Enabler-driven
User-driven

Knowing the characteristics of each type of Living Lab will help them to identify which actor drives the innovation, to

anticipate likely outcomes, and to decide what kind of role they should play while "Living Labbing".

As introduced in a previous section: **'What is Open Innovation and a Living Lab'**, there have been classifications made also for the water specific Living Labs (WoLLs): Research driven, Network driven, and Project driven. In addition to that, from the market angle, the following typologies have been identified for **WoLLs**:

	Utilizer-driven	**Provider-driven**	**Enabler-driven**	**User-driven**
PURPOSE	Strategic R&D activity with preset objectives	Strategy development through action	Operations development through increased knowledge	Problem solving by collaborative accomplishments
ORGANIZATION	Network forms around an utilizer, who organizes action for rapid knowledge results	Network forms around a region (regional development) or a funded project (e.g., public funding)	Network forms around a provider organization(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 preset 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 the information that provider gets from the others	Information is not collected formally and builds upon users' interest; 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

	SOLUTION PROVIDER DRIVEN	**PUBLIC (WATER) AUTHORITY** DRIVEN	**PUBLIC-PRIVATE PARTNERSHIP** DRIVEN	**CITIZENS** DRIVEN
	Solution providers-driven Living Labs (short-term and project-based): Companies launching Living Labs to collect data on test-users of new products and services and to develop their businesses	**Public (water) authority-driven Living Labs (long-term and trans-formative):** Public sector actors launching projects thet pursue social innovation and improvements.	**PPP-driven Living Labs (short-term project based or long-term transformative):** Public and private organizations launching Living Labs to co-develop new products, services and solutions by providing their network based on their portfolio and assets.	**Citizens-driven Living Labs (long-term transformative or project-based):** Citizens communities launching Living Labs to solve users' problems and develop a community of interest in the long-term.
OBJECTIVE	Strategic R&D activity with preset objectives	Strategy development through action	Operations development through increased knowledge	Problem solving by collaborative accomplishments
ORGANIZATION	Networks forms around a solution provider, who organizes actions	Network forms around a region or a founded project	Operations development through increased knowledge	Network initiated by users lacks formal coordination mechanisms
ACTION	Solution provider guides information collection from the users to achieve preset goals	Information is collected and used together and knowledge is co-create in the network.	Information is collected for immediate or postponed use; new knowledge is based on the information that PPP partners gets 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

During the first interactive session to be hosted in 2022, besides clarifying the terminologies and categorisations, each **REWAISE** Living Lab will have to position their organisation within a Living Lab type and a Water oriented Living Lab WoLL typology. While some more mature Living Labs show closer connection to certain Living Lab types: i.e., Midlands could likely be going into the direction of a Provider-driven Living Lab, whereas Skåne Living Lab seems to be more an Enabler-driven one, these categorisations must be understood and self-assessed with facilitation by the Living Lab core team itself.

There are visible and clear connections between the WoLLs characterisation and the quadruple helix model representatives: Citizen Driven-Civil Society and Governmental-Public helix, while the remaining two characteristics divert somehow from the helix pillars: Solution providers – Industry and Business and Public-Private – Academia and Universities. In case of strong collaboration with universities: University of Santiago de Compostela and water companies: Aqualia this connection is vivid, such as in Vigo Living Lab.

Industry, Academia, Public Authorities and Citizens are part of the so-called **Quadruple Helix model (QHM)**, where users are placed at the heart of the innovation ecosystem. This means that citizens/users must be considered as actors, not factors, of the innovation process. Actors have their own knowledge base, individual needs, and reasons to contribute to the creation of new products and services. In this vein, co-creation relates to the various levels of involvement of end-users in the different stages of service/product development.

Figure 6
The Quadruple Helix Model (QHM). Source: Finquelievich (2016)

ACADEMIA & UNIVERSITIES

INDUSTRY & BUSINESS

GOVERNMENT & PUBLIC SECTOR
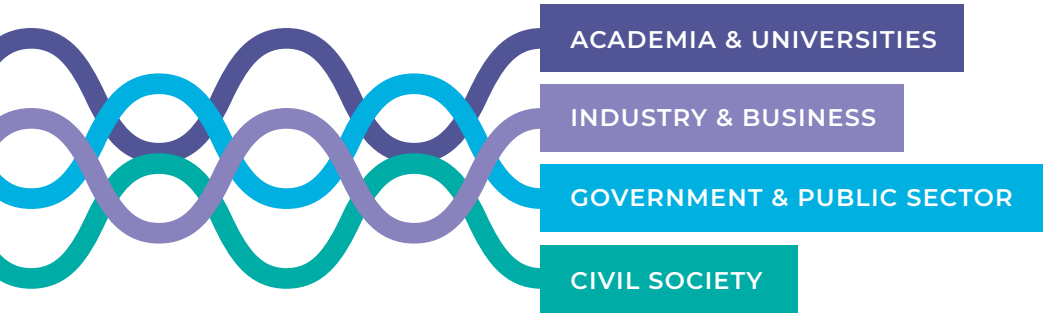
CIVIL SOCIETY

The QHM is an extension of the Triple Helix Model (THM) and was first defined by Carayannis and Campbell (2009) in order to represent the civil society and how they are invited to participate in knowledge and innovation creation.
Both models refer to structures in which innovation is stimulated by co-creation amongst the actors, in which knowledge moves without any restriction (García-Terán and Skoglund, 2018).

As defined by Cavallini et al. (2016, p. 5) both the THM and QHM are "grounded on the idea that innovation is the outcome of an interactive process involving different spheres of actors, each contributing according to its 'institutional' function in society". The four categories are described as follows (Cavallini et al., 2016; Finquelievich, 2016) and the actors of the categories are shown in Figure 6:

Academia & Universities

Historically this sector has always been fundamental in knowledge production and has recently become a contributor to innovation creation as well, thanks to the crucial role that knowledge has gained in development processes. This sector has become a key actor of economic and cultural growth.

Industry & Business

Also known as the commercial market or as the economic category. Frequently a strong actor that leads technological and organizational innovation and usually has the role of generating, producing and distributing products and services. Produces innovations alone or associated with other stakeholders.
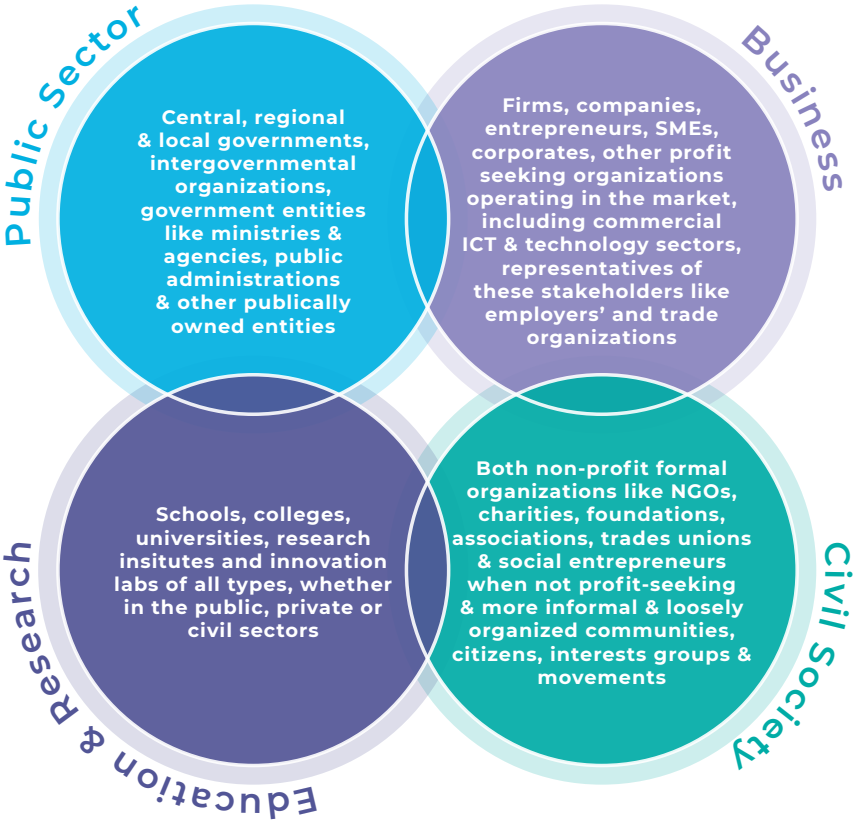
Government & Public Sector

The innovation within this sector is framed within new ideas that create value for the society and as such usually this innovation comes through policies, strategies and initiatives. The role of these institutions is to support both industry and academia for the application of information to development.

