IASP International Association of Science Parks and Areas of Innovation

35th IASP World Conference
on Science Parks and Areas of Innovation 2018
Isfahan, Iran

Open Innovation Living Lab: the case of Enel in Malaga

Parallel session 6:

The 'Lab factor': Living Labs, Fab Labs and STPs

Author:

Josep Miquel Piqué
Carmen Adán

Hosted by:

ISFAHAN
SCIENCE & TECHNOLOGY TOWN
(ISTT)

ISBN: 978-84-09-17612-0

Open Innovation Living Lab: the case of Enel in Malaga

Josep Miquel Piqué* and Carmen Adán
La Salle Technova – Ramon Llull University
Email: jmpique@salleURL.edu
*Corresponding author

Susana Carillo and Inmaculada Prieto
New Technology and Living Labs - Endesa Distribución

ABSTRACT

Living Labs appear in response to the need to incorporate real environments in innovation processes where users, clients or citizens are incorporated. The Living Lab is a key instrument for validating Pilots prior to scalability (incorporating technological, economic, security, environmental, etc. dimensions).

The Open Innovation Living Lab (OILL) of ENEL is a testing, validation and feedback instrument with the client that provides at the organization space to develop controlled experiences through Pilots of technologies, products, processes and solutions in real environments that have an impact of innovation in the company's business and value for customers.

The purpose of this paper is to define and present the implementation model of Pilots and Centers of the Open Innovation Living Lab (OILL), which allows ENEL to develop these in different locations around the world to promote open innovation; evaluate and validate the proposed solutions; and communicate and share the results obtained. The Case of ENEL in Malaga will be analyzed

Keywords: Living Labs, Pilots, Test, Open Innovation, Ecosystems of Innovation Entrepreneurs; Startup; Corporates, Quadruple Helix

Biographical notes:

Josep Miquel Pique is President of the International Association of Science Parks and Areas of Innovation (IASP) and Executive President of Technova Barcelona La Salle - Ramon Llull University.

Carmen Adan is Innovation Manager at Technova Barcelona La Salle - Ramon Llull University.

Susana Carillo and Inmaculada Prieto work at Endesa Distribución in New Technology and Living Labs.

1 - INTRODUCTION

This paper presents a model for the Open Innovation Living Lab (OILL) Centers and Pilots, that allows Enel-Endesa to manage them at the various sites around the world to foster open innovation, evaluate and validate proposed solutions, as well as report and share outcomes. The paper describes the design of the methodology and general processes and operational management that can be implemented. The model is based in the experience of the Smartcity Malaga Living Lab. This Living Lab hosts real experiences carried out by an active, varied stakeholder environment -formed by a Utility, ENEL-ENDESA, and a series of industrial partners, universities, research entities, local and regional public administration, etc.-, presenting all the factors of reality, instead of a controlled, predetermined replication of it.

Smartcity Malaga Living Lab has a long experience and a valuable know-how acquired through years from living use cases. A variety of initiatives have been carried out and are now on going in this Living Lab, with both private and public funds - national, regional and European-, with two common factors: the collaboration of active, engaged final users -external or internal, household or professional, companies or citizens, etc.- and the aim of continuity, synergy and evolution of infrastructures, stakeholders and experiences. Smartcity Malaga Living Labs has a great support from the Municipality and citizens that let us install and test different network technologies everywhere we need.

1.1. Living Labs as catalysts for the adoption of new technologies.

Open Innovation and Living Labs strategies are being rolled out in a number of innovation ecosystems around the world. Pilots such as Open Cities, the establishment of Living Labs in European cities, and Open Innovation mechanisms in major corporations are signs of the international trend in these areas.

The Open Innovation Living Lab is a testing and validation tool that provides an organization with a space for piloting products, processes and solutions in real-world scenarios with an impact on innovation in the Company's business.

Open Innovation Living Lab brings the Open Innovation and Living Labs worlds together, creating a benchmark model for maximising synergies between the two.

Living Labs have arisen to meet the need to include real-world settings in innovation processes involving users, customers and the general public. This section underlines the importance of validating Pilots in real-world settings before scaling up the best proven solution (from a technological, economic, safety, environmental perspective, etc.). The benefits of carrying out Pilots in real-world settings and involving end users, and the benefits of Living Labs for all stakeholders will be considered, while the impact of Living Labs and Pilots and management of the know-how and user feedback will also be looked at.

A real-world test space for Pilots

Living Labs provide a means for validating innovation Pilots in real-world settings.

Where technology and innovation meet

Living Labs offer a permanent space where new technologies can be applied in products and/or solutions in real-world settings, facilitating and encouraging the transfer of scientific-technological know-how.

A test space where risks are controlled

Extremely innovative products/solutions that have not been tried out with real customers can be tested in the Living Labs.

From ideas to validation: Speed of learning

Living Labs help reduce the time it takes for ideas to be validated through tangible results that can be evaluated in real-world settings.

From Pilot to scale-up

Living Labs can be used to evaluate Pilots and determine their scalability prior to rolling a product or process out across the world.

A permanent innovation ecosystem

The OILL is a mechanism for building permanent relations with agents in the innovation ecosystem: science and technology parks, universities, technology centres, research institutes, business clusters, investors, etc.

Engaging users in innovation

Living Labs offer a space for the beneficiaries of the innovation to interact with the team managing an innovation Pilot.

An instrument for encouraging Open Innovation in the Company

An OILL provides the Company and its stakeholders with a tool to encourage innovation and nurture a culture of innovation.

