

# D5.1.1. LIVING LAB METHODOLOGY

InnovaMare project

Blue technology - Developing innovative  
technologies for sustainability of Adriatic Sea

WP5 - Cooperation in innovation on robotic and  
sensors solution (TT) – pilot actions

## Project References

**Call for proposal 2019 Strategic – InnovaMare**

**Project number:** 10248782

**Work package:** WP5 Cooperation in innovation on robotic and sensors solution (TT) – pilot actions

**Activity title:** A1 Mentorship of PP regarding Living lab (LL)

**Deliverable title:** D5.1.1. Living lab methodology

**Expected date:** M12

**Deliverable description:** LL methodology will be created using external expert and all PPs inputs. Methodology will present steps and facilitator elements for open innovation processes focusing on co-creation of innovative robotic and sensors solutions in real-world contexts by involving multiple stakeholders with the objective to generate sustainable value for all stakeholders focusing in particular on the end-users.

**Partner responsible:** Croatian Chamber of Economy

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## Key terms

<b>Design Thinking</b>	A non-linear, iterative process that teams use to understand users, challenge assumptions, redefine problems and create innovative solutions to prototype and test. Involving five phases—Empathise, Define, Ideate, Prototype and Test—is most useful to tackle ill-defined or unknown problems.
<b>Dogfooding</b>	The use of a newly developed product or service by a company's staff to test it before it is made available to customers <sup>1</sup> .
<b>Gamification</b>	The process of adding games or game-like elements to something (such as a task) to encourage participation <sup>2</sup> .
<b>Hackathon</b>	An event in which professionals collaborate intensively with one another and sometimes with people in other specialities over a relatively short period, usually for a new product or service (adopted from the Merriam Webster dictionary) <sup>3</sup> .
<b>Ideation</b>	The structured process of generating ideas for new products/services.
<b>Living Lab</b>	A research concept representing an open-innovation ecosystem that integrates research and innovation processes within a public-private-people partnership. LL generates the opportunity to start a co-creation and technology transfer between R&D institutions, users and the economy.
<b>Living Lab methodology</b>	Presents steps and facilitator elements for open innovation processes focusing on co-creation of innovative robotic and sensors solutions in real-world contexts by involving multiple stakeholders to generate sustainable value for all stakeholders, focusing mainly on the end-users.
<b>Field trial</b>	In field trials, a product is tested by users in a real-life setting (as opposed to testing under artificial laboratory conditions). Both the product and the field trial settings are designed to be as close as possible to actual usage. This often involves installing a particular piece of equipment and then monitoring its performance over a period of time. It is common to allow users to operate the equipment as they would in actual usage, and it is usual to monitor that usage using objective and subjective measures. Field trials are typically applied when a final prototype is available, or a complete product is evaluated. Because of the relative time and expense of running field trials, it is not common to use them in the early stages of product development rather for evaluation purposes <sup>4</sup>

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<sup>1</sup> <https://www.lexico.com/definition/dogfooding>

<sup>2</sup> <https://www.merriam-webster.com/dictionary/gamification>

<sup>3</sup> <https://www.merriam-webster.com/dictionary/hackathon>

<sup>4</sup> <https://rauterberg.employee.id.tue.nl/lecturenotes/UFTfieldtrial.pdf>

<b>Open innovation</b>	“A distributed innovation process based on purposively managed knowledge flows across organisational boundaries, using pecuniary and non-pecuniary mechanisms in line with the organisation’s business model.” <sup>5</sup>
<b>Scenario development</b>	Scenarios are developed for thinking about the future and longer-term planning, especially when considering the links between ecosystem services and development. Scenario approaches range from highly exploratory to decision-oriented and intuitive (e.g. visionary) to analytical (e.g. rational). In addition, they vary in the degree of complexity. <sup>6</sup>
<b>Technology scouting</b>	A method that can lower the time lag between the advance in technology and its detection by the technology intelligence associated with techniques such as patent or publication analysis. <sup>7</sup> It also encompasses other activities such as direct contacts with the network, scenario workshops and similar.
<b>Testbed</b>	Testbeds are composite abstractions of systems and are used to study system components and interactions to gain further insight into the essence of the real system. They are built of prototypes and pieces of real system components and are used to provide insight into the workings of an element(s) of a system. <sup>8</sup>
<b>User-panel</b>	It is a specialist group made up of people who will use the development when it is completed and contribute to briefing and design workshops. <sup>9</sup>

<sup>5</sup> Chesbrough, H., & Bogers, M. (2014). Explicating open innovation: Clarifying an emerging paradigm for understanding innovation. *New Frontiers in Open Innovation*. Oxford: Oxford University Press, Forthcoming, 3-28.

<sup>6</sup> <https://ipbes.net/policy-support/tools-instruments/scenario-development-scenario-planning>

<sup>7</sup> Rohrbeck, R. (2006, August). Technology scouting–harnessing a network of experts for competitive advantage. In 4th Seminar on project and innovation, Turku, Finland (pp. 15-29).

<sup>8</sup> Paul J. Fortier, Howard E. Michel, in Computer Systems Performance Evaluation and Prediction, 2003, [Testbed - an overview | ScienceDirect Topics](#)

<sup>9</sup> [https://www.designingbuildings.co.uk/wiki/User\\_panels\\_for\\_briefing\\_and\\_design\\_development](https://www.designingbuildings.co.uk/wiki/User_panels_for_briefing_and_design_development)



## Abbreviations

<b>BM</b>	business model
<b>BMC</b>	Business Model Canvas
<b>DIH</b>	Digital Innovation Hub
<b>ENoLL</b>	European Network of Living Labs
<b>KPI</b>	key performance indicators
<b>LL</b>	Living Lab
<b>NPD</b>	The New Product Development process
<b>PoB</b>	Proof of business
<b>PoC</b>	Proof of concept
<b>PoS</b>	Proof of service
<b>PP</b>	project partners
<b>SME</b>	small and medium-sized enterprise
<b>WP</b>	work package

## 1 The InnovaMare project

The InnovaMare project aims to enhance collaboration on technology transfer by creating an innovative underwater robotics and sensors network. The project's mission is to create a cross-border innovation ecosystem in Šibenik as the leading centre of cooperation, knowledge and technology transfer that will be used to develop new innovative solutions in underwater robotics and sensors.

Among nine main InnovaMare project outputs, there is a Digital Innovation Hub (DIH) and a Living Lab (LL) for innovative underwater robotics and sensors in the Adriatic Sea. The main goal of Work Package 5 is to establish cooperation in innovation through the joint development and piloting of eco-innovative tools and processes in the marine technology sector of the blue economy. Furthermore, the collaboration between stakeholders and users will be established using the Living Lab approach and demonstrated through pilot actions I and II.

The Living Lab concept implies the involvement of users in real-life conditions. Therefore, the consultant's expertise will cover Living Lab methodology and advisory during all WP activities. Project partners are a heterogeneous group of stakeholders:

- **Universities:** University of Dubrovnik; University of Trieste; University of Rijeka, Department of Biotechnology; the University of Zagreb, Faculty of Electrical Engineering and Computing.
- **Institutes:** National Institute of Oceanography and Applied Geophysics, Italy; Institute Ruđer Bošković, Croatia; The Institute of Marine Science (CNR- ISMAR), Italy.
- **Open innovation hub:** Maritime Technology Cluster FVG, Italy.
- **Local government:** Šibenik-Knin County, Croatia
- **Agencies and chambers:** Apulia Regional Agency for Technology and Innovation (ARTI), Italy; Croatian Chamber of Economy; Regional Union of the Chambers of Commerce of Veneto Region, Italy.
- **Enterprises:** Communication Technology S.R.L., Italy and Geomar d.o.o, Croatia

## 2 Scope and design

Configuring the LL methodology requires the researcher to balance various dimensions such as the process, tools, actors, services, the network structure and the business model of the LL. While process and tools clarify methodology, other dimensions allow for the necessary insight into the LL context. The document was designed keeping in mind many LL dimensions that need to be explained and the simplicity that helps the reader stay focused on the LL methodology as the main topic.

### 2.1 Scope

Within the scope of this paper is the InnovaMare LL methodology. Since LLs are multi-stakeholder, multi-project networks, they require a holistic approach. To illustrate such a complex network, we will put all explained dimensions and elements in the context of the InnovaMare LL and build the user-centred Living Lab configuration. The configuration will be described through the **process, tools, services, roles, network structure and business model**.

The evidence for LL configuration comes from primary sources (workshop and survey) and secondary data, mostly through available literature.

### 2.2 Design

In this document, the InnovaMare Living Lab methodology will be explained. Firstly, we present the LL as a concept through a literature search. Afterwards, we update the current InnovaMare status explaining the project, the first online workshop and the survey as a source of information collected from PP organisations. That will help the reader to understand the next chapter that describes the proposed InnovaMare LL methodology. Finally, the process, tools, services, roles, network structure and business model will be explained.

In conclusion, we will propose the roadmap and put it in a timeframe. That will serve as a guide for the implementation of the methodology.

### 3 Introduction

The concept of the Living Lab emerged at the beginning of this millennium<sup>10</sup>. The initial focus was on testing new technologies in home-like constructed environments. Since then, the concept has grown, and today one precondition in Living Lab activities is that they are situated in a real-world context.

Compared to the traditional systems, Living Labs differ significantly in openness. Living Labs are influenced by the open innovation; therefore, strongly believe that organisations should combine external and internal ideas into the development process. Traditional systems development takes the opposite approach, limiting inflows into the development process, arguing that it becomes too complex and expensive to involve all stakeholders.

The open innovation grounds on a principle that organisations allow for a knowledge flow across their organisational boundaries. An effective knowledge flow can be achieved through stakeholder cooperation and collaboration. In the case of a Living Lab, this means user involvement, engagement and motivation. Users, therefore, become the central stakeholders. The nature of their participation ranges from very active to occasional involvement.

LLs as effective knowledge flow networks connected to each other form the super-network. An example of such a super-network is the European Network of Living Labs (ENoLL) – the international federation of benchmarked Living Labs in Europe and worldwide. As an authority in the field, ENoLL defines LL as a “user-centred, open innovation ecosystems based on systematic user co-creation approach, integrating research and innovation processes in real-life communities and settings. They operate as intermediaries among citizens, research organisations, companies, cities and regions for joint value co-creation, rapid prototyping or validation to scale innovation and businesses up. LLs have common elements but multiple different implementations.”

Next, we will explain LLs concerning their characteristics and building blocks.

#### 3.1 Explaining Living Labs

Since Living Labs are rather a new phenomenon that emerges in such diverse areas as health services, different industries and rural development, it is a hard concept to define and describe. However, one way of looking at it is through attributes of the LL. Those attributes include<sup>11,12</sup>:

- **Continuity:** Good cross-border collaboration, which strengthens creativity and innovation, builds on trust, which takes time to build up.

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<sup>10</sup> Markopoulos, P. and G.W.M. Rauterberg, Living Lab: A White Paper, in IPO Annual Progress Report. 2000. p. 53-65.

<sup>11</sup> CoreLabs, Living Labs Roadmap 2007-2010: Recommendations on Networked Systems for Open User-Driven Research, Development and Innovation, in Open Document. 2007, Luleå University of Technology, Centrum for Distance Spanning Technology: Luleå. p. 1-61.

<sup>12</sup> Bergvall-Kareborn, B. H. M. S. A., Hoist, M., & Stahlbrost, A. (2009, January). Concept design with a living lab approach. In 2009 42nd Hawaii international conference on system sciences (pp. 1-10). IEEE.