Civil Society

Represents citizens or users who provide knowledge about their needs, experiences and expectations. As they are directly affected by any changes made in an urban context, they can provide first-hand information related with the problem that is the subject of the study, becoming innovation users. By including civil society to the THM, thus creating the QHM, the innovation shifts from technical to social.

Figure 7
Quadruple Helix Model (QHM) stakeholder's categories. Source: Finquelievich (2016)

Public Sector
Central, regional & local governments, intergovernmental organizations, government entities like ministries & agencies, public administrations & other publically owned entities

Business
Firms, companies, entrepreneurs, SMEs, corporates, other profit seeking organizations operating in the market, including commercial ICT & technology sectors, representatives of these stakeholders like employers' and trade organizations

Education & Research
Schools, colleges, universities, research insitutes and innovation labs of all types, whether in the public, private or civil sectors

Civil Society
Both non-profit formal organizations like NGOs, charities, foundations, associations, trades unions & social entrepreneurs when not profit-seeking & more informal & loosely organized communities, citizens, interests groups & movements

How to set up a Living Lab

A Living Lab environment should have a good relation with, and access to, users willing to be involved in the innovation processes. Any Living Lab should also have access to multi-contextual environments, as well as high-end technology and infrastructure that can support both the processes of user involvement and technology development and tests.

Each Living Lab environment also needs organisation and methodologies suitable for its specific circumstances. Finally, a Living Lab needs access to a diversity of expertise in terms of different partners that can contribute to the current activities. Equally important are the Key Principles of the approaches applied in Living Lab activities.

Living Lab
Essentials

When setting up a Living Lab, the main components of the constellation need to be walked through multiple times with the core stakeholders and the Living Lab team: Living Lab Manager, Project Manager, Pilot Manager, Panel Manager, Human Interaction specialist, etc. to agree on the initial strategy, operational and business plan. Numerous tools have been developed to facilitate this process, some of which are listed in the External Sources chapter. Gamification has been used widely to tackle complex challenges and to address strategic questions. The Bristol based Living Lab, Knowledge West Media Centre has been co-designing Tips & Tricks resources, a series of thought-provoking recommendations for collaboration, innovation and action since 2014, when they worked with academics and community activists to explore how they could better understand each other's ways of working. When creating the Tips & Tricks for Building a Sustainable Living Lab in the context of **iScape project**, the **discussion-starter cards** have been categorised in the following four themes to help reflect on the work of the Living Lab and explore new perspectives and possibilities:
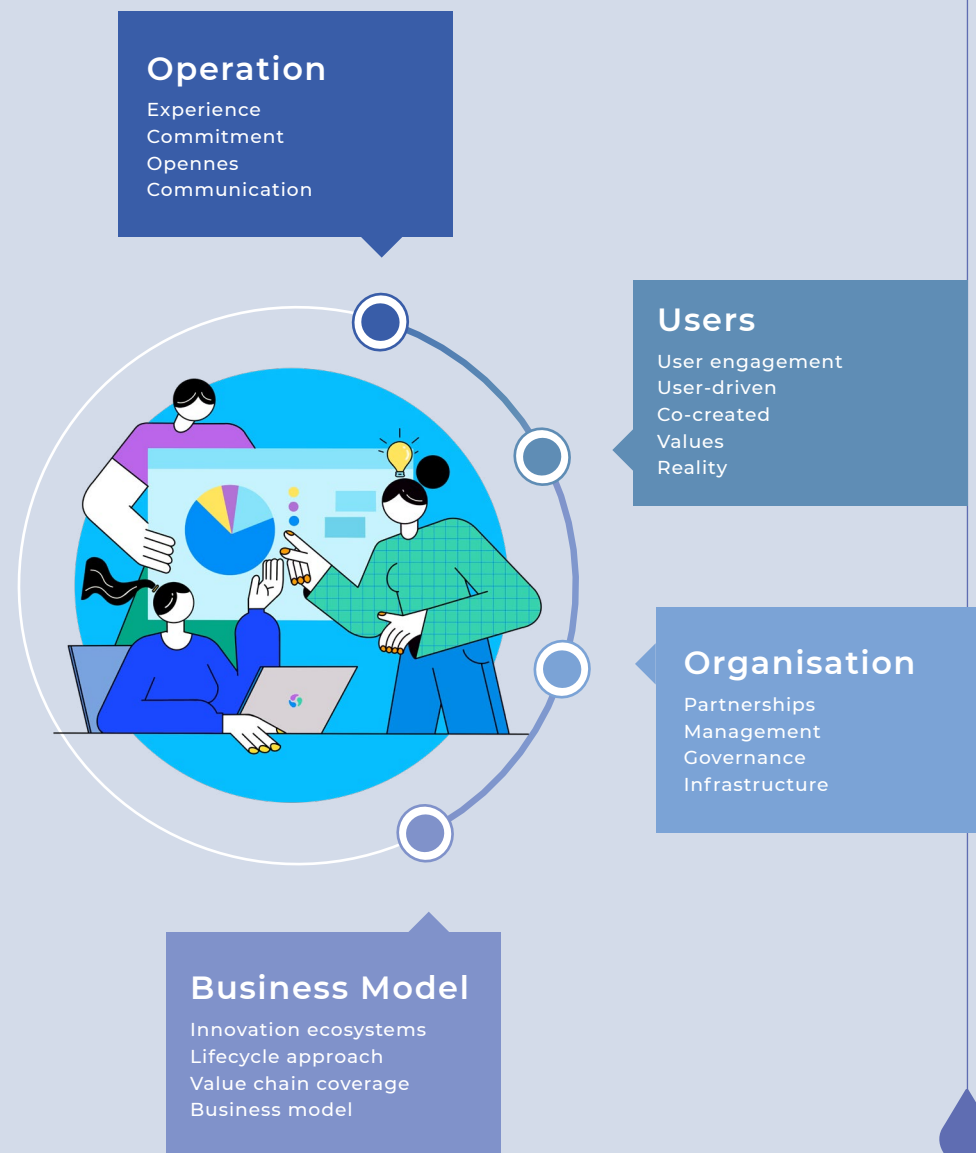
Operations Looking at a Living Lab from an operational perspective offers the possibility to judge not only the Living Lab's experience, maturity of projects and activities, but also their way of developing an open-minded perspective when it comes to all stakeholders from the quadruple helix (academia, industry, government, and civil society). Important aspects in this part of the evaluation are, among others, proof of Living Lab activities, stakeholder engagement and communication strategy, evidence of how the co-creation trajectory has been established, the level of effectiveness of communication and how this is handled to keep a deeply transparent approach among all the stakeholders.

Users

Here, several elements are taken into account such as how users/citizens have been involved and engaged in the development process of new solutions, how intellectual property is managed during the co-creation process, as well as what tools and methodologies are used to engage and co-create with users/citizens. The methods and tools deployed by a Living Lab in their engagement activities are evaluated in terms of their effectiveness. Important aspects in this part of the evaluation are, among others, proof of a structured way and dedicated efforts for active user involvement, a palette of co-creational methods and tools, as well as evidence of co-created values for all types of stakeholders.

Organisation

Investigating the organisational level of a Living Lab creates insights into the foundations of the Living Lab and its strengths, focusing on the resources on the one hand and the management of the Living Lab on the other hand. Important aspects in this part of the evaluation are, among others, proof of infrastructure, equipment, and data, proof of a strong network including different types of stakeholders, as well as evidence of a clear governance model with dedicated and sufficiently supported roles and responsibilities.

Business Model

Creating a viable business model that offers value to all different types of new and/or involved stakeholders is key to the sustainability of a Living Lab. Critical elements to be considered are, for example, funding sources, value proposition, lean approach, impact, purpose, and key metrics. In addition, all the phases of a lifecycle approach should be considered: from ideation to design, experimentation and validation. Important aspects in this part of the evaluation are, among others, proof of integration of the Living Lab operations into innovation ecosystems, SWOT-analysis of a Living Lab, a roadmap for the future, and a value chain approach throughout the operations of a Living Lab.

Operation
Experience
Commitment
Opennes
Communication

Users
User engagement
User-driven
Co-created
Values
Reality

Organisation
Partnerships
Management
Governance
Infrastructure

Business Model
Innovation ecosystems
Lifecycle approach
Value chain coverage
Business model

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Figure 8
Essential factors when setting up a Living Lab. Source: ENoLL (2019)

Key characteristics
of Living Labs

Contemporary definitions of Living Labs can vary, nevertheless the following elements tend to be core features in the innovation hubs. From a methodological perspective, today's Living Labs are networks composed of heterogeneous actors, resources and activities that integrate user centred research and open innovation (Leminen et al. 2012). From the infrastructure perspective, they can be seen as facilities that enable experimentation and co-creation with users in real-life environments (Sundramoorthy et al. 2011).

Orchestration

The Living Lab operates as the orchestrator within the ecosystem to connect and partner up with relevant stakeholders.

Multi Stakeholder Participation

Taking a holistic view on society, involving stakeholders from the quadruple helix model: government, academia, private sector and citizens.
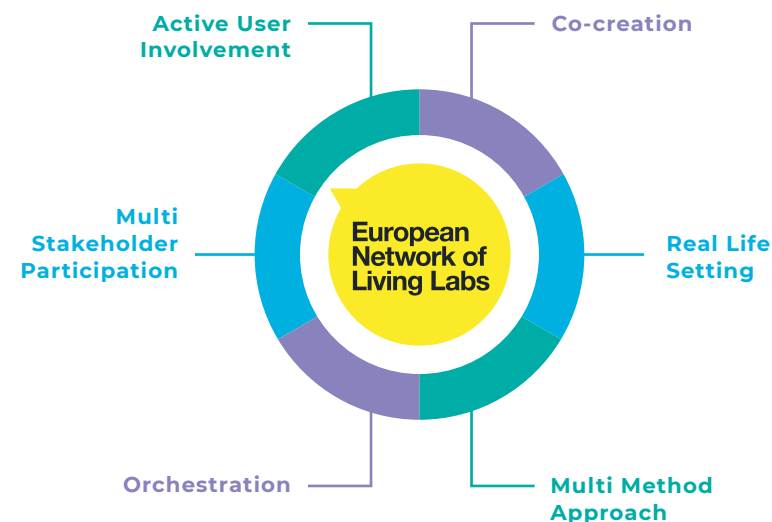
Active User Involvement

A Living Lab involves relevant stakeholders 'actively' in all relevant activities, ensuring their feedback is captured and implemented throughout the whole lifecycle of the innovation.

Co-creation

In a Living Lab values are bottom-up co-created not only for but also by all relevant stakeholders, ensuring a higher adoption at the end.

Real-Life Setting

A Living Lab operates in the real-life setting of the end users, infusing innovations into their real life instead of moving the user to test sites to explore the innovations.
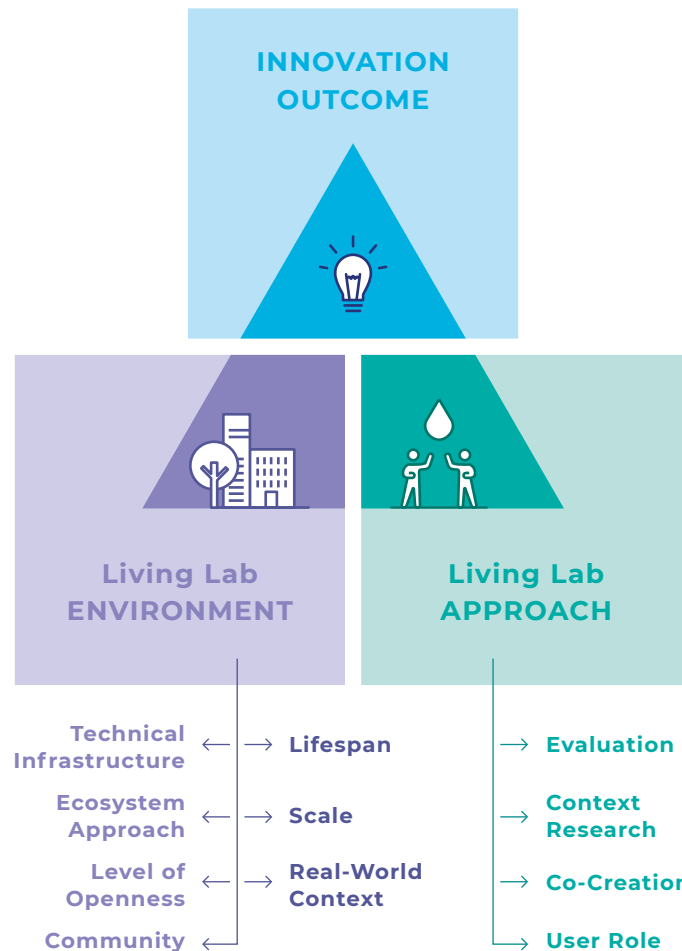
Multi Method Approach

Each Living Lab activity is problem driven. Therefore, the methodological approach towards every individual activity will be selected based on the expected outcomes of the activity and the stakeholders who needs to be involved.

A comprehensive framework was established to analyse the link between the building blocks of Living Labs and their effect on the Living Lab outcomes. The Living Lab Triangle framework can be studied via analysing the following study: **Linking Living Lab Characteristics and Their Outcomes: Towards a Conceptual Framework [3]**

INNOVATION OUTCOME

Living Lab ENVIRONMENT

Living Lab APPROACH

Technical Infrastructure	← →	Lifespan	→	Evaluation
Ecosystem Approach	← →	Scale	→	Context Research
Level of Openness	← →	Real-World Context	→	Co-Creation
Community	←		→	User Role

Governance models
for Living Labs

The governance and management structure reflects on the way that a Living Lab in the strategic or operational level is managed and organised. The domain specific Living Lab activities must be supported by the local governments, decision makers and the private companies. In this regard, the Living Lab vision and scope, risk management, operations, knowledge sharing as well as dissemination activities should be taken into account.

The Living Lab constellation should provide decision-making opportunities to all stakeholders. Involving from the beginning a representative from each stakeholder group will help to form a governance model and an appropriate legal form when the Living Lab is mature enough (i.e. integrated in an association, a charity, cooperative, etc.). The model should mirror a circle of mediators where there are no dominating voices. All stakeholders are providers.

The governance model and key principles implemented by the Living Labs (LL) can entail multiple challenges on the constellation's performance and sustainability:

✳ Governance & Process-related Challenges

— Multi-business collaboration and issue of openess
— Visibility and dissemination of LL activities
— Flexibility and fast changing requirements
— Collaboration and communication with stakeholders
— Financial issues
— Technical and infrastructural challenges
— Integrating social and technical aspects of LL activities
— Keeping user motivated, in the LL projects
— Balance between research and development activities
— Mutual learning

The **below canvas** has been developed to help the Living Lab define the **most fitting governance model** for their needs by answering the following questions:

Who are the participants?

- Public administration
- Research institutions and Universities
- Companies, SMEs
- Society

Who is paying/contributing with what? Including:

- Project manager and other personnel
- Budget
- In-kind

How are decisions taken in the different levels?