- **Openness:** The innovation process should be as open as possible since gathering many perspectives and bringing enough power to achieve rapid progress is important. The open process also makes it possible to support the process of user-driven innovation, including users wherever they are and whoever they are.
- **Realism:** To generate valid results for real markets it is necessary to facilitate as realistic situations and behaviour as possible. This principle is also relevant since focusing on real users in real-life situations distinguishes Living Labs from other open co-creation environments.
- **Empowerment of users:** Users' engagement is fundamental to bring innovation processes in the desired direction, based on the humans' needs and desires. Living Labs efficiency is based on the creative power of user communities; hence, it becomes important to motivate and empower the users to engage in these processes.
- **Spontaneity:** To succeed with innovations, it is important to inspire usage, meet personal desires, and fit and contribute to societal and social needs. Here, it becomes important to have the ability to detect, aggregate, and analyse spontaneous users' reactions and ideas over time.

In Living Labs, the approach is for real-world contexts, real users and real use situations. This means that users are involved in their private contexts all day round. Hence, when a Living Lab approach is applied, the aim is to create as authentic use situations as possible. For example, in traditional user involvement processes, users can be asked to use a system or device in a so-called field study. However, in these processes, the user is requested to use the device in a context where the researcher, or developer, can observe users' actions and how the technology impacts them<sup>13</sup>; hence, the use situation is not fully authentic.

All of the described elements will be considered important during the design of the InnovaMare Living Lab concept.

Furthermore, during this conceptualisation phase, Living Labs can be understood as an **environment, methodology or system**. Depending on which perspective one takes, certain themes come into focus:

- **environment**<sup>14</sup>- objects such as technology platforms and user communities come to the forefront,
- **methodology**<sup>15</sup> processes such as data transfers and methods for user involvement are highlighted, and

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<sup>13</sup> Preece, J., Y. Rogers, and H. Sharp, *Interaction Design: Beyond human-computer interaction*. 2002, New York: John Wiley & Sons, Inc.

<sup>14</sup> Ballon, P., J. Pierson, and S. Delaere. *Open Innovation Platforms for Broadband Services: Benchmarking European Practices*. in in 16th European Regional Conference. 2005. Porto, Portugal.

<sup>15</sup> Eriksson, M., et al. *State-of-the-art and Good Practice in the Field of Living Labs*. in in *Proceedings of the 12th International Conference on Concurrent Enterprising: Innovative Products and Services through Collaborative Networks*. 2006. Milan, Italy.

- **system**<sup>16</sup>- puts focus on the relation between the Living Lab as a whole and its interdependent parts.

Those three definitions represent complementary perspectives. In this document, we will focus on methodology. However, system and environment perspectives will also be described to fully understand InnovaMare Living Lab and its entire complexity.

Next, the Living Lab will be explained as a methodology.

### 3.2 Living Lab methodologies

The rapid development of LLs promoted the need to define the grand process and other methods and tools that effectively structure innovation activities in LLs. Two main trends in described methodologies are **the tendency to manage the innovation development process and the tendency to manage organisational activities**. In this section, we will focus on **innovation development processes**.

Several methodologies are described in the literature<sup>17</sup>:

- **Service Experience Engineering Methodology (SEE)** was introduced in Taiwan LL to improve the open innovation process. It focuses on discovering unexpected use for technologies and new product/service opportunities through user involvement and market analysis. In a design phase, it allows stakeholders to test products/services in real-life conditions through techniques such as proof of concept (PoC), proof of service (PoS) and proof of business (PoB).
- **Collaboration@Rural (C@R)** was developed for collaborative working environments in rural Living Labs. It starts with the construction of the local user's community, followed by the user's engagement. It finishes with a cyclic and spiral new product/service development process. The method fosters synergistic creation among stakeholders and an active approach to users. This process is not focused on technology, rather on users and their cooperation.
- **Rural Inclusion Methodology** involves users in all stages of the innovation process. It starts with planning the community, its action plan, evaluation criteria and identifies stakeholders.
- **The community management** process follows to ensure measurement of motivation, communication management and different events. The purpose is to engage users and keep them motivated.
- **FormIT**<sup>18</sup> was first applied to Botnia LL. It is a spiral process that focuses on product/service design. Its importance in industrial innovation development processes will be elaborated in more detail in the chapters to follow.

<sup>16</sup> CoreLabs., *Living Labs Roadmap 2007-2010: Recommendations on Networked Systems for Open User-Driven Research, Development and Innovation, in Open Document. 2007, Luleå University of Technology, Centrum for Distance Spanning Technology: Luleå. p. 1-61.*

<sup>17</sup> Corallo, A., Latino, M. E., & Neglia, G. (2013). Methodology for User-Centered Innovation in Industrial Living Lab. *International Scholarly Research Notices*, 2013.

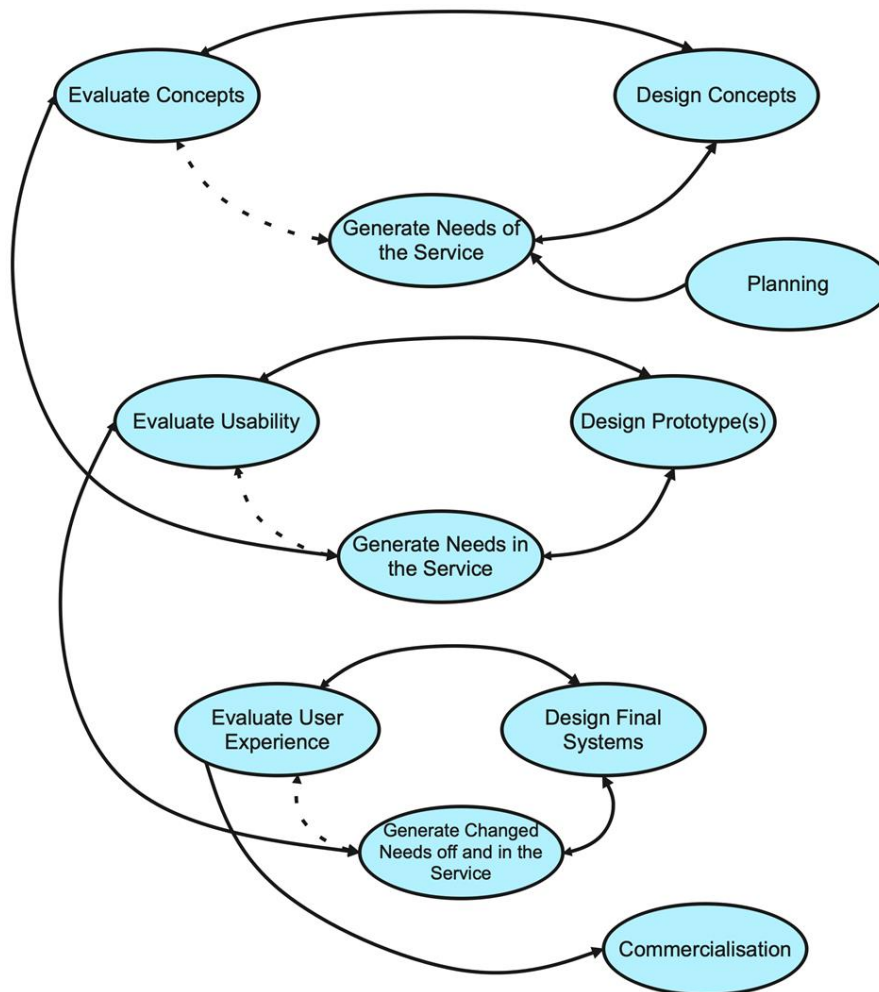
The FormIT methodology for LLs describes an iterative process that can yield both incremental and radical innovation outcomes. FormIT is grounded in the Appreciative Inquiry (positive thinking) theoretical approach. It was also theoretically underpinned by Soft Systems thinking that considers ethical, heuristic, and epistemological aspects of consensual decision-making and NeedFinding theories. FormIT process contains three iterative cycles, Appreciate Opportunities, Design, and Evaluate, as shown in Figure 1.

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<sup>18</sup> Ståhlbröst, A., & Bergvall-Kåreborn, B. (2008). FormIT: An approach to user involvement. In a book: European living labs: a new approach for human centric regional innovation Publisher: Wissenschaftlicher Verlag.



Figure 1. The FormIT process



**The first iterative cycle** begins with planning the whole intervention, and the last ends with commercialisation. In the planning phase, it is highly important to gain a common perspective of what the purpose of the project is and to set common KPI's (key performance indicators). Commercialisation is a separate project to introduce a product/service to the client and assess market potential. The first iterative cycle is conceptualisation, with a purpose to generate needs that users consider relevant in relation to the system.

**The second phase** focuses on the prototype design, where the scope broadens to include basic functions, workflows, and interfaces. The designed prototype needs to be detailed enough to understand and experience how the final product/service will look and feel.

**Cycle three** brings the final system design to the users and focuses on user evaluation. During all cycles, interventions to the product/service design happen. However, an opportunity to make a significant change



to the product/service lowers with each iteration.

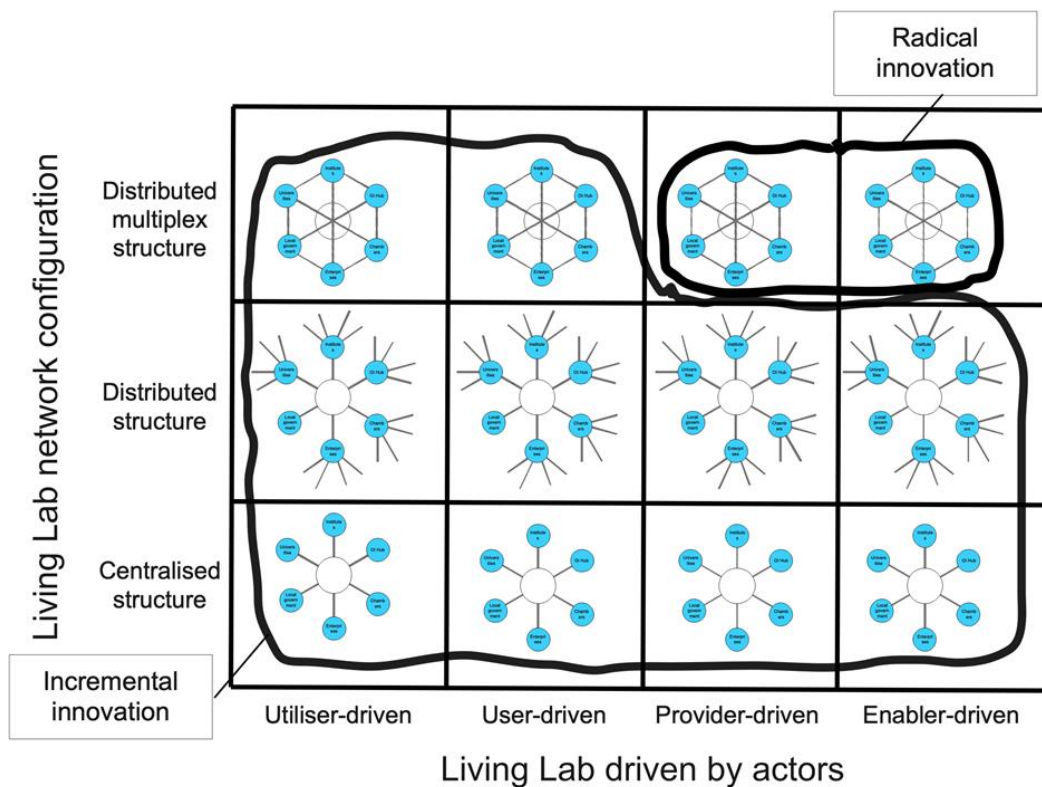
When designing a specific LL methodology, it is essential to **consider the advantages of all presented methodologies and combine them to achieve optimal user involvement** through motivation and engagement techniques, not forgetting the importance of technological focus. Thus, the most efficient **blend of processes** will be proposed for the InnovaMare Living Lab.