- Project strategy
- Project implementation
- Day-by-day decisions

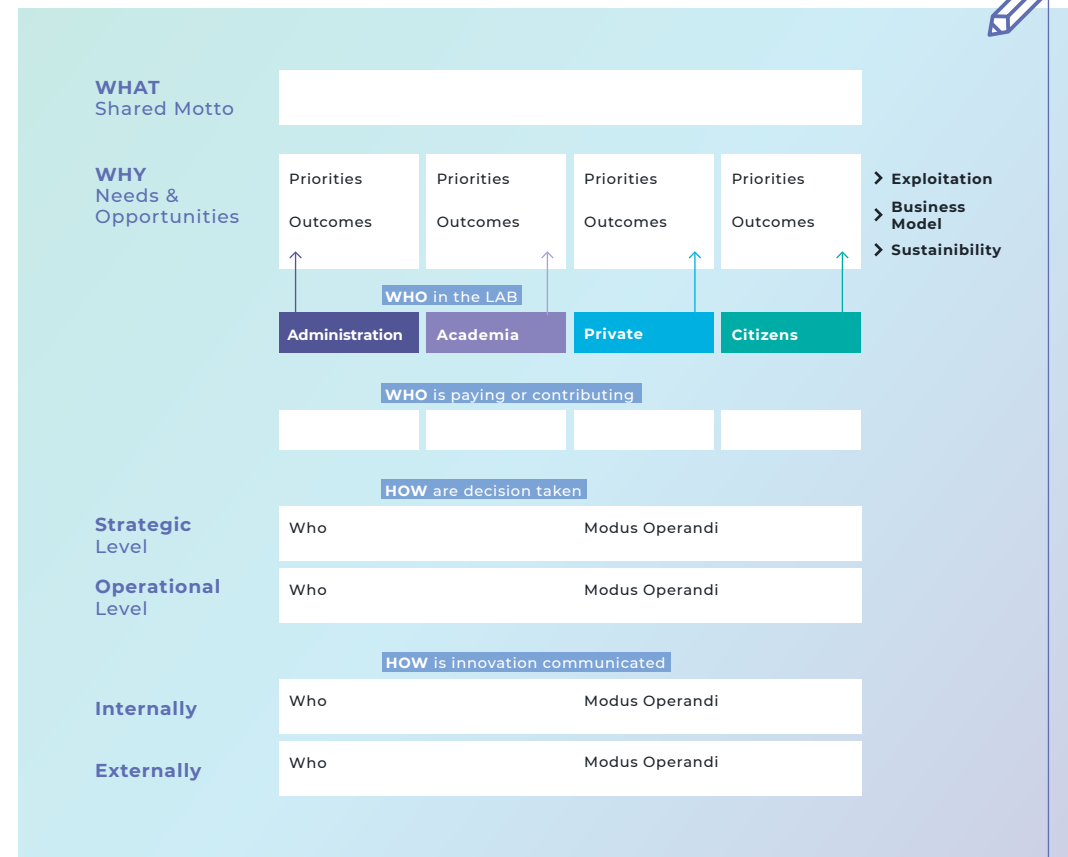## Which is the communication strategy?

- Internal communication
- External communication

Figure 12
Models of Governance Developed by Fernando Vilariño-CVC-UAB-ENoLL

What does each participant get?

- Money
- Social impact
- Prototypes, products or services
- Intellectual property

WHAT Shared Motto					
WHY Needs & Opportunities	Priorities / Outcomes	Priorities / Outcomes	Priorities / Outcomes	Priorities / Outcomes	> Exploitation > Business Model > Sustainibility
	WHO in the LAB				
	Administration	Academia	Private	Citizens	
	WHO is paying or contributing				
	HOW are decision taken				
Strategic Level	Who Modus Operandi				
Operational Level	Who Modus Operandi				
	HOW is innovation communicated				
Internally	Who Modus Operandi				
Externally	Who Modus Operandi				

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Real-life experimentation in Living Labs

> A very specific characteristic of Living Labs is that the activities take place in real-life settings to gain a thorough overview of the context.[6]

The Living Lab (LL) is an open innovation ecosystem serving to provide opportunities for local stakeholders to practice research and to experiment with meaningful improvements for cities and other organizations. Living Labs aim at involving the user as a cocreator.

Hawk et al.
2012

Why co-creating by following the Living Lab methodology?

Typically, especially in technology projects, activities are designed as top-down experiments, benefiting from users being involved as factors rather than actors. There is an increasing recognition that this needs to change so that users become equal contributors and co-creators rather than subjects of studies. The Living Lab approach strives for mutually valued outcomes that are the results of all stakeholders being actively engaged in the process from the very beginning.

Problem Space			Solution Space			Deployment Space	
EMPATHISE		**DEFINE**	**IDEATE**	**PROTOTYPE**	**TEST**	**IMPLEMENT**	**SCALE UP**
Select a Practice	**Integrate stakeholders**	**Uncover barriers**	**Co-design plan**	**Pilot an intervention**	**Evaluate performance**	**Demonstrate the system**	**Exploit the solution**
The context is researched to understand the socioeconomic and cultural setting. User behaviours and social practices are understood.	A People Public Private Partnership (PPPP) Model is used to integrate stakeholders.	Community based social marketing helps to uncover barriers.	A common vision and shared goals enables mash up and then co-design with users and not for the users.	Real-life experimentation is carried out in the field.	Measurement, verification and performance scorecards enable scale up.	Actual system proven in operational enviroment.	Test the solution outside the initial scope. Enlarge the solution, pollinate it and replicate it in other settings.

There are numerous **proven benefits of co-creation**, to mention some of them:

Ideas out of the box

By engaging external audience in the ideation of a project, or upcoming service offerings, the organisation is likely to receive inputs for new, unexpected innovative solutions. Closed innovation is outdated, fresh, customer centric solutions are needed in our rapidly changing every day.

The client becomes your developer

By putting the user in the centre of the co-creation process, the project owner can count on better uptake on the market and de-risk development costs. Not to mention that partly the staff cost becomes outsourced and economise some budget on the headcount.

Products and services better fitting the market

Tailor made clothes will fit better and will be closer to the clients' own taste than just picking a random dress in the retail store. However, it requires you to collect needs in advance, have a plan and try it on several times. This simple example can illustrate well a much more complex exercise, Living Labs are carrying out. In this case, just like with Living Lab projects, the selection of key users is essential, since they will be the ones fine-tuning the end result.

Scaling up from local to global

As a result of allowing a diverse clientele to access the prototype, you have good chances that the marketing is partly running by itself. By experimenting the product with a heterogeneous user pool, you also validate the prototype for international markets, allowing a better match possibility for a wider audience. Cross-border Living Lab services are regular to pre-validate international acceptance of a new product or service.

Trust in the community

Creating a stable community of experimenters takes time in a Living Lab constellation, nevertheless once trust is created, you can count on a solid base of users ready to jump on a new project. The behavioural change does not only happen on a meso scale, but depending on the project a whole macro level, positively affecting policy and decision-making levels.

Removing the silos

With the active use of the quadruple helix setup, communication becomes smoother between the different stakeholder groups. We can often experience the gap between academics and private sector representatives, by offering them a neutral discussion platform for joint co-creation. Through inspiring and/or heated conversations a common message will be elaborated at the end of the process.

Better financial performance

An automatic benefit of co-creation is to save certain costs of the development and de-risk investment. Based in a research study analysing Living Lab projects, the conclusion was that for 1 public euro invested in the Living Lab projects that were evaluated, 1.5€ was realised in follow-up private investment, with an additional 11€ foreseen (Ballon et al. 2018).

What real-life experimentation in a Living Lab entails?

Real-life experimentation is a key requirement for Living Labs as it enables deeper insights in the potential success of innovations.

Reassuring real life setup within a Living Lab project is essential to provide the most reliable feedback from the users. The idea is, to mimic the original environment and circumstances at the venue where the experimentations are carried out. In case the venue is built, it is of utmost importance to have thorough planning and a deep understanding of the real venue's or life situations' overall behaviour and parameters as the setup cost can be significant. To be worthwhile the investment, the least post-productions are aimed.

Living Lab projects in Business-to-Business (B2B) innovation projects have some limitations however for reassuring real-life experimentation. The technological complexity, the need for integration, and the difficulty in identifying testers have been identified as barriers and potential solutions have been suggested by the following study: **Overcoming Barriers to Experimentation in Business-to-Business Living Labs**[7]

Figure 14
Three barriers to experimentation in B2B Living Labs and possible solutions. Source: D'Hauwers et al. (2017)

BARRIER	POSSIBLE SOLUTIONS
1 Process Integration	● Simulate innovation ● Exclude complex technologies
2 Technological Complexity	● Train technological Living Labs researchers ● Exclude complex technologies
3 Tester Identification	● Test with exixting clients ● Conduct one-on-one field study

Why the **iterative process is so important** for Living Labs?