Next, Living Lab will be explained as a system concerning interdependent parts.

### 3.2.1 Living Lab as a system

From an inside perspective, LLs are networks of organisations that share a common goal and projects. As shown in Figure 2., they can be organised around one central nod forming a centralised and distributed structure or can function with loose connections to the central nod as a distributed multiplex structure<sup>19</sup>:

**Figure 2. A framework for analysing the configuration modes of Living Lab networks**



Distributed and centralised open innovation network structures promote the emergence of incremental innovation in open innovation networks, while distributed multiplex structure allows for the emergence of radical innovations.

<sup>19</sup> Leminen, S., Westerlund, M., Nyström, A.-G. & Kortelainen, M. (2015) "The Effect of Network Structure on Radical Innovation in Living Labs". Journal of Business Industrial Marketing (JBIM).

It is essential to recognise different LL types concerning the actor to support continuity and user empowerment principles. Laminen et al. (2012)<sup>20</sup> distinguish between four different types: **utiliser, user, provider and enabler-driven LLs**.

Utilisers are non-producer firms seeking efficiency gains and knowledge. In addition, they are looking for practical applications of the LL innovation outcomes.

On the other hand, users are looking for innovation outcome properties such as functionality in the user-driven LL and want to see how LL innovation can solve challenges. Users can be private persons or industries, further distinguishing between industrial, urban or rural LLs. Users and utilisers, when driving parties, expect LL to fulfil their needs, rather than the needs of other stakeholders, through LL innovation process outcomes.

Providers' main role is to provide knowledge to the LL network, and enablers provide supportive technologies and other resources to the LL. The providers and enablers dominated approach emphasises the wishes of other stakeholders, not the driving party.

Therefore, different types of Living Labs networks from the dominant actor perspective (Figure 2, i.e., utiliser-driven, enabler-driven, knowledge provider-driven, and user-driven living labs) differ by their key characteristics, including purpose, organisation, action, outcome and lifespan. Also, LLs driven by users or utilisers enable incremental innovation in open innovation networks. Only when knowledge providers or enablers drive the distributed multiplex structure, radical innovation can be expected as an outcome.

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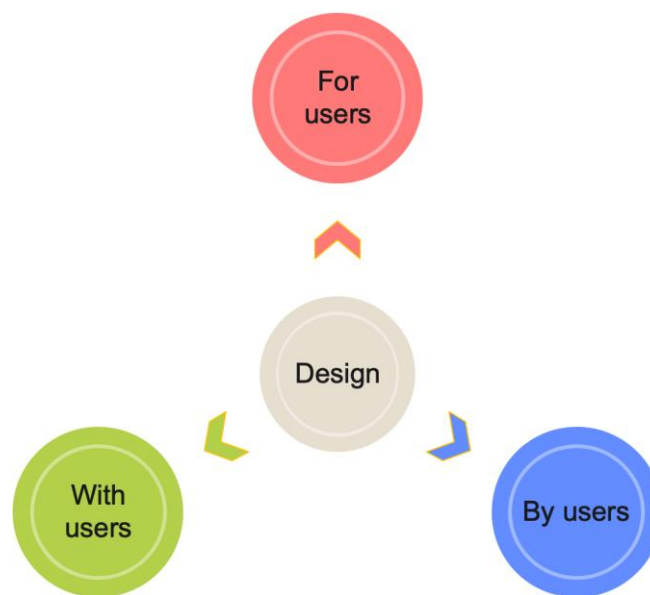
<sup>20</sup> Leminen, S., Westerlund, M. & Nyström A.-G. (2012) "Living Labs as Open Innovation Networks", Technology Innovation Management Review, Vol. 2, No. 9, pp. 6-11.

### 3.3 User involvement and actor's roles

As previously described, a particular actor can dominantly drive the LL. Nevertheless, LLs are focused on users, and in any described actor-driven model, users are involved.

Users can be involved in different ways depending on the nature of the innovation process. FormIT<sup>21</sup> classification of user involvement distinguishes between three user involvement strategies, as illustrated in Figure 3.

Figure 3. Different approaches to innovation design concerning user involvement



When designing for users:

- Users enter the development process relatively late.
- It is necessary to verify requirements and prototypes.
- Designers are active: they steer and drive the process.
- Users are passive information repositories.

A higher level of user involvement is ensured with design with users approach:

- Users are involved throughout the development process, with special attention to early and late phases.
- Co-creation based on human behaviour and needs as input for innovation.

<sup>21</sup> [https://www.ltu.se/cms\\_fs/1.101553!/file/FormIT\\_handbok.pdf](https://www.ltu.se/cms_fs/1.101553!/file/FormIT_handbok.pdf)

- Designers are active; they steer design and development activities.
- Users are active; they steer context and evaluation activities.

Whereas, when designing by users:

- Designers facilitate the process.
- Users initiate and drive the process.
- Users inspire idea generation, create prototypes, produce content and develop the solution.
- Users design and develop ideas or parts of the solution.

For the case of the InnovaMare LL, it is essential to define how users will be involved, to what extent and for how long.

As well as other network actors, users take certain roles in the network to ensure its operations. Conventionally, the role concept focuses on individuals, whereas this document covers organisations in innovation networks as key actors. Their roles will be described later in the methodology section.

Next, the LL will be described as a platform for experimentation and explained as a nexus between different approaches.

### 3.4 Living Lab as test and experimentation platform

Living Labs are based on the assumption that users are both objects and subjects<sup>22</sup> in innovation development activities. The user reveals his own needs and experiences as an object, validating and testing products, services, technology, and systems. Being a subject, the user co-develops or co-creates innovation. Activities that involve users beyond testing and validation are **prototyping, field trials, testbeds, societal pilots and market pilots**. These activities aim to involve users deeper into the design phase of the innovation process.

If a Living Lab develops low maturity products and is focused on design, then prototyping and field trials shall involve users. On the other hand, if the focus of a particular LL is on testing, testbeds and field trials are choice activities.

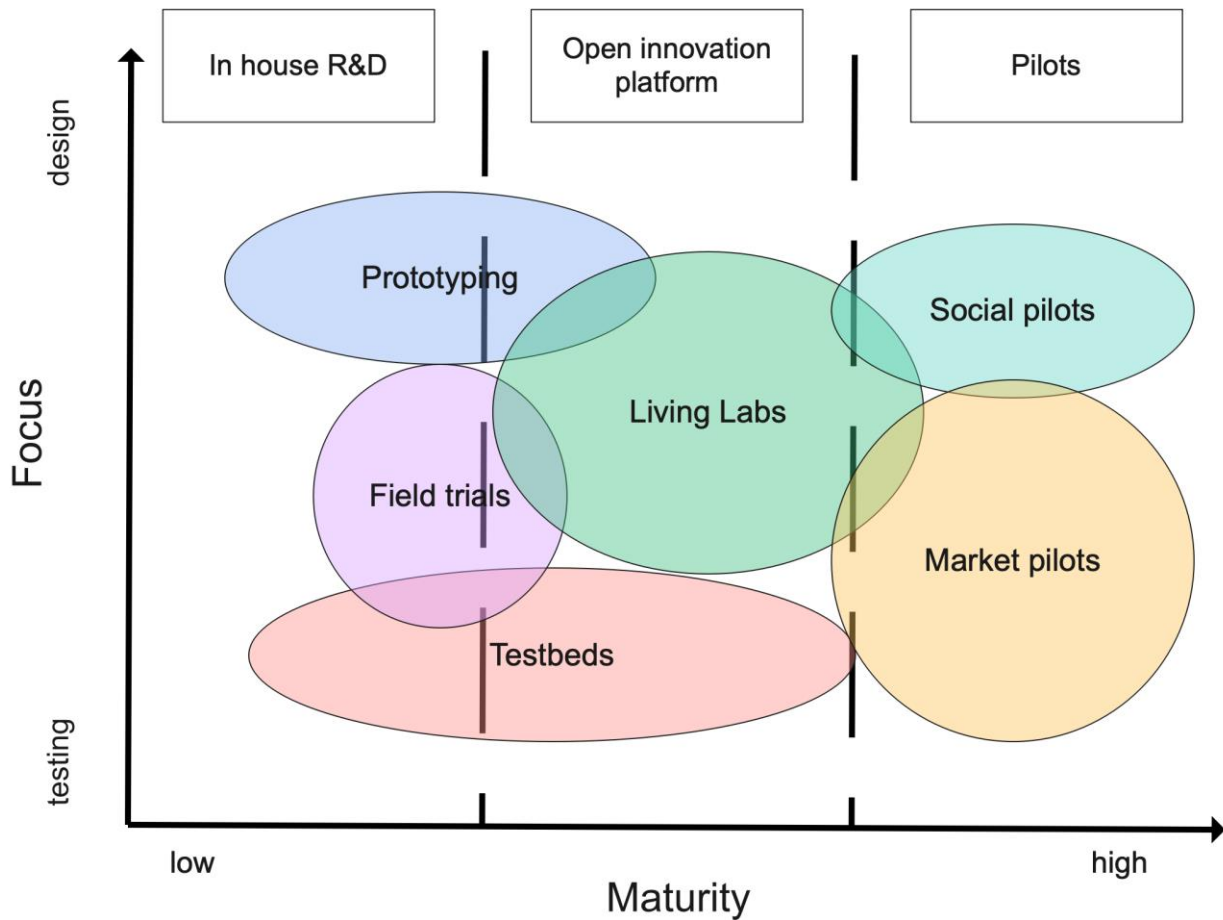
Suppose a Living Lab is closer to the commercialisation phase and is focused on piloting. In that case, societal pilots ensure the link to the design phase and market pilots' connection to the testing phase.

As shown in Figure 4, LL as the central concept connects to resonating concepts such as field trials or market pilots, providing the platform for experimentation with technologies and the market and social surroundings. That gives a LL flexibility to deal with different product/service maturity levels or focus primarily on testing or designing that product/service. Therefore, LL serves as a link between in house R&D and pilots. ž

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<sup>22</sup> Ballon, P., Pierson, J. & Deleare, S. (2005) Test and Experimentation platforms for Broadband Innovation: Examining European Practice. Conference Proceedings of the 16th European Regional Conference, International Telecommunications Society, Portugal, 4-6 September 2005.

Figure 4. Conceptual framework of test and experimentation platforms



Source: Leminen, S. (2015). *Living labs as open innovation networks-networks, roles and innovation outcomes*

A specific configuration of described activities further leads to a better understanding of LL's nature.

In the following section, we will describe the business model approach to the LL.

### 3.5 Living Labs and business modelling

At a very general and intuitive level, a business model describes an organisation and how it functions to achieve its goals (e.g., profitability, growth, social impact...).<sup>23</sup> The Business Model Canvas is a strategic management template used for developing new business models and documenting existing ones, and as such, it has been used to describe LL surroundings.

A successful business model is a key to sustainable Living Lab as a network organisation. Business Model

<sup>23</sup> Massa, L., Tucci, C., & Afuah, A. (2016). A critical assessment of business model research. *Academy of Management Annals*, annals-2014.