The iterative innovation model proposes that innovation activities are repeated rather than follow phases. Although Pierson and Lievens (2005) propose that Living Labs are cyclic by nature, other scholars (e.g., Bergvall-Kåreborn & Ståhlbröst, 2009) provide a guideline for the iterative Living Lab. Building on this guideline, Ståhlbröst and Bergvall-Kåreborn (2008) stress that iteration and interaction between phases foster innovation development, and Holst, Ståhlbröst, and Bergvall-Kåreborn (2010) add that openness improves and fastens innovation.

The iterative process of understanding citizens' needs and ideas has different objectives when referring to environmental projects

1. Enhance the understanding the need for the citizens' participation in the experimentation projects.

2. Build citizens' knowledge about the potential solutions and different viewpoints.

3. Value the design decisions throughout the Living Lab experimentation process. Citizens' are empowered because they can follow how their voices are heard, from an idea until the final developed solution.

During the iterative stages in large scale projects besides Living Labs, demonstrations are also appearing where the testing/piloting stage of Living Lab activities are partly integrated into demonstration activities.
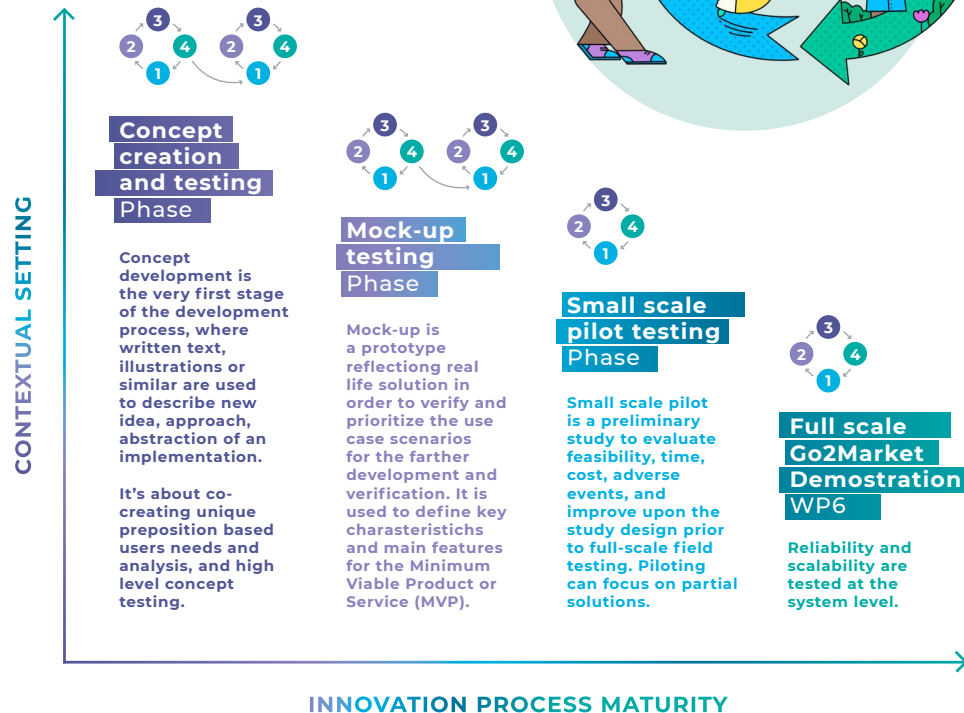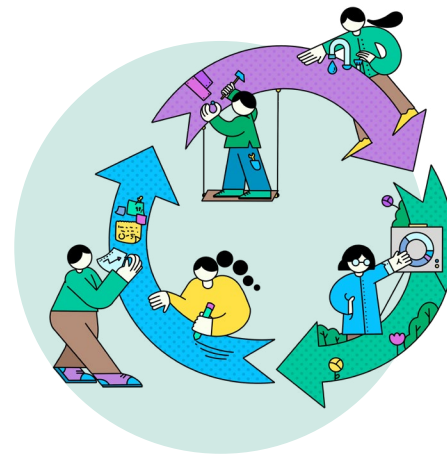
In **CIRC4Life project**, each stage of an innovation process is implemented based on iterative rounds consisting of four steps: explore, co-create, implement, and evaluate. The number and duration of the iterations varies depending on the development task. The rounds length depends on their mission and scale. Consortium meetings have been used as a milestone to evaluate the results of each round, and adjust Living Lab plans.

Figure 15
Iterative project timeline from **CIRC4Life project**

CONTEXTUAL SETTING

Concept creation and testing Phase

Concept development is the very first stage of the development process, where written text, illustrations or similar are used to describe new idea, approach, abstraction of an implementation.

It's about co-creating unique preposition based users needs and analysis, and high level concept testing.

Mock-up testing Phase

Mock-up is a prototype reflectiong real life solution in order to verify and prioritize the use case scenarios for the farther development and verification. It is used to define key charasteristichs and main features for the Minimum Viable Product or Service (MVP).

Small scale pilot testing Phase

Small scale pilot is a preliminary study to evaluate feasibility, time, cost, adverse events, and improve upon the study design prior to full-scale field testing. Piloting can focus on partial solutions.

Full scale Go2Market Demostration WP6

Reliability and scalability are tested at the system level.

INNOVATION PROCESS MATURITY

04

Building a Living Lab

Understanding the strengths, values and weaknesses of each Living Lab is critical for its survival and sustainability. Given that the methodology has been used for a longer time span, numerous tools - tips and tricks cards, games, templates, strategies, ideation workshop formats -, case studies and guidelines are available to assist those landing in their new co-creation journey. Insufficient knowledge of the concept, lack of planning, negligence of formal protocols and a missing business model often led to failures when setting up a Living Lab. The first edition of the REWAISE Living Lab Online Handbook offers insight into a draft Living Lab mapping canvas, a self-assessment tool and preview of the transition to water specific tools. The canvas and self-assessment will be reviewed with the REWAISE Living Labs for the extension of the handbook, including water Living Lab case studies.

The Living Lab Mapping Canvas

The Living Lab mapping canvas has been developed through an iterative process, just like all Living Lab projects are built. In this current edition pieces of it are being shared preliminary and the final version will be developed in consultation wiht the **REWAISE** Living Labs. The canvas is a strategic tool used for visually developing or displaying a Living Lab strategic and operational model. The final template will help determine and align the key Living Lab activities and their relationship to the Living Lab's value proposition. As a preliminary analysis, three Living Labs have been selected from the three **REWAISE** Living Lab hubs based on their maturity. These Living Labs went through the canvas as early adopters to understand the strengths, values, weaknesses and to provide feedback to iterate the next edition of the canvas.

Figure 16
Please request authorization to use part or the entire canvas ©ENoLL.

MICRO
MESO
MACRO

0 PURPOSE

WHY
are we doing what we are doing in first place?

1 VISION & SCOPE

WHAT
is the vision and scope of the Hubs /LLs?
SCOPE = The extent of the area or subject matter that something deals with or to which it is relevant. VISION = What do you aim to achieve in the long-run

2 STAKEHOLDERS & EXTERNAL ROLES

FOR WHOM
What quadruple helix stakeholders are you already in touch with? Please list top 5

3 THE URBAN CONTEXT

WHERE
will the solutions will be tested / implemented?

4 HOST ORGANIZATION

WHO
is your host oganization? e.g. public body - municipality, private body, research institute

5 PEOPLE & INTERNAL ROLES

WHAT
are the roles you have in the team?

6 STRENGHTS & ASSETS

WHAT
skills do you have in the team that will help you achieve your goals? What interpersonal / soft skills do you have? What are you good at, individually and as a team?

7 CHALLENGES, WEAKNESSES & DEVELOPMENT AREAS

WHAT
are the weaknesses you have, individually and as a team? What your teammates should know about you? What are some obstacles you see ahead of you that you are likely to face?