Canvas<sup>24</sup> is used to identify basic elements of the business model and intervene in that business model during the LL conceptualisation phase. This tool is also useful in the Living Lab evaluation process and adds to evaluation criteria by ENoLL through the introduction of three missing elements; identification of the cost structure, customer segments and the revenue stream.<sup>25</sup>

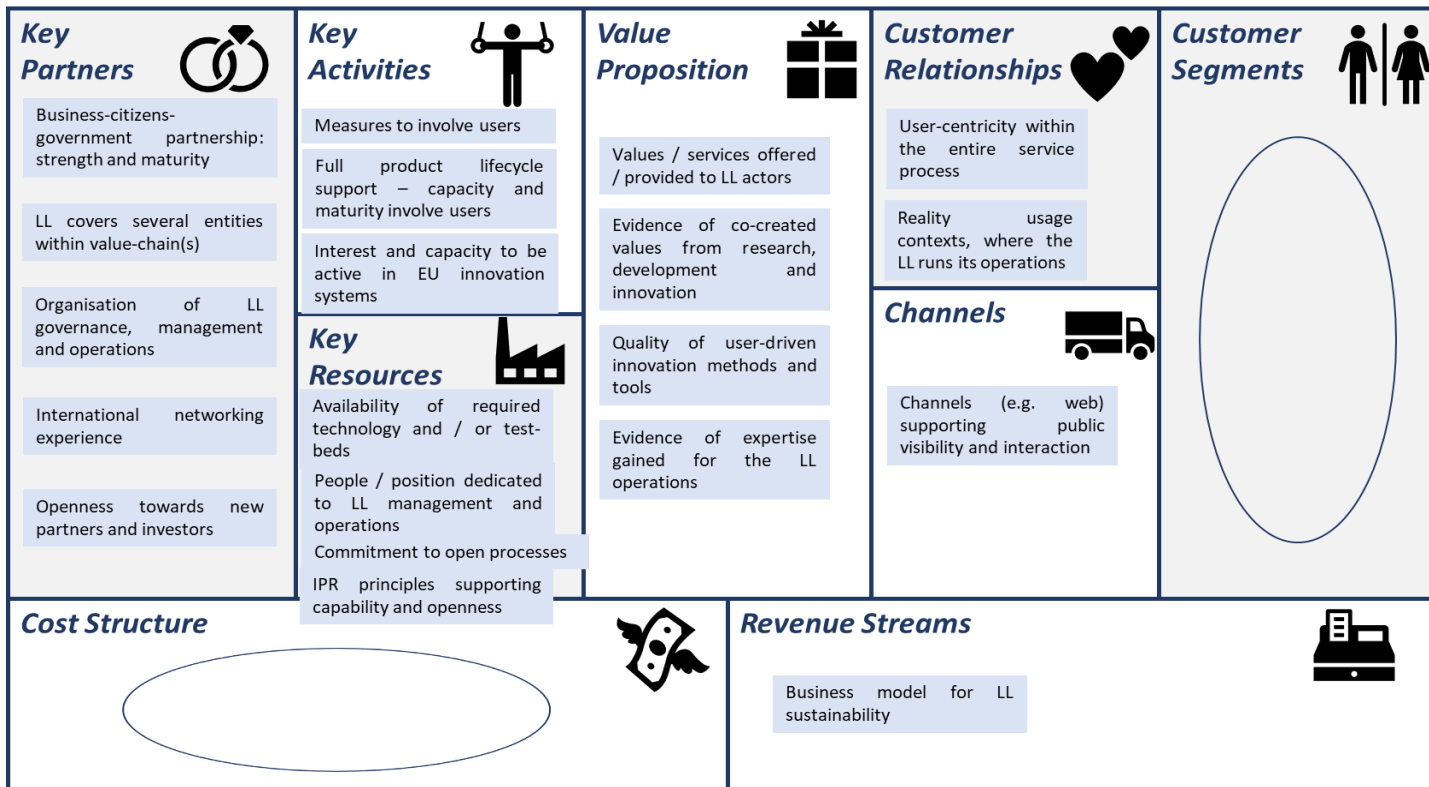
Business modelling allows forming a completely new stakeholder setup that involves relationships, channels and resources necessary for the new value creation. Business modelling can also be used as a tool for the identification of strategic and operational KPI's in a multi-stakeholder context.

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<sup>24</sup> Osterwalder, A. and Pigneur, Y. (2010), *Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers*, Wiley.

<sup>25</sup> Mastelic, J., Sahakian, M. and Bonazzi, R. (2015), "How to keep a living lab alive?", *info*, Vol. 17 No. 4, pp. 12-25.  
<https://doi.org/10.1108/info-01-2015-0012>

Figure 5. ENOLL criteria for LL evaluation applied to business model canvas



Source: Adopted from Mastelic, J., Sahakian, M. and Bonazzi, R. (2015), "How to keep a living lab alive?", *info*, Vol. 17 No. 4, pp. 12-25. <https://doi.org/10.1108/info-01-2015-0012>



## 4 The InnovaMare Living Lab project update

In this section, following the introduction to key building blocks for the LL methodology, we will present the online workshop with PPs and the survey results.

### 4.1 The first online workshop

The online workshop was held on February 11th, 2021. The primary purpose was to introduce the open innovation and Living Lab concepts to project partners, discuss all relevant LL aspects, and dive deeper into the LL methodology and its application to the InnovaMare project. The workshop also introduced terminology and established common ground for further LL methodology development. Other concepts and terms were discussed during the 4-hour online session, besides open innovation and Living Lab concepts. Some of those are open innovation networks, Living Lab innovation outcomes, Living Lab roles and user involvement, Living Lab business model, technology scouting, FormIT methodology, Living Lab services and tools. The workshop participants were employees of partner organisations ranging from junior to executive positions.

During the workshop, participants were prepared to understand statements and questions they will encounter later during the online survey.

### 4.2 The survey

The survey was launched on February 17th, 2021, after the online workshop, to collect relevant information for LL methodology development. All workshop participants were invited to fill the survey during the following two weeks. At least one representative from each partner organisation was asked to participate in the survey. Overall, 12 out of 14 project partner organisations participated. Project partner organisations' sizes range from 1 to 500, with three micro-organisations employing 1-9, five small organisations employing 10-49, four medium-size organisations with 50-499 employees, and one large organisation (>500).

#### 4.2.1 Project Partner organisations

The first group of statements focuses on identifying the PP organisation's experience and capacity to innovate. Survey shows that 64% of PP organisations collect new ideas without a structured innovation process, 21% implement a structured process, and 14% do not collect ideas nor have a pre-defined innovation process. Also, 44% of PPs have limited experience managing projects with innovative outcomes, 22% with the commercialisation of innovative products, 22% with rapid prototyping, and 11% with mock-ups.

When asked to identify the standard methods and tools they use to increase employee and user engagement in the innovation process, 21% confirmed the Design thinking and 21% Future and scenario workshops, while 17% use focus groups and 17% Appreciative inquiry. Overall, 8% claim to use gamification and experience diaries, while 8% do not use any engagement techniques.



Out of all survey participants, 32% use advanced and new technologies, 14% own patents/licenses, while 18% implement an effective R&D process compared with the sector competition.

#### 4.2.2 Innovation processes

The second group of statements is focused on comparing partners organisations current status with the preferred future of the Living Lab.

**Table 1. Comparing answers for the current status of partners organisations with the preferred future of the Living Lab**

<i>Which out of three measurable innovation indices would be the most important for your organisation?</i>	
We are not measuring.	38%
The number of products that reach the market.	31%
The number of peer-reviewed publications.	31%
<i>Which out of three measurable innovation indices would be the most important for Living Lab?</i>	
The number of products that reach the market.	83%
The number of peer-reviewed publications.	17%

Partner organisations represent a mixed group covering those with no measurable indices for innovation and those focused on products/services and scientific organisations with their own specific KPIs. On the other hand, project partners see the Living Lab as the product/service-oriented network (Table 1).

**Table 2. Comparing answers for the current status of partners organisations with the preferred future of the Living Lab**

<i>The innovation process in your organisation is:</i>	
Iterative - we often go back, iterate, then proceed to the next step.	80%
Linear - once we are done with one activity, we proceed to the next.	20%
<i>The innovation process in Living Lab should be:</i>	
Iterative - we often go back, iterate, then proceed to the next step.	75%
Linear - once we are done with one activity, we proceed to the next.	25%

The way projects are led in PP organisations seems to correspond with how PP see the Living Lab (Table 2). Thus, it appears that an iterative methodology used to manage projects in organisations can be applied to

the Living Lab. In our next workshop, we shall dive deeper into project management practices in PP organisations.

PP organisations are the most experienced in field trials and prototyping. However, they prefer field trials over prototyping and testbeds for the future Living Lab platform (Table 3). That is because the field trial approach involves real-life conditions and extensively includes users, corresponding to the nature of the living lab concept.

**Table 3. Comparing answers for the current status of partners organisations with the preferred future of the Living Lab**

<i>Your organisation already has experience with:</i>	
Field trials	40%
Prototyping	40%
Testbeds	20%
<i>The InnovaMare Living Lab shall use the following platforms to generate new products or services:</i>	
Field trials	44%
Prototyping	28%
Testbeds	28%

In the next section, we will discuss user involvement.

#### 4.2.3 User involvement

Well defined user involvement is essential for LL sustainability and implies motivation and engagement of stakeholders along the way. For this study, it is vital to identify where and how this involvement is taking place concerning PP organisations and what are project partner expectations from the LL network.

Currently, 40% of PPs have experience with extensive user involvement, 30% involve users occasionally, and 30% have limited experience collaborating with users. The survey shows that currently, the preferred involvement (40%) of users is by advice, meaning that users’ advice is asked for with the help of interviews or questionnaires. However, when it comes to the future LL, support for involvement by advice falls to 33%.

Approximately 30% of PPs organisations involve users “by doing”. These users are design team members or official “liaisons” with the development team. It is also very close (33%) to what PPs expect from the LL. In 10% of PPs’ practices, users are responsible for “sign off” at each stage of the development process, being involved by a weak control. PPs expected with more enthusiasm (22%) that users would participate in product development by weak control in the future LL.

While PPs expect (35%) to involve users at the early stage of the future LL innovation process when an idea and opportunity for scouting occurs, they practice this in 27% of their organisations. On the other hand, 23% of LL’s partners see an opportunity to conceptualise and develop prototypes together with users

within the future LL, and 19% in the detailed development phase, when the opportunity to significantly intervene in product design gets lower. Furthermore, 23% of PPs expect user involvement in the future LL later, during the validation and assessment of LL products. Again, these expectations from the future LL are very close to how PP currently practices user involvement. Finally, the majority (73%) thinks that the InnovaMare Living Lab’s main interest for involving users should be to co-create and co-develop with them and less (27%) to limit their involvement to a source of information and feedback.

When asked to answer the open-ended question and identify future LL products/services users, project partners identified innovative companies and SMEs. They emphasised operators with operation sites in coastal areas such as the marine and environmental sectors, coastal management authorities, fisheries, aquaculture companies, port authorities/marinas, and SAR operators. They also identified public EPAs, NGOs, national parks, agencies for environmental protection, ministries and technology transfer and innovation agencies and universities.

#### 4.2.4 The nature of the InnovaMare Living Lab

Project partners expect the output of the InnovaMare Living Lab innovation process to be incremental (91%) rather than radical (9%) innovation. As shown in Table 4, the Living Lab offering shall be focused on education, training, ecosystem and project management rather than marketing support, customised or R&D services. The unique infrastructure of the future LL, expertise on user involvement, funding and funding support presents an important set of LL’s functions.

**Table 4. The InnovaMare Living Lab offering**

<i>The InnovaMare Living Lab shall offer:</i>	
Education and training	18%
Ecosystem and project management	18%
Unique infrastructure	11%
User involvement expertise	11%
Funding and funding support	11%
Value & impact evaluation	9%
Methodology for user involvement	9%
Marketing support	5%
Customised services	5%
R&D service	2%

### 4.3 The second workshop in Bari

The workshop was held on the 15th and 16th of July 2021 in Bari. The main objective of the workshop was to dive deeper into the design and configuration of the InnovaMare LL methodology. The workshop’s scope was the InnovaMare methodology described through relevant LL dimensions: the process, services, tools,

roles, network structure and business model. The workshop presented a valuable source of information and was the final step to completing this document. Participants proposed, prioritised and classified InnovaMare's business processes, tools, services, own roles, organisation and network structure, and business model during the workshop. That helped PP's to understand the InnovaMare LL from different perspectives and allowed them to participate in the methodology design.

In this blended event, participants were either present on-site or attended through the online channel. The workshop participants were employees of partner organisations ranging from junior to executive positions. All attendees present on the first workshop were present on the workshop in Bari. After the workshop, a short survey was focused on individual data such as PP's roles in the LL. After the workshop, attendees were asked to fill a short questionnaire. Overall, 6 out of 14 organisations participated in the questionnaire.

Participants discussed the proposed grand process and tools and consented to its configuration. Also, the discussed process and tools were further elaborated in the Design thinking workshop as presented in chapter 5.

#### 4.3.1 The user group identification

The PPs' networks consist of different stakeholders. The majority of PPs is willing to share their network with the InnovaMare LL and invite those network members to participate in the InnovaMare network. PPs' networks include a large number of potential users that are already accessible through their channels. PPs' networks typically cover different organisations from education, research and private sectors:

- Private companies, mainly SMEs
- Universities
- Research centres
- Schools
- Training providers
- Public administrations (Regional Government, Municipality, Port)
- Marina, operators with productions sites in coastal areas
- National parks
- NGOs

Discovered network structure served in the identification of the LL user groups. As the most relevant users, participants identified:

- Educational system,
- Touristic sector,
- Public administration,
- National parks and protected area agencies, archaeological sites,
- Operators with productions sites in coastal areas (ship and boat builders, private companies, fisheries, aquaculture companies, port authorities/marina),
- NGOs.

Discovered user groups will be in the focus of the InnovaMare LL. It is to be noted that the network structure

of the InnovaMare LL corresponds to identified user groups.

#### 4.3.2 Services

An important part of the workshop was to discover and prioritise services that will address user needs. Identified services with the most potential for the InnovaMare LL are:

- Network coordination
- Hackathons
- IPR support to the private sector
- Technology matching
- Funding and funding support

Other services that can present an opportunity for the InnovaMare LL are:

- Prototype testing
- User involvement expertise
- PoC
- Circular economy services
- Environmental services
- User panels
- Creative workshop
- Education

#### 4.3.3 The keywords describing the InnovaMare LL

From stated services, the first five present the group of services that need to be developed within the LL as the internal organisational capacity. The workshop discussion extended to the area of organisational mission and vision. Following key words appeared:

- Ecology
- Circular economy
- Green innovation in the Blue sector

Identified keywords can be useful for building the InnovaMare brand strategy.

#### 4.3.4 The innovation network roles

The InnovaMare LL actor roles were discussed as a continuation of the first workshop discussion, which introduced the concept of roles. The role categorisation was taken from Heikkinen et al. (Table 5). Roles correspond to the innovation and management processes describing an interaction between network actors and network actors and users.

**Table 5. Roles in Living Lab networks**

Roles in the innovation network	Characteristics
<b>1. Webber</b>	Initiates network connections by deciding which actors are to be contacted to accomplish the development process.
<b>2. Instigator</b>	Influences by encouraging other actors in their decision-making processes.
<b>3. Gatekeeper</b>	Has significant resources and key elements and has the power to determine the usage of these for other actors and activities in an innovation network.
<b>4. Advocate</b>	Has a background role and does not interfere with operations but distributes positive information and offers connections to an innovation network.
<b>5. Producer</b>	Plays a significant role by contributing concrete development and realisation activities.
<b>6. Planner</b>	Injects input and intangible resources into a development process.
<b>7. Entrant</b>	Intervenes in the ongoing development process to protect its own rights.
<b>8. Auxiliary</b>	Plays an active role that strengthens towards the end of development activities.
<b>9. Compromiser</b>	Attempts to avoid contradictions or conflicts by balancing actions and relationships in an innovation network.
<b>10. Facilitator</b>	Furnishes an innovation network with resources, such as venues, without intervening in the process itself.
<b>11. Aspirant</b>	Plays the role of an 'outsider' who aims to participate in development activities.
<b>12. Accessory provider</b>	Attempts to promote and demonstrate its product and service portfolio and expertise in development activities.

Source: Heikkinen, M.T., Mainela, T., Still, J. & Tähtinen, J. (2007) "Roles for managing in mobile service development nets", *Industrial Marketing Management*, Vol. 36, No. 7, pp. 909-925.

Using described systematisation PPs were asked to identify their role in the network as described in Table 6.

Table 6. Roles in Living Lab networks by agent group

The InnovaMare LL Process	Universities	Institutes	Open innovation hub	Agency (non-PP)
User engagement	Advocate	Webber	Webber, Advocate	Webber, Facilitator
Communication management	Webber (potentially), Advocate		Facilitator	Webber
Governance and conflict management	Compromiser		Gatekeeper, Planner	Compromiser, Gatekeeper
Idea scouting and selection	Planner, Advocate, Entrant	Webber, Facilitator, Planner	Webber, Instigator, Advocate, Compromiser	Webber, Facilitator, Instigator, Planner
Developing user-centred innovation	Producer	Facilitator, Planner, Producer		Facilitator, Aspirant, Entrant, Planner
Result promotion and dissemination	Accessory provider	Accessory provider	Webber, Facilitator	
Stakeholder motivation	Advocate		Webber, Instigator, Advocate	Auxiliary, Webber, Facilitator

Findings show that universities and institutes differently perceive their roles in the idea development process and other management processes. The open innovation hub as a hybrid organisation complements the roles defined by universities and institutes.

The workshop in Bari allowed the clarification of the InnovaMare concept from different perspectives.

#### 4.4 Summary of the findings

The most important results of the workshop and survey show that most PPs lack a structured process for collecting ideas. The most prevalent tools PPs use to increase engagement of stakeholders are Design thinking, future and scenario workshops, focus groups and Appreciative Inquiry. Therefore, there is an experience in using tools and applying approaches that are essential for LL functioning. In addition, there are organisations within the PPs stakeholder group that are already experienced users of advanced and new technology.

Furthermore, when comparing the current PPs status with their expectations from the LL, the most important is to note that PPs support introducing those organisational features already adopted in their organisations. For example, they support the iterative PM process for the LL and field trials. On the contrary, when it comes to the key LL's KPI, PPs support KPI: the number of commercialised products.



However, they are currently a mixed group of entities with KPIs set around both commercialisation and scientific outputs.

Most stakeholders have some experience with user involvement in the innovation process. They also keep their organisational preferences on how to involve users in LL processes. For them, the best way to add value to the LL's innovation process is through user involvement at the beginning of the process when scouting for new opportunities and ideas. They also support other involvement options, such as involvement during phases of concept development and detailed development. It is clear that PPs support the idea of co-creation and co-development with users more than assigning users the role of being the source of information and feedback.

Also, throughout the survey, PPs have identified the major LL innovation process, the most important LL's services and offerings and groups of users.

The workshop in Bari further confirmed previous findings and allowed for the final proposal of the methodological model for the InnovaMare LL. Especially in the area of services and roles, this workshop brought new insights.

In the next chapter, we will discuss all described results and link them with the introduction chapter, where LL dimensions have been described. Finally, in the following section, the InnovaMare Living Lab methodology will be proposed based on described LL building blocks and the primary data collected through the survey and the first workshop.



## 5 The InnovaMare Living Lab methodology

In this section, the InnovaMare Living Lab methodology will be proposed. The methodology will be addressed for the sake of this exercise as a **process**, and further explained through LL's process **outputs** (services) and actor roles. Finally, an **evaluation** of the proposed methodology will be provided with the BMC.

The InnovaMare Living Lab is a heterogeneous group of organisations forming a multi-stakeholder environment. They come from different sectors and are grouped into companies, science and government stakeholder groups. Also, they differ in size regarding the number of employees, ranging from micro to big organisations and their organisational purpose. However, the InnovaMare project is already set around a common vision, mission and project. As a result, PP organisations reached an agreement on LL's purpose and defined major operational features of the underwater sea platform and other key technologies.

On the other hand, LLs are a part of specific context and surroundings. The same is true for the InnovaMare LL. These context elements will be important for our further discussion on the LL process. Extracted from the survey and workshop results, Table 7 describes context elements for the InnovaMare LL.

**Table 7. Elements of InnovaMare LL context**

Context elements	The InnovaMare context
Sectors/industries which generate innovation	Knowledge providers such as universities and institutes, SMEs specialised in key technologies, users.
Products/services which generate innovation	Prototype of innovative robotic solutions as a platform for developing solutions for monitoring and predicting sea pollution.
LL mission	To pave the way on the cross-border and transnational level of collaboration and knowledge transfer for one mission - sustainability of the Adriatic Sea.
Strategic partners to be involved in LL	The local and regional government, companies, environmental protection organisations, and universities partner with the InnovaMare LL as an open platform for developing or upgrading new innovative robotic and sensors solutions.
Types of end-users	The educational system, touristic sector, public administration, national parks and protected area agencies, archaeological sites, operators with productions sites in coastal areas (shipyards, private companies, fisheries, aquaculture companies, port authorities/marina), NGOs.
Criteria for joining the LL	Excellence, research capacity, user experience

The LL will, in its operating phase, simultaneously deal with multiple projects and services. Therefore, the complexity of stakeholder relationships and processes demands thoughtful configuration and development

of the LL methodology. The next major steps in the methodology development are finding the optimal grand process and defining tools, services, roles, the network structure, and the business model.

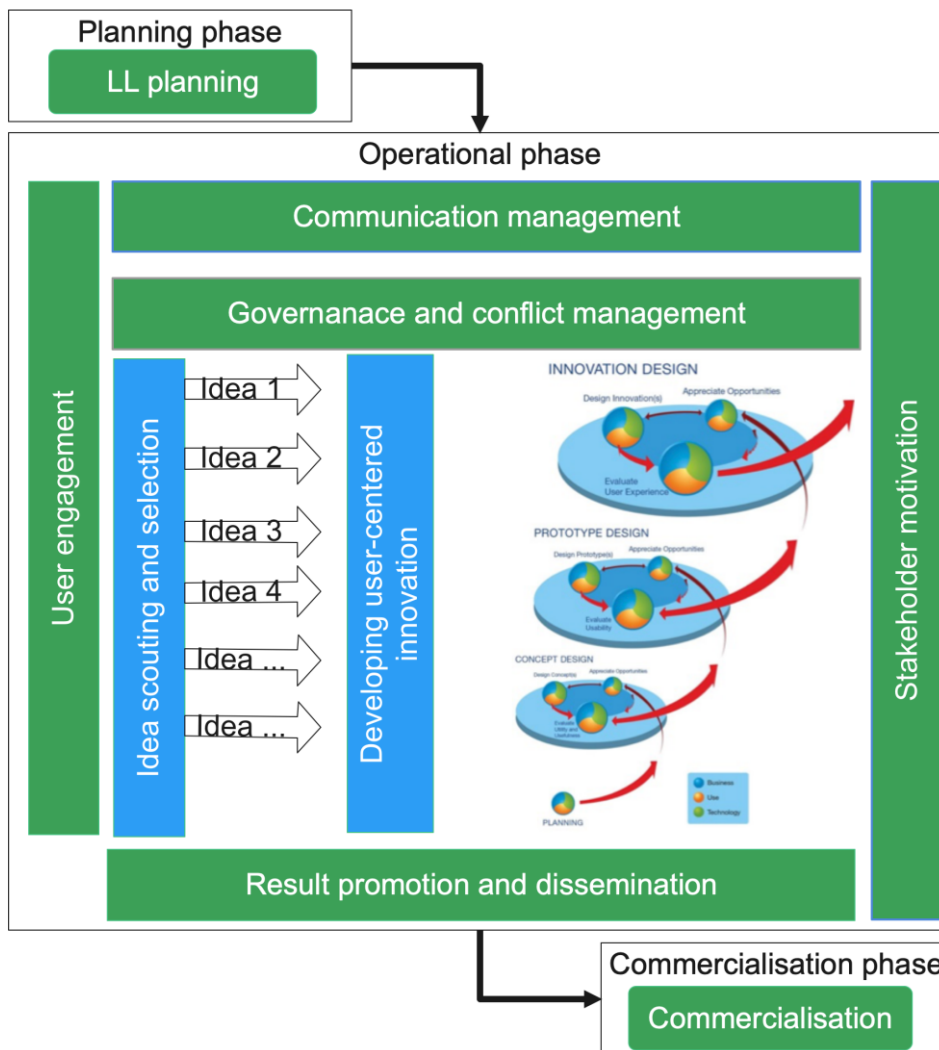
### 5.1 The Process

This paragraph will discuss the grand process and subprocesses that can emerge out of that process.