8 FINANCING & BUSINESS MODELS

WHAT
does the Water Living Lab maintenance plan look like? Is it appropriate to support long-term commitment? Who are the financers? In addition, what do they bring and who will pay you and for what?

9 COMMUNICATION STRATEGY AND CHANNELS

WHAT
What communication channels do you already have (e.g. communication strategy, social media, website, newsletter, etc.) and are you planning. on establishing any new communication channels?

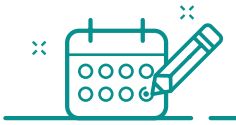**10** NEEDS & EXPECTATIONS (Living Lab Framework)

WHAT
do you need to be successful? How can others support you? What are your expectations in terms of e.g. knowledge transfer, type of assistance, others?

11 GOVERNANCE

WHO
The governance and management structure reflects on the way a Living Lab in the strategic or operational level is managed and organised. All Water Living Lab activities must be supported by the local governments, decision makers in the cities as well as the politicians.

12

CALENDAR
You should map you yearly activities ahead of time and match with your strategic plan. Please add all events - if existent - that you are already planning / anticipating, where you will be engaging with stakeholders or communicate externally.

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY
DATE OBJECTIVE(S) STAKEHOLDERS INVOLVED	DATE OBJECTIVE(S) STAKEHOLDERS INVOLVED	DATE OBJECTIVE(S) STAKEHOLDERS INVOLVED	DATE OBJECTIVE(S) STAKEHOLDERS INVOLVED	DATE OBJECTIVE(S) STAKEHOLDERS INVOLVED	DATE OBJECTIVE(S) STAKEHOLDERS INVOLVED	DATE OBJECTIVE(S) STAKEHOLDERS INVOLVED

Case History

The above illustration demonstrates the readable version of the Living Lab Mapping canvas. The following **REWAISE**'s Living Labs were interviewed based on ENoLL canvas approach.

① Preliminary mapping **with Skåne Living Lab:**

0 Purpose

- Skåne Living Lab's goals are three folded: to reach more efficiency in the usage of drinking water, to provide continuity on water management, recycle and to handle stormwater.
- Together with the citizens present in the pilot areas and organisations participating in their stakeholder map, they aim equally to reach stronger decision-making power by using matchmaking and networking amongst others.
- The Living Lab's ambition is to become more independent from the private sector in case when stormwater occurs, as the current offers are not sufficient for VA SYD, especially in the case of reuse.

2 Stakeholders

- The core stakeholders highlighted by the Living Lab managers include: third parties as cities of Malmo and Lund; property owners and real estate developers; consumers who are the Living Lab's customers and other nearby municipalities, such as Helsingborg using the sharing cities concept.

1 Vision

- In the centre of Skåne Living Lab's vision, decreasing drinking water consumption takes a central stage.
- One of the strategies to reach this, is to follow the sharing concept (Sharing Cities), by creating a collaborative system between the buildings and making them sustainable, using community engagement.
- The Living Lab got inspired by the energy provider EON by using local grids, prices adjusted to specific usage time slots, which method could be applied by VA SYD during specific periods.

3 Urban Context

- The two pilot areas are: Brunnshög with a newly built living unit and Sege Park including both refurbished and new houses. The areas both have new water networks with separate pipes for sewage/stormwater/drinking water.

4 Host Organisation

- The Living Lab is hosted by the municipalities of the city of Malmo and city of Lund.

5 People & Internal Roles

- Skåne Living Lab has a dedicated team to support operations of the organisation and realise its vision.
- The fulfilled positions are Technical Manager, Urban Living Lab Manager, Pilot Managers, Project Managers, Communication Manager and Senior Advisor.
- Further information about the organisation ca be found via the official D9.4 deliverable and https://www.svensktvatten.se/va-chefens-verktygslada/va-organisationen/

6 Strenghts

- The stakeholder groups have been engaged closely from the early days of the Living Lab's existence, including highest-level decision makers.
- This has been engineered purposely by a senior experienced programme coordinator, who created clear operational plan and strong internal communication for the Living Lab.
- The teams are working in a democratic and co-creative way, with shared responsibility, as a result creating a motivational and trusted environment.

7 Challenges

- The outdated regulations of stormwater management slow down the innovation perspective of such project.
- The timing of important project milestones arises complex questions:
- Public sector representatives do not necessarily follow the outcome of R&D and innovation projects, decisions can be made faster than a real experimentation would be carried out.
- The private sector stakeholders, in this case builders work on a timeline as per their services agreement stipulates.
- The Living Lab team REWAISE is not the only unique running project.

8 Financing & Business Models

- The financial means of the Living Lab are covered by the municipality from local taxes and the European Commission co-funding. The project budgets are defining the Living Labs' activities.

9 Communication

- Skåne Living Lab works with a written communications strategy that is updated regularly, based on structured communication channels and dedicated personnel.
- The team uses a website and LinkedIn channel, and newsletters are sent every 3 months to the cities, stakeholders, and citizens.
- It took approximately a year for the communications team to get to a mature level of communication tools usage and techniques on a common platform with the cities.

10 Needs & Expectations

- While local level communication works fluently, the hub level cooperation and communication with the Polish and Czech continental hub sites need to be structured and strengthened.

11 Governance

- The steering committee is managing the advisory and strategic activities of the LL.

2 Preliminary mapping **with Vigo Living Lab**

0 Purpose

Vigo Living Lab's objectives are two-folded:
- To demonstrate resource recovery from wastewater streams
- Create new service assignments by offering pre-validation services.

1 Vision

- The Living Lab project's main mission is to offer better water management and recovery of nutrients from wastewater.
- By implementing and upscaling the developed technology in other locations, the goal is to achieve significant impact for a lower energy footprint.

2 Stakeholders

Vigo Living Lab functions in a triple helix setup:
- based on a PPP collaboration, having Zona Franca de Vigo the public owner of the area representing a governmental institution and Aqualia private company who is the promoter and host of the Living Lab.
- the research pillar of the triple helix is represented by the University of Santiago de Compostela and the University of Valencia
- In addition, WE&B as a social facilitator joins the Living Lab project.

There is no direct representation of citizens (yet) in the project and Living Lab constellation.

3 Urban Context

- The primary focus is on Spain and the city of Nigran at this stage of the pilot and the Stellantis plant in Vigo.
- Decentralized wastewater sanitation brings new opportunities for hybridizing industrial/urban and energy/water/waste sectors.
- Soon, the demonstration plant is targeting other zones to join, that could use the same technology. In the selection process it is essential to have similar climate environment.

4 Host Organisation

- There is an agreement between Aqualia and Zona Franca de Vigo to operationally run and host the Living Lab.

5 People & Internal Roles

- The current team includes an Operational Manager, a Project manager, Visiting researchers and an Investigator/Operator. In
- addition, University of Santiago de Compostela to be the visiting researchers and WE&B to be the operator of the Living Lab. Further identification of Living Lab roles is yet to happen for a sustainable future of the Living Lab. Further information about the organisation ca be found via the official D9.4 deliverable

6 Strenghts

- The host of the Living Lab and owner of the area is a strong and genuine promoter of sustainability commitments (with certificates such as BREEAM), the team is well connected and is working successfully together. The main client has been engaged from an early stage of the project, therefore there is a good perception of achieved results and the scale-up phase can be already experienced.

7 Challenges

- It is challenging to reach the appropriate technology readiness level and cost/benefit ratio to make the solution attractive for external clients and reach their buy in.
- During this process the engagement of the final client would help to win their interest, but it is difficult to get hold of the right decision level, especially external big companies' or other cities and rural communities' representatives.

8 Financing & Business Models

- Vigo Living Lab and communication activities will be financed by its hosts. The goal is to create a business model based on the developed technology and its replication, interlinking different sectors (water, energy, waste, industry, etc.) need to be validated and demonstrated.
- The living lab scale up into an industrial solution would include a B2B agreement between the affected stakeholders, which will help the Living Lab become self-sustaining from its client's base.

9 Communication

- The current communications strategy functions across the project. Selected messages are shared to the Living Labs' stakeholders and audience.

10 Needs & Expectations

- Easing up regulations and finding waivers for certain barriers would help to speed up the innovation potential of REWAISE Living Lab alike constellations, as was introduced by Prof. Aurora Seco of UV as leader of innovation deal.
- Mass stakeholder board influence from the right decision level and providing direct policy recommendations can help to achieve some flexibility.

11 Governance

- There is no formal Board set up yet.

3 Preliminary mapping **with Midlands Living Lab**

0 Purpose

Midlands Living Lab's objectives are two-folded:
- To save and reduce water loss, by using bioenergy and waste recovery on a local level.
- Educating customers on water consumption.

1 Vision

- Midlands Living Lab aims to set up water and wastewater networks in the area, in a circular economy setup.

2 Stakeholders

- Midlands Living Lab is functioning in a quadruple helix setup, involving universities and other research institutions, private, public water networks, government bodies and the policy level.
- Through the Living Lab activities, the voice of customers is brought in.

REWAISE
Resilient Water Innovation for Smart Economy

3 Urban Context

◆ The Living Lab is located in central England, Coventry.
◆ The core project partners are Severn Trent (STW), Organics (ORG), Coventry University (COVU) and Environmental Monitoring Solutions Ltd (EMS)

4 Host Organisation

◆ Midlands Living Lab is hosted by Severn Trent Water, which is a private water company in the United Kingdom.

5 People & Internal Roles

◆ At the Living Lab, Project Manager and Technical Lead positions are filled in currently. The promotional activities are carried out by an internal communications team. The Living Lab staff belongs to Severn Trent Water's innovation department.
◆ On the academic helix pillar the core partners are Coventry University, University of Exeter, KTN/KTP Knowledge Transfer partnerships, University of Sheffield, Innovate UK KTN.

6 Strenghts

◆ With the setup of Midlands Living Lab, a new operational structure was set up at Severn Trent Water which improved the efficiency of the organisation.

7 Challenges

Two major challenges were identified by the Living Lab at this stage of the project:
◆ The new constellation brought operational tasks where the new staff is adjusting to the projects' needs.
◆ Strengthening the REWAISE Atlantic hub level communication could improve knowledge transfer capacity.

8 Financing & Business Models

◆ Midlands Living Lab is financed by its host and the European Commission co-funding allocated to REWAISE project.

9 Communication

◆ Severn Trent (STW) have both external & internal communication teams. The external communication team create and oversee all communications shared publicly.
◆ The Innovation, internal, communication team receive input about the project and share this internally within the business through company news posts, large screen displays etc.; and prepare, in liaison with the external comms. team, articles for publication.
◆ In addition, there is a dedicated Programme Manager assigned for better information flow.
◆ Currently there are quarterly meetings scheduled between the hubs and the labs as well.
◆ Communication towards external stakeholders has some limitations due to confidentiality measures of some innovative technologies or new technical solutions.

10 Needs & Expectations

◆ Based on the current steps the work is going as planned. Challenges are mainly expected at the time of the pilots, where more internal support will be needed.

11 Governance

◆ The Living Lab is managed by its host, its Living Lab governance structure is yet to be defined.
◆ Overall governance, as with internal, Innovation, governance is to support project managers in delivery of their projects, validating new processes and technologies, against STW's feasibility, desirability, and viability requirements, ensuring the continued provision of wholesome drinking water and safe removal and treatment of sewage.

REWAISE
Resilient Water Innovation for Smart Economy
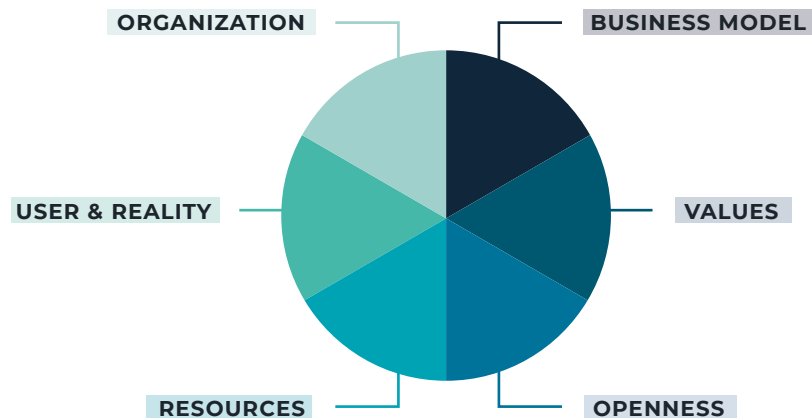
Self-assessment
for Living Lab

Figure 17
Maturity
components of
Living Labs ©ENoLL

In the previous chapters, it has been presented that different definitions for the term Living Labs exist. What is common in all are, the involvement of users as co-creators on equal grounds with the rest of the participants and experimentation in real world settings (Almirall, Lee and Wareham, 2012).

These definitions are rather complementary than contradicting, and therefore it can be concluded that Living Labs are both practice-driven organisations that facilitate and foster open, collaborative innovation, as well as real-life environments or arenas where both open innovation and user innovation processes are studied and new solutions are co-created (Leminen, Seppo & Westerlund, Mika & Nyström, Anna-Greta, 2012).

For organisations on their Living Lab path, working towards a sustainable future, a self-assessment exercise helps to understand where they are standing on their maturity scale and identify strong and weak points:

Organization

Tackling the operational setup of the Living Lab: management and governance structures.

User & Reality

Assessment of end-user engagement, and realization of real-life setup for the Living Lab projects and experimentations.

Resources

Different kinds of resources within the Living Lab: infrastructures, materials, tools etc.

Openness

Applying the open innovation principle, the inclusion of. all quadruple helix stakeholders.

Value

Impact realized by the Living Lab by running its programmes and projects, monitoring the value created for its stakeholders.

Business Model & Plans For The Future

Operating business plan of the Living. Lab, including sustainability measures, cash flow and SWOT analysis.

Key Evaluation Indicators

Evaluation committee members take into consideration the following indicators to assess the degree of maturity of a given Living Lab.

- Organisation, management and governance of the Living Lab
- Experience in Living Lab operations
- Interest and ability to participate in regional, national and international innovation systems
- Users and people engagement approach
- Application of iterative Living Lab process and usage of real-life settings
- Quality assessment of used methods and tools
- Roles and responsibilities of staff and their qualification
- Internal and external communication strategy
- Access to infrastructures and availability of equipment
- Openness of innovation processes and collaborations
- Intellectual property rights and fair data management
- Values generated for stakeholders by co-creation activities
- Understanding and coverage of the value chain
- Business model and access to funding
- Sustainability plan, SWOT analysis

For the **REWAISE** specific assessment to be prepared will be aligned with WP7 leader (CETIM) for stakeholder assessment.

Once the Living Lab mapping activity is walked through by the management team and the self-assessment is covered, the Living Lab team is ready to work on their action plan towards the future. It is included in the 2022 activity roadmap to help the **REWAISE** - and potentially WATER-MINING and B-WaterSmart - Living Labs complete this activity including the water specific categorisation.

Transformation to
water specific tools

Living Labs can combine European vertical specialisation domains (health, smart cities, environment, education etc.) with horizontal and territorial specialization.

Based on the mapping activity realised in the context of the Atlas of the EU WoLL, the research found the following shared characteristics of the Water Oriented Living Labs:

- Demo-type and platform-type research and innovation settings, with context specific needs and enabling conditions
- Water-oriented interventions with a cross-sector nexus approach in real-world and/or realistic environments
- Proactive learning and innovation ecosystem with R&D continuity and reproducibility
- Open and local multi-stakeholder governance structure with democratic control systems

Based on the mapping of 105 WoLL research sites (in 92 organizational structures), 12 are network platforms, 26 are Living Lab project-platforms, and 67 are Living Lab research platforms. 71 water Living Labs have the maturity levels of between 2.5 and 3 out of 4.