#### 5.1.1 The grand process

The InnovaMare LL grand process encompasses the LL management (green) and innovation development (blue) process, as shown in Figure 6.

Figure 6. The InnovaMare grand process proposal



Source: Modified from Corallo, A., Latino, M. E., & Neglia, G. (2013). *Methodology for User-Centered Innovation in Industrial Living Lab*. *International Scholarly Research Notices*, 2013.

For the operational phase, it is essential to apply such a methodology to orchestrate InnovaMare LL in its activities and drive the grand innovation process. The grand process is designed by combining the methodological approaches described above in their best features. It consists out of four management processes that support two innovation development processes (Figure 6).

The operational phase starts after the planning phase and finishes with entering the commercialisation phase.

**The planning phase** output is the plan for activities, and the process continues to the operational phase. Then, the operational phase starts with the user's engagement as the first management process. This step is important for preparing the idea scouting and selection process and exercising cooperation among project partners.

The **user engagement process** extends from the beginning of the communication management process to the final stage of the user-centred innovation process. **Communication management** is the second management process that emphasises communication among users. It enables users to communicate and share information and documents. It continues with the **governance and conflict management** that is the third management process within the operational stage. The behaviour policy (code of conduct) that users follow during collaborative and co-creation activities is described as part of this process. In addition, essential PP moderating roles for resolving conflicts and monitoring user's behaviour are set.

The process continues with two innovation development processes: idea scouting and selection and user-centred innovation development. The **idea scouting and selection** aim to enable stakeholders to propose new ideas related to the product or service. Selected ideas will be developed in the user-centred innovation process. The user-centred innovation development process is inspired by the FormIT methodology and is described above in detail. The majority of PPs agreed that the iterative approach to innovation development is the choice for the InnovaMare Living Lab. **Since the FormIT process is already applied in different LL cases, and the iterative project management approach is already practised in most PP organisations, it is advisable to use FormIT as an iterative method in InnovaMare LL. The purpose is to emphasise user-centred innovation.**

At the end of this stage, users' engagement stops, and promotion and dissemination of results start through enrolment in different social media, presentations of products/services, organised events, workshops, conferences and similar.

### 5.1.2 The grand process sub-processes

During detailed development of the grand process, it will be necessary to elaborate each process into sub-processes when necessary. That will depend on the scale of the future LL projects. When projects become too much of a burden to LL's organisational capacities, there will be a need for sub-process development concerning specific organisational needs. For example, governance and conflict management might contain funding, funding support or ecosystem orchestration as separate and specific sub-processes.

Furthermore, the need to develop horizontal and supportive processes might emerge when projects become numerous and complex. Such a supportive process might be the project management process. However, it is still left to determine what sub-processes or horizontal processes are necessary for the operational phase. To determine that, it will be necessary to have a better insight into the scale of the future LL operations.

Described context elements together with the grand process elaboration will help to identify the LL services.

## 5.2 Tools

After defining major InnovaMare LL processes and services, there is a clear path for closer discussion about social and business tools that comply with the idea of InnovaMare as a user-centric Living Lab. A set of different tools shall be applied in different stages of the grand process. Table 8 proposes the optimal usage of tools for the operational phase of the LL and dives deeper into the methodological character of each InnovaMare process.

Table 8. Proposed tools for each InnovaMare operational phase process

Process	Tool	Objective
<b>User engagement</b>	<ul style="list-style-type: none"> <li>• Gamification of the user onboarding process</li> <li>• Focus groups</li> <li>• Demonstration of technologies</li> <li>• Experience diaries Surveys</li> </ul>	Enabling effective user lifecycle management, from onboarding to offboarding. Emphasis is on user retaining throughout the whole innovation process.
<b>Communication management</b>	<ul style="list-style-type: none"> <li>• Gamification of communication</li> <li>• Wiki</li> <li>• Forum</li> <li>• Chat</li> </ul>	Enabling users to communicate and share information and documents with the constant feedback enabled.
<b>Governance and conflict management</b>	<ul style="list-style-type: none"> <li>• Assigning actor roles</li> <li>• Code of conduct</li> <li>• Team management techniques</li> </ul>	Make stakeholders feel comfortable in the LL environment through transparent management of LL operations.

Process	Tool	Objective
	<ul style="list-style-type: none"> <li>• Success metrics and KPI's</li> <li>• Future Search</li> </ul>	
<b>Idea scouting and selection</b>	<ul style="list-style-type: none"> <li>• Technology scouting</li> <li>• Technology radar</li> <li>• Discovery interviews Future and scenario workshops</li> <li>• Advisory board focused on LL's scope and focus</li> <li>• Hackathons, jams and sprint events</li> <li>• User-panel</li> </ul>	Establish the open innovation platform capable of identifying and finding strategic opportunities.
<b>Developing user-centred innovation</b>	<ul style="list-style-type: none"> <li>• Design Thinking</li> <li>• Focus groups</li> <li>• World café</li> <li>• Standardised project management method</li> <li>• Hackathons, jams and sprint events</li> <li>• User-panel</li> </ul>	Prepare innovative product/service for commercialisation phase.
<b>Result promotion and dissemination</b>	<ul style="list-style-type: none"> <li>• Participation in national and international events, workshops and conferences, open days, and trade shows</li> <li>• Publication in journals</li> <li>• Promotional events</li> <li>• Enrolment in the main social networks (LinkedIn, YouTube, and Facebook) and publication of interesting content on a web platform dedicated to LL.</li> </ul>	To promote products/services to potential customers, inform the public on the benefits of developed innovation.
<b>Stakeholder motivation</b>	<ul style="list-style-type: none"> <li>• Appreciative inquiry</li> <li>• Gamification</li> <li>• Stakeholder events</li> <li>• Recognition of behavioural models</li> </ul>	Enabling stakeholder retention throughout the whole operational phase.

Process	Tool	Objective
	<ul style="list-style-type: none"> <li>• Publications</li> <li>• Advisory board with the scope on user needs</li> <li>• World café</li> </ul>	

A significant number of PPs is already familiar with techniques such as Design thinking, future and scenario workshops, focus-group interviews, Appreciative Inquiry and experience diaries. That experience will present valuable knowledge for the operationalisation of the LL. However, **there will be a need for education and workshops to apply those techniques and digitalise them**. As for the tools that the PPs are less familiar with, such as the Advisory board or World café, education and training will be necessary. That will all help in sharing a common understanding of the meaning of those processes.

Revealing the process and tools lead to the next important topic, the InnovaMare LL services, that are the outcome of the operational phase.

### 5.3 Services

The InnovaMare LL services present the outcome of already described processes. We have proposed the Living Lab service classification model and connected it with typical services (Table 9). The proposed services are different in significance for the InnovaMare Living Lab. Some of the proposed services fit more than one service class. For example, the Advisory board can give an opinion in different areas. For that reason, this service fits the Idea scouting and selection, user-centred innovation, testing and validations class of services.

Similarly, key stakeholder engagement service stretches from project planning and management to business advisory services. All stated services are emerging from the user engagement process. Co-creation workshops, hackathons, jams and design sprints can also appear as useful tools for the innovation development process.

During the Bari workshop, InnovaMare project partners selected the most important services for the InnovaMare LL. Those services and offerings are:

- **Network coordination.** Understanding the ecosystem would bring an opportunity to find knowledge and start new projects. Furthermore, the InnovaMare LL can offer coordination and PM services to customers from the same technology field.
- **Hackathons.** Represent an opportunity to ideate and conceptualise new innovative ideas in the open form of an event. Hackathon attendees might be chosen from a wide range of stakeholder groups. Hackathon can be used as a powerful co-creation tool with users. Hackathons can be used at different stages of the innovation process.
- **IPR support to the private sector.** Companies, especially SMEs require IPR support. That is because many of them only occasionally need this service and did not develop their capacities. The InnovaMare LL can develop such a service and support new knowledge generation within its network.
- **Technology matching.** The InnovaMare LL network already presents a potential for starting new projects, ideation and co-creation. As the network grows, the number of network nodes will grow together with the complexity of the network. In addition, the InnovaMare LL will adopt technology scouting as the core business intelligence activity and collect a number of opportunities for the LL. Therefore, the service of technology matching will be based on making connections between technologically compatible interested parties, further linking those parties to potential financing opportunities.
- **Grant writing and funding application support services.** As an EU funded project, the InnovaMare LL already has experience in fundraising. Also, further opportunities will arise through funded projects lead or partner roles.

Identified services shall become the core offering of the InnovaMare LL. For that reason, the LL needs to develop its capacities to provide those services to users. The InnovaMare LL partners shall gain more experience and knowledge in those specific areas even before the LL is operational. Selected core services are

presented in Table 9 in red fonts.



Table 9. The InnovaMare Living Lab services offering classification

Living Lab service classification model						
Innovation network governance	Project planning and management	Idea scouting and selection, market intelligence	Developing user-centred innovation -co-creation	Testing and validation services	Business advisory, management consulting, educations and training	Results promotion and dissemination
Typical services						
<b>Innovation network building and maintaining</b> Stakeholder identification, analysis and mapping	Briefing	Expert opinions and advisory services				Network contacts, project leads Event arrangement Public procurement support service The InnovaMare user-approved certificate Showroom Education and training
		Key stakeholder engagement				
<b>Grant writing and funding application support service</b> Building and maintaining the shared vision for innovation network Capacity building: Training, knowledge sharing and awareness-raising, site visits and event arrangement		The Advisory board				
	Project planning	User involvement expertise User panel - User engagement involving permanent or ad hoc panel members			IPR-support Risk analysis	
<b>Funding and funding support for private sources (investors, VC)</b> End-user engagement by using ad hoc or application support service	Project management	Design thinking, interviews, surveys and other InnovaMare LL tools				
		Circular economy and environment-related services				

Living Lab service classification model						
Innovation network governance	Project planning and management	Idea scouting and selection, market intelligence	Developing user-centred innovation -co-creation	Testing and validation services	Business advisory, management consulting, educations and training	Results promotion and dissemination
Typical services						
Equipment and facility rental service			<b>Technology matching</b>			
Project management		Competitor and market analysis, benchmarking and other secondary research methods such as literature reviews	<b>Ideation and other co-creation workshops</b>	<b>Idea selection and testing</b> <b>PoC and feasibility testing</b>		
		Future and scenario development	<b>Hackathons, jams and design sprints</b>	Prototype testing		
		Technical requirements	Dogfooding	Simulation test		
		Legal regulation and safety standard support		Usability testing		
		Access to data		Integration testing		
				Small scale real-life testing		
				Large scale real-life testing and piloting		
				Impact assessment and validation testing		
				Regulatory approval tests		

Source: Adopted from Santonen et al. (2020)

Red fonts represent prioritised services and purple fonts other services that present the opportunity for the InnovaMare LL.