The next edition of the **REWAISE** Living Lab Handbook aims to provide case studies, tools and methods for lower-level maturity Living Labs to reach sustainability level 4 maturity:

Level 1

Preparation of Living Labs Development

- Stakeholders involvement
- Vision building
- User community building
- Innovative scenarios and use cases
- Requirements analysis and definition of services

Level 2

Limited scale experimentation based on user experience

- Mock-up development
- User experience and idea generation
- Limited applications development and testing based on ideas
- Limited user interaction and user experience
- Integration of tools
- Limited proof of principle experimentation at reference laboratory
- New concepts and ideas

Level 3

More extensive application development and field experimentation

- Experimentation and validation with users
- Full-scale software development
- Integration of tools and services
- Sound methods for extended testing and validation
- LL field trials preparation and initiation
- Training and demonstration capabilities

Level 4

User-led co-creation & Living Lab business model operation

- LL field trials extended to full user experience
- Experimentation with new ways of collaboration
- Evaluation of LL as innovation environment and impact on rural development
- Functioning LL business model and innovation system
- LL as Service provison to stakeholders

Figure 18
Maturity levels of water Living Labs @. Source: Water Europe, Brussels, 2019.

In addition, while the basic principles have been provided on self-assessment criterions for Living Labs under the previous chapter, a water Living Lab specific labelling methodology is under preparation to be experimented by the **REWAISE** Water Living Labs and gradually the CIRSEAU cluster: firstly **REWAISE**, secondly Water-Ming and B-Water Smart and thirdly, Wider Uptake and ULTIMATE.

Through direct interviews and joint workshops common findings will be shared to the Water Living Lab communities:

While the basic principles have been provided on self-assessment criterions for Living Labs under the previous chapter, a water Living Lab specific labelling methodology is under preparation to be experimented by the **REWAISE** Water Living Labs and other twin projects: **Water-Mining** and **B-WaterSmart**.

Water-Mining project aims for the creation of two living labs in Rotterdam (the Netherlands) and Almeria (Spain) which will offer an engaging environment around the different innovations demonstrated. For them the **REWAISE** Living Lab handbook can become helpful in the setup phase, and they will have the opportunity to consult with the peer Living Labs through joint workshops and activities.

Findings from B-WaterSmart projects' D4.1 deliverable, which seeks to provide a general manual of data specifications and acquisition, from a technical and a socio-economic view will be reused in the **REWAISE** context. The report is focusing on Water-Energy-Waste-Materials from each project Living Lab, to define circular opportunities for Living Lab owners and their stakeholders.

When working towards the final edition of the handbook, findings from the cross-cutting **REWAISE** work packages work packages - WP7 and WP8 - as KPI indicators, SROI (Task 9.6), Business models (WP8), Competency groups (TASK 9.2) , and more will be used and referred within the upcoming workshops.

ENoLL

The European Network of Living Labs (ENoLL) is an international non-profit association which aims to promote and enhance user-driven innovation ecosystems, more precise the Living Labs concept globally. ENoLL focuses on facilitating knowledge exchange, joint actions and project partnerships among its historically labelled +480 members, influencing EU policies, promoting Living Labs and enabling their implementation worldwide.

Competency Groups (CGs)

In REWAISE three CGs will be established to help facilitate a genuinely participatory and 2-way wisdom dialogue between parties. CGs are an innovative method for understanding environmental knowledge controversies where they impact upon multiple stakeholders and require collaborative actions.

Living Labs

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

Living Lab labelling

To ensure high value-added exchanges within the network and quality outputs from ENoLL certified Living Labs, membership is limited to those organisations able to demonstrate the consistent use of a Living Lab approach. ENoLL Living Labs undergo a structural and methodological quality assessment on their maturity as an innovation ecosystem. This seal of quality makes ENoLL Living Labs the global standard on user-driven innovation.

Open Innovation

The term Open Innovation (OI) was coined in 2003 by Henry Chesbrough, is the opening of the innovation process. Once new products have been developed secretly and behind closed doors, today a targeted integration of customers, researchers, suppliers and partners into the innovation activities takes place.

REWAISE Living Labs

REWAISE is structured as nine Living Labs grouped into three main European hubs according to hydrological resources, needs and also geography and climate.

The **three main regions** selected are:
- 🜂 **MEDITERRANEAN** (Levante, Salamanca, Extremadura)
- 🜂 **ATLANTIC** (Galicia, Midlands, Northern - Cantabria/Asturias - region)
- 🜂 **CONTINENTAL** (Poznan, Ostrava, Skåne)

The **nine Living Labs** address:
- 🜂 Different water sources: surface, rain, ground, sea, brackish water and municipal and industrial wastewater streams.
- 🜂 Various water users: urban, rural, industrial, and agricultural.
- 🜂 Different raw materials, nutrients, bioproducts and bioenergy recovery.
- 🜂 Five main governance models: Public Company, Delegated Public Management, Direct Private Management, Delegated Private Operation and Concession.

Stakeholder

Any individual or group who has an interest in the outcome of an action provided by an organisation or a company.

Quadruple Helix model

The Quadruple Helix Model (QHM) of innovation recognizes four major actors in the innovation system: science, policy, industry, and

Glossary

REWAISE
Resilient Water Innovation for Smart Economy

society. In keeping with this model, more and more governments are prioritizing greater public involvement in innovation processes.

Triple Helix mode

The Triple Helix model (THM) of innovation refers to a set of interactions between academia (the university), industry and government, to foster economic and social development, as described in concepts such as the knowledge economy and knowledge society.[4]

Users

Users bring their own specific wealth of knowledge and expertise to the collective, helping to achieve boundary spanning knowledge transfer. Users can also be involved and have influence on innovation processes for democracy reasons, learning reasons or economical reasons. Adding to that is the emerging trend of customers and users who want the opportunity to influence products and services. In a Living Lab setup, users change roles from passive consumers to active prosumers of content. The users of the **REWAISE** Living Labs are considered to be the ones that will be using the smart water solutions.

Water Europe

Initiated by the European Commission (EC) in 2004 as the European Technology Platform (ETP) for water with the name WssTP. This ETP status was renewed by the EC in 2013 in line with its ETP2020 strategy. In 2007, Water Europe (WE) was transformed into a member-based multistakeholder platform under Belgian law. Since then, the membership and activities of the organisation have continuously grown and evolved in line with its ambition to represent the whole value-chain of water and achieve a European Water-Smart Society.

Water-Oriented Living Labs

Water-Oriented Living Labs (WoLLs) are real-life, water oriented and demo-type and platform-type environments with a cross-sector nexus approach, which have the involvement and commitment of multi-stakeholders (including water authorities) and a certain continuity (good chance to continue to their existence), and provide a "field lab" to develop, test, and validate a combination of solutions as defined in the SIRA, which include technologies, their integration as well as combination with new business models and innovative policies based on the value of water.

External
Resource

- **Atlas-of-the-EU-Water-Oriented-Living-Labs**
- **CIRC4Life project**
- **Co-creative workshop book**
- **ENoLL Learning Lab and Capacity Building**
- **FISSAC Living Labs**
- **Living Labs**
- **Living Lab HANDBOOK FOR URBAN Living LabS DEVELOPING NATURE-BASED SOLUTIONS**
- **Living Lab services for business support and internationalisation**
- **Short History of Living Labs- Research and Policy context**
- **U4IoT LivingLabMethodology Handbook**
- **The Living Lab Guidebook for cities fighting against air pollution**
- **The Living Lab Methodology Handbook**
- **Tips and Tricks**
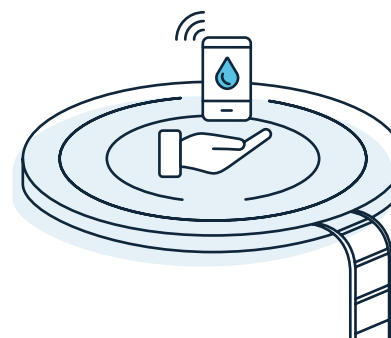
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The
Consortium

24 research and water industry entities working together to create a new "**smart water ecosystem**"; mobilising all relevant stakeholdres so that **society can embrace the true value of water**; and reducing freshwater and energy use; resulting in a carbon-free, sustainable hydrological cycle to transition into a resilient circular economy.

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