Those other services that present an opportunity for the InnovaMare LL are:

- **Prototype testing.** Building the platform for developing solutions for monitoring and predicting sea pollution opens a wide range of opportunities on the market, from renting the platform as a testbed to offering field trials, prototype design, structured innovation process, and similar. Detailed analysis of infrastructure features will reveal all possibilities. Prototype testing using this unique infrastructure can present an important service for the InnovaMare LL.
- **PoC.** The InnovaMare LL will be based on exploiting developed technological platform for different PoC activities. Users shall be able to test their prototypes and concepts using this platform.
- **User involvement expertise.** Gaining experience with user involvement will present an excellent opportunity for InnovaMare LL to understand how to optimally use motivational tools to engage all stakeholders effectively.
- **User-panels.** Regular meetings with user groups provide an opportunity to generate important and relevant knowledge on developed technologies. That knowledge can be presented to the customers as a newsletter for network members, periodic publications, education and similar.
- **Education and training.** The InnovaMare's experts shall build a list of education and technology training opportunities and develop online and on-site training for professionals. Gaining clients from different blue sector industries would contribute to LL's financial sustainability.
- **Circular economy and environment-related services.** The Circular economy concept becomes a part of different EU policies. The European economy will necessarily need to comply with this framework. The InnovaMare LL can become a leader in providing services focused on the Circular economy compliance for new maritime technologies developed in the InnovaMare LL.
- **Funding and funding support from private sources.** PPs and members can use the InnovaMare network to match their financing needs and strategic partnerships.
- **Internationalisation.** Internationalisation support is essential for fast-growing small and medium enterprises. The InnovaMare LL can offer this support based on its large network.

Identified services shall be developed through PP staff education and active workshops (user panels) where LL users can express their interest in services, advise and co-create them with PPs.

**At this point, the InnovaMare LL partners shall build capacities and further sharpen skills and competencies for the identified services.**

Next, we will discuss actor roles that are essential for processes and services to function.

## 5.4 Roles

Previously elaborated processes, tools, and services describe the context in which actors will set in their positions and play their parts. In this paragraph, project partners will be discussed as the project actors.

Defining actor roles is essential for the InnovaMare LL operational phase. Table 5 describes roles in Living Lab networks and explains their characteristics. When those characteristics fit the purpose of the grand innovation process activities, the actor roles are linked with that activity (Table 10). This model is built on the assumption that each role belongs to a particular part of the project.

Roles merely describe how actors are participating in different LL's projects or functions. For that reason, it is necessary for the InnovaMare LL project partners to understand the relationship between actors roles and the process to effectively engage in that particular role during the operational phase. By accepting roles, actors will build their capacity for interaction with other actors, gain new knowledge and expand their business network.

**Table 10. Identified supportive roles for each InnovaMare LL subprocess**

The InnovaMare LL Process	Roles needed to support the process
User engagement	Webber, Advocate, Facilitator
Communication management	Webber, Advocate, Facilitator
Governance and conflict management	Compromiser, Advocate, Gatekeeper, Planner
Idea scouting and selection	Webber, Facilitator, Instigator, Planner, Advocate, Compromiser, Entrant
Developing user-centred innovation	Facilitator, Aspirant, Entrant, Planner, Producer
Result promotion and dissemination	Accessory provider, Webber, Facilitator
Stakeholder motivation	Auxiliary, Webber, Advocate, Facilitator, Instigator

Following this exercise and example, roles shall finally be negotiated among actors and connected to each process activity. All of that will allow for easier project resource identification and assignment and the involvement of resources like people, budget and time for each specific LL project. Finally, all of that is an important predisposition for setting up the stage for effective process management. When actors accept roles, their interaction with the InnovaMare LL is defined. We suggest using this also for contracting with

the PPs. The DIH's purpose is the governance of the LL. Therefore, its roles correspond to the Gatekeeping, Advocate and Compromising roles. During the workshop in Bari, PPs have discussed their roles in the InnovaMare LL processes, as presented in Table 10. Each PP chose the role that would fit its aspirations, competencies, and skills.

The presented description of roles is a merely methodological explanation and needs further elaboration before implementing the LL. It also presents an essential part of the implementation planning phase.

After explaining actors, their roles, the nature of the process and services, we will describe the network structure of the InnovaMare LL.

## 5.5 The network structure

The InnovaMare project aims to establish the Digital Innovation Hub (DIH) and the Living Lab. DIH remains the central node in the network configuration and presents the governing body.

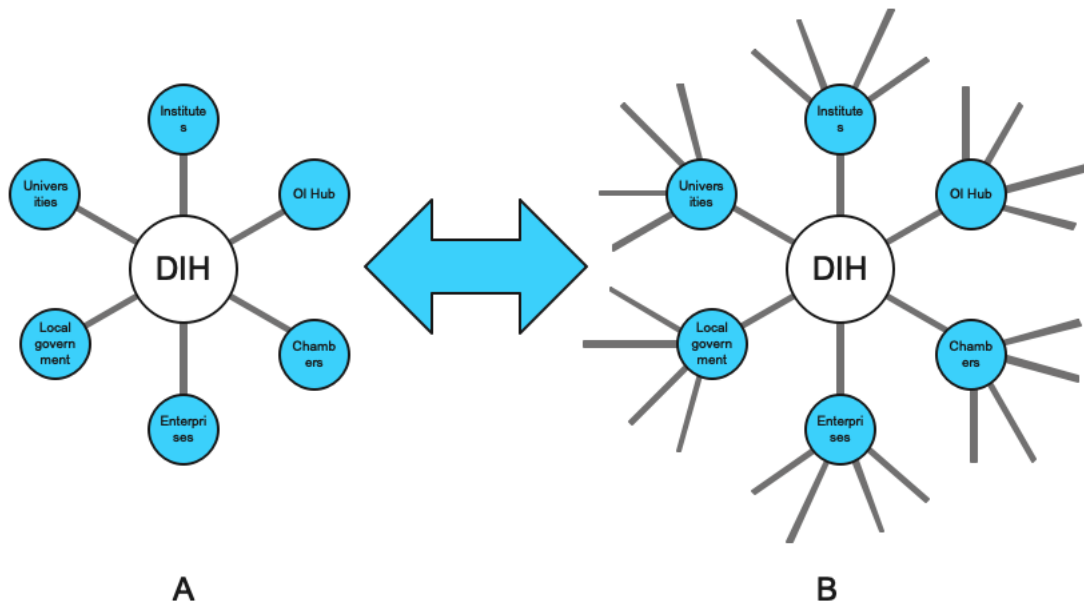
Users are central to most of LL's processes and present the essential stakeholder. They are involved through several activities described for the grand process. However, they will act as an external stakeholder from the perspective of process and organisation. Earlier described groups of project partners (universities, institutes, open innovation hub (OI hub), local government, agencies, chambers and enterprises) will be used for classification to illustrate different network configurations relevant for the InnovaMare LL. In this paragraph, we will refer to them as nodes.

The InnovaMare LL nodes can function with their capacities or act as the gate to their networks. The network structure can, therefore, transform from centralised to the distributed structure. Both presented structures in Figure 7 support incremental innovation and are positioned top-down (centralised structure) or in the middle of the way between bottom-up and top-down (distributed structure) approaches.

If individual nodes are willing to offer their networks as a resource, the initial centralised structure can transform into the distributed structure. According to the findings from the workshop in Bari, 85% of PPs are willing to open their networks to the InnovaMare LL needs, and the distributed structure remains a realistic option for the future. PP's networks present an important asset for the InnovaMare LL. An opportunity to include them into the LL innovation process as users or new members can catalyse LL's success on the market. Since this is a formal and structural transformation, adequate preparations shall be foreseen in the phase of detailed LL implementation planning. **It seems that the most feasible solution is to implement a centralised structure first.**

It only remains to be determined which actor will drive the InnovaMare Living Lab. Regardless of DIH being a central node, its function is mostly governance of the projects; the leading stakeholder groups can be knowledge providers (provider-driven) or users (user-driven). Universities and institutes as the knowledge providers form the prevalent and well technologically diversified group rich in knowledge as a resource and users that present the source of specific needs relevant for innovation, co-creation and co-development processes (survey results).

Figure 7. The InnovaMare Living Lab possible network configurations



A Centralised and B Distributed structure

The survey results support the idea of the InnovaMare LL as the commercialisation platform. Therefore, **the number of products that reach the market shall become the most important organisational KPI**. The nature of the InnovaMare LL innovation outputs remains in the field of incremental innovation.

For the lack of comprehensive knowledge in managing operations with users, **adopting the provider-driven approach rather than the user-driven approach is advisable**. The provider-driven approach promotes the transformation of concentrated technological knowledge residing in universities and institutes into innovation. Furthermore, that knowledge is distributed among partners and users. That also means that branding of the InnovaMare LL will be around the knowledge that resides within the network, attracting other potential actors to join, invest or use InnovaMare LL services.

In this section, we have discussed the network structure nature and all other relevant LL dimensions. Next, we will conceptualise the business model.

## 5.6 The Business Model Canvas as configuration and validation tool

To develop the InnovaMare LL business model, we will use the Business Model Canvas approach described by Santonen et al. (2020)<sup>26</sup>.

<sup>26</sup> Santonen, T., Julin, M., Hirvikoski, T., Salmi, A., Leskinen, J., Saastamoinen, K., ... & Kjærsgaard Nielsen, E. (2020). Living lab business models and services Key findings from Product Validation in Health (ProVaHealth) project

Table 11. The InnovaMare BMC

<b>Key partners</b>	<ul style="list-style-type: none"> <li>Local and regional government</li> </ul>	<ul style="list-style-type: none"> <li>Companies</li> </ul>	<ul style="list-style-type: none"> <li>Environmental protection organisations</li> </ul>	<ul style="list-style-type: none"> <li>Universities and institutes</li> </ul>
<b>Key activities</b>	<ul style="list-style-type: none"> <li>Network coordination</li> <li>User engagement (hackathons)</li> <li>Circular economy and environment-related services.</li> </ul>	<ul style="list-style-type: none"> <li>IPR support to the private sector</li> <li>Technology matching</li> </ul>	<ul style="list-style-type: none"> <li>Developing the grand process and subprocesses</li> <li>Governing the innovation process</li> </ul>	<ul style="list-style-type: none"> <li>Fundraising</li> <li>Funding support</li> <li>Matching with investors</li> </ul>
<b>Key resources</b>	<ul style="list-style-type: none"> <li>Universities and institutes</li> <li>User panel</li> </ul>	<ul style="list-style-type: none"> <li>Infrastructure and technologies</li> <li>Partners</li> </ul>	<ul style="list-style-type: none"> <li>External networks</li> <li>Data</li> </ul>	<ul style="list-style-type: none"> <li>Advisory board</li> <li>IPR</li> </ul>
<b>Value propositions</b>	<ul style="list-style-type: none"> <li>Circular economy principles embedded in all objectives and activities</li> <li>Green innovation in the Blue sector</li> </ul>	<ul style="list-style-type: none"> <li>Innovated with real end-user using unique infrastructure</li> <li>Extensive provider-driven support</li> <li>Internationalisation opportunities</li> </ul>	<ul style="list-style-type: none"> <li>Customised services</li> <li>Prototyping and testbeds</li> </ul>	<ul style="list-style-type: none"> <li>Fundraising</li> <li>Funding support</li> <li>Matching projects with investors and VC</li> </ul>
<b>Customer relationships</b>	<ul style="list-style-type: none"> <li>Co-Creation with various stakeholders</li> <li>Project-based contacts</li> </ul>	<ul style="list-style-type: none"> <li>Digital channels</li> <li>Gamification of communication channels</li> </ul>	<ul style="list-style-type: none"> <li>Direct personal contacts</li> <li>Ideation and co-creation activities</li> </ul>	<ul style="list-style-type: none"> <li>Networking</li> <li>Events</li> </ul>
<b>Channels</b>	<ul style="list-style-type: none"> <li>Regional channel through chambers</li> <li>Event participation/arranging</li> </ul>	<ul style="list-style-type: none"> <li>Educational channels</li> <li>Direct channels</li> </ul>	<ul style="list-style-type: none"> <li>Online, mobile and social media</li> <li>Cooperation projects</li> </ul>	<ul style="list-style-type: none"> <li>Professional publications</li> <li>Scientific publications</li> </ul>
<b>Customer segments</b>	<ul style="list-style-type: none"> <li>Educational system</li> <li>NGOs</li> </ul>	<ul style="list-style-type: none"> <li>Touristic sector</li> <li>Operators with productions sites in coastal areas (ship and boat builders, private companies, fisheries, aquaculture companies, port authorities/marina)</li> </ul>	<ul style="list-style-type: none"> <li>Public administration</li> </ul>	<ul style="list-style-type: none"> <li>National parks and protected area agencies, archaeological sites,</li> </ul>



<b>Key partners</b>	<ul style="list-style-type: none"> <li>Local and regional government</li> </ul>	<ul style="list-style-type: none"> <li>Companies</li> </ul>	<ul style="list-style-type: none"> <li>Environmental protection organisations</li> </ul>	<ul style="list-style-type: none"> <li>Universities and institutes</li> </ul>
<b>Cost structure</b>	<ul style="list-style-type: none"> <li>Infrastructure and facilities cost</li> <li>Marketing and sales</li> </ul>	<ul style="list-style-type: none"> <li>Personnel</li> <li>Consulting fees for external experts</li> </ul>	<ul style="list-style-type: none"> <li>Internal R&amp;D development</li> </ul>	<ul style="list-style-type: none"> <li>Travelling costs</li> <li>IPR-protection</li> <li>End-User fees and other variable costs</li> </ul>
<b>Revenue</b>	<ul style="list-style-type: none"> <li>Education services</li> <li>IPR</li> </ul>	<ul style="list-style-type: none"> <li>Project grants</li> <li>Consulting</li> </ul>	<ul style="list-style-type: none"> <li>Fixed or permanent funding</li> <li>Royalties</li> </ul>	<ul style="list-style-type: none"> <li>R&amp;D project and consulting service sales</li> <li>Device and infrastructure rental</li> </ul>

The InnovaMare LL BMC is built on data collected during the online workshop and survey. It reflects the LL customer segments, relations, communication and distribution channels, key activities, revenue sources and cost structure (Table 11).

The BMC can serve two purposes - for business model configuration and validation during implementation. It allows for a **configuration of the InnovaMare LL business model and summarization of previously described elements**. During the operationalisation phase, it shall be consulted regularly as a strategic guide when preparing action plans, deciding on strategic alliances, or choosing projects.

Proposed BM needs deeper insight before making the final implementation plan.



## 6 Conclusion

This exercise described the InnovaMare organisation’s methodology by primarily explaining the process and tools. Also, we linked them with the network structure, users, stakeholders and the incremental nature of the InnovaMare LL innovation outputs. Consequently, the proposed methodology describes essential elements and features of the LL and encompasses the process, tools, services, roles, network structure and business model as we have previously elaborated.

When preparing the Implementation plan, all discussed dimensions shall be considered. Before we explain the methodology, it is necessary to summarise the context for that methodology.

### 6.1 The context for the methodological approach

The proposed summary of the InnovaMare LL features is presented in Table 12.

**Table 12. The summary of the InnovaMare elements and features**

LL element/feature	The InnovaMare LL element/feature
<b>Methodology</b>	The grand process is based on a blended methodology with FormIT as the user-centred innovation process
<b>Network structure</b>	Centralised
<b>Central nod</b>	The Digital Innovation Hub
<b>Type of innovation</b>	Incremental
<b>Driving actor</b>	Knowledge providers: universities and institutes
<b>Strategic KPI</b>	The number of commercialised products/services

According to the proposed summary of the InnovaMare elements and features, the InnovaMare LL can be described as the centralised network structure with DIH as the central nod. The InnovaMare LL will implement a customised user-centred innovation process proposed in this document, with incremental innovation as the output. It will be the provider-driven network organisation that is strategically oriented toward the commercialisation of its services. Therefore, the strategic KPI is the number of commercialised products/services. In the next phase, we will focus on the implementation plan preparation. The described context and its elements will serve as a guide.

## 6.2 The InnovaMare LL methodology

Methodology for the InnovaMare LL is described through the elaboration of processes, their nature and tools. Furthermore, we proposed customised methodology based on the user-centred approach, which is the result of blending the best features of the following LL methodologies:

- Service Experience Engineering Methodology
- Collaboration@Rural
- Rural Inclusion Methodology
- The community management process
- FormIT

**The FormIT methodology** was chosen for its focus on product/service innovation. It was then incorporated into a larger set of processes to support and ensure a more customised approach to the InnovaMare LL. Previously described LL methods inspired us to define those supportive LL processes. Those are management processes. Consequently, **the final InnovaMare methodology addresses all relevant dimensions and elements tailored to fit the InnovaMare description.**

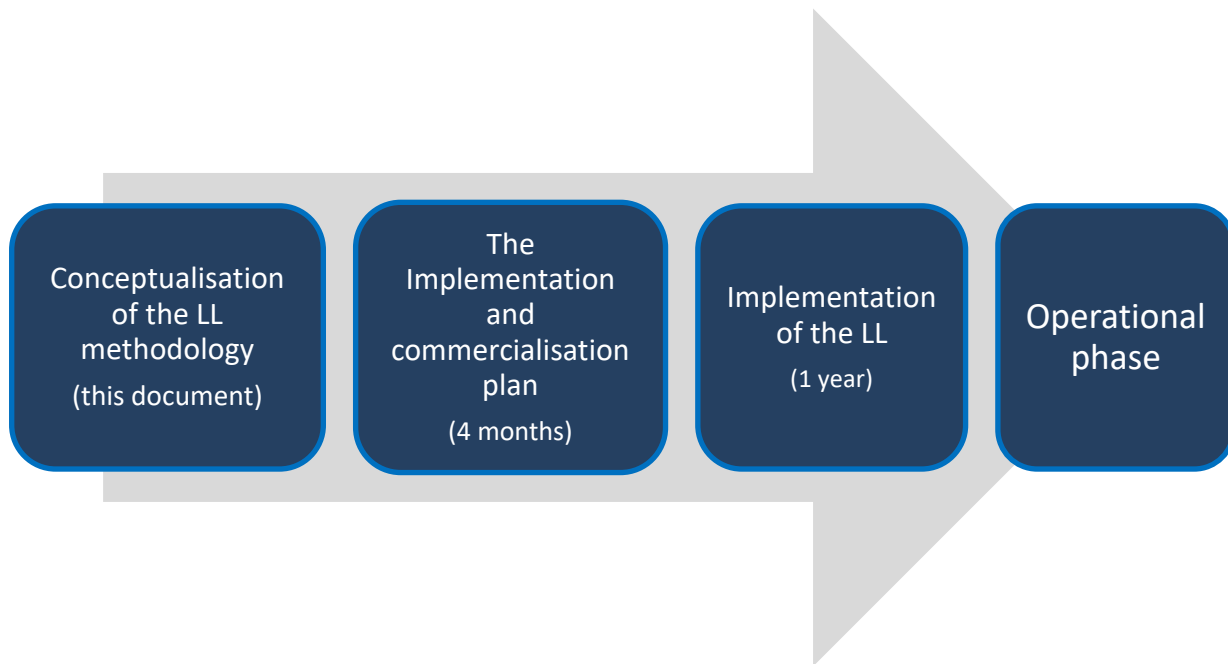
Next, we will describe the roadmap to the InnovaMare LL operationalisation.

## 6.3 The Roadmap

The roadmap to the operational phase consists of four major phases:

- **The conceptualisation of the InnovaMare LL.** All essential LL dimensions have been described and explained in this document.
- **Developing the Implementation and commercialisation plans.** The Implementation plan shall contain more detailed elaboration for each process. Also, more detailed elaboration of stakeholders, markets and users is necessary to prepare such a comprehensive plan.
- **Implementation.** Will present a separate phase in which all necessary preparation activities will be done. Those are education and training of LL partners, setting up joint processes, testing the LL infrastructure and governance process.
- **Operational phase.** At this phase, the InnovaMare LL is fully functional with all processes running. Maintaining the balance between the business model elements is crucial to sustaining LL at this stage.

Figure 8. The roadmap to implementation of the InnovaMare LL



Due to experience gained through working on this project, we estimated the time necessary to complete them would be four months for preparing the Implementation and commercialisation plan and one year for the implementation.

More about the implementation and commercialisation plans will be elaborated next.

#### 6.4 The Implementation and commercialisation plan

Although the Living Lab is a recent concept, it is well defined throughout the literature, especially in process, innovation methodology, stakeholder participation and engagement. What is scattered in the literature is a discussion on the commercialisation aspect of the LL. Commercialisation is essential to sustain operations. To mitigate the risk of failing in the commercialisation of the InnovaMare LL services, **we suggest that the Commercialisation plan is proposed together with the Implementation plan.**

Those documents shall contain all relevant information for future management. It shall include detailed

process mapping, process compatibility assessment for all PPs, financial plan, user engagement and communication plan, and the commercialisation plan.

**Therefore, it is necessary to immediately focus on commercialisation because it will allow for a balanced approach to the detailed planning of the operational phase.**

Next, we will discuss the InnovaMare governance and conclude with its description.

## 6.5 The InnovaMare Living Lab governance

It is already clear that other major points are to be addressed following the implementation and commercialisation plans. One of those points is the governance of the LL that will need to be defined and conducted, keeping in mind that the LL is among the most complex organisational approaches. For that reason, governing the LL requires managing both people and organisations that are members of the network. Aside from that, there are users as well. Management of the InnovaMare LL starts at the implementation phase when LL is formed as an active network and continues to the operationalisation phase, where the grand process is fully operational.

Another dimension is managing other key resources through coordination of activities, asset management, network, and central organisation (the DIH) management.

Future management shall be aware of differences between existing organisational setups within the network members, the PPs and the network itself. For that reason, management will need to find a way to sustain LL's processes. Therefore, the balance between different organisational interests will need to be met. The management will need to be familiar with the LL processes, project partners' organisational configurations and management approach. The first important thing to do is ensure compatibility between network and PP's processes, adapt own processes accordingly, and help members do the same.

**The governance of the InnovaMare LL will play a critical role in LL sustainability.** In this document, we could not afford extensive elaboration of this concern. Nevertheless, governance will be described extensively in the Implementation plan. In practical terms, it will demand an experienced crew to lead this project and balance different forces present in such a complex organisation.

## 6.6 Limitations

This document, as a methodological conceptualisation, faces limitations in different fields.

It lacks detailed elaboration for described areas, and for that reason, cannot be used directly for the

implementation. However, it will be used as a guideline for drafting the final implementation plan. As preparation for making the Implementation and commercialisation plan, this document provides essential information on the nature of the InnovaMare LL, its context and the methodology. It also helps the reader to understand the complexity of the LL concept.

The survey was completed on a small number of interviewees. There was no opportunity to distinguish among PPs (universities, institutes, open innovation hub), local government, agencies, chambers and enterprises). However, it served its purpose through providing triangulation for the workshop inputs and complementing with new discoveries. We suggest further exploring and introducing semi-structured and open-ended approaches to dig deeper into the matter for the next step.

The DIH is still emerging, and its organisational structure and functions are not described in detail. Nevertheless, throughout this document, we have described its role and position in the network.