1.2. Benefits of incorporating a real-world setting into the innovation process

The benefits of including a real-world setting into the innovation process are as follows:

Engaging the real-world market at an innovation centre

Involving the real-world market in the innovation process ensures Pilots respond to the real value proposal put forward.

The real-world setting as a validation mechanism

Early-stage inclusion of a setting in the validation of innovation Pilots ensures proposals are effective and reduces the risk of subsequent errors.

Beneficiary as a co-designer

By including the final beneficiary as a co-designer in the Pilots, it is made certain that the innovation Pilots focus on real needs and the perceived value proposals.

Demonstration to encourage action

The showrooms at Living Labs help stakeholders understand the value proposals, encourage adoption and scale-up of the innovation, and nurture the culture of innovation.

Measurement of outcomes and consequences

Evaluating the results of a Pilot and observing the consequences of conducting a Pilot in a real-world setting contribute overarching information on the proposed innovation.

The golden reference

Selecting golden references (customers) to validate innovations provides assurance that the results have been tested by key customers (financial attraction, proximity to customers or characteristics of key users).

1.3. Benefits of having a Living Lab

Living Labs are key because they are:

A critical phase in finalising an innovation

Living Labs are involved in the critical phase and decision to adopt an innovation.

A tool for validating innovation Pilots

Living Labs can be used to validate expected results of a proposed innovation and validate the features of the products and/or solutions developed.

A systemic source of open innovation

Living Labs enable spaces to be created that promote open innovation and ongoing dialogue between customers, entrepreneurs, partners, businesses in other sectors, centres of learning, research institutes, technology centres, public authorities, etc.

Regional representation

Living Labs can be located where they can offer the most value to the Company from a technological or functional perspective. They also provide a shop window for I&N's innovations in each region.

Transfer of know-how to boost competitiveness

Living Labs can be used to handle internal and external know-how, validate it in controlled real-world settings, and gain experience that can be shared and replicated across the Company.

Leadership in innovation

Through their Pilots and Showrooms, Living Labs position the Company as an innovative and competitive enterprise.

1.4. Evaluation of economic, environmental and social impacts of Living Labs

The outcomes of a Living Lab can have a socio-economic and environmental impact on the local region. A socio-economic impact study by iMinds Living Lab shows that most companies using Living Labs in their processes, adapt their products before market launch based on the evaluations and feedback from Pilots.

Economic impact

- Reduction in the costs of new products or services through user involvement in the development process.
- Lower costs related with technology risks.
- Decrease in organisational costs on incorporating innovation processes into formal systems.
- Increase in value for users.
- Greater worker productivity through use of technology.
- Increase in competitiveness through quicker roll-out of new products and services.
- Increase in value for the Company in its efforts to incorporate innovation in formal systems and establish new businesses.

Social impact

- Stronger culture of innovation in the areas where they are sited.
- Active involvement of universities and centres of learning to observe and/or propose innovative solutions.
- Increase in courses related with innovation and technological studies.
- Involvement of customers, users, market and society in defining, designing and validating innovation Pilots.

Environmental impact

- Search for solutions to environmental challenges that could be tested in Living Labs.
- Reduction in environmental impact of a Pilot as it is conducted in a controlled setting.

- Identification of the environmental impact before replicating proposed solutions.

1.5. Management of knowledge generated by Living Labs to capitalize it.

Living Labs can be used to create a variety of innovations, foster collaboration, and enhance the flow and dissemination of know-how (Mavridis, 2009)

Knowledge management is founded on collating information on user needs and on the learning points gleaned from Pilots.

It consists of a raft of activities:

Identification

Activity aimed at identifying the specific challenges and entities that can develop or already have the solutions to these.

In this regard, active mapping of available intellectual property and knowledge providers is needed.

Creation

Mechanisms used to generate know-how through Pilots that bring together the data and information required to certify expected functionalities.

It is crucial here that methodologies are in place to nurture creativity and manage innovation Pilots.

Representation

Systems that graphically and effectively show the know-how acquired which impacts on processes, products or business models.

This activity includes coding forms, infographics and understanding through visualisation.

Availability

Systems that make the know-how acquired available (including search and selection mechanisms) to any party requiring said knowledge, irrespective of location.

A digital platform is needed here, which facilitates access and helps users search for the required knowledge.

Exploitation

Formula for the accumulated know-how to be used internally or externally through licences or cessions.

A policy is required on the use and exploitation of intellectual property.

1.6. Open Innovation: A core strategy

The definition of this paradigm by Henry Chesbrough(2003), the father of Open Innovation, is "the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively". Firms can and should use external ideas as well as internal ideas, as they look to develop their technology.

Open Innovation can be understood as the antithesis of the traditional vertical integration model where internal R&D activities lead to internally developed products that are then distributed by the firm. There are consequently two faces to Open Innovation: "outside-in" where external ideas and technologies are absorbed by a firm into its own innovation processes; and "inside-out" where undervalued ideas and technologies in a firm can be used externally, incorporating them in other innovation processes.

Since Henry Chesbrough's book "Open Innovation" was published in 2003, open innovation ideas have come to influence innovation managers in many organisations.

The Open Innovation concept exists when an organisation does not just innovate using ideas generated internally, but learns from and uses ideas from outside (users, suppliers, researchers, etc.). One example of Open Innovation is working together to develop technologies. Another way would be through specialist intermediaries who bring the parties looking for a solution together with those who can provide one, and in this sense, science and technology parks could be a specialized intermediary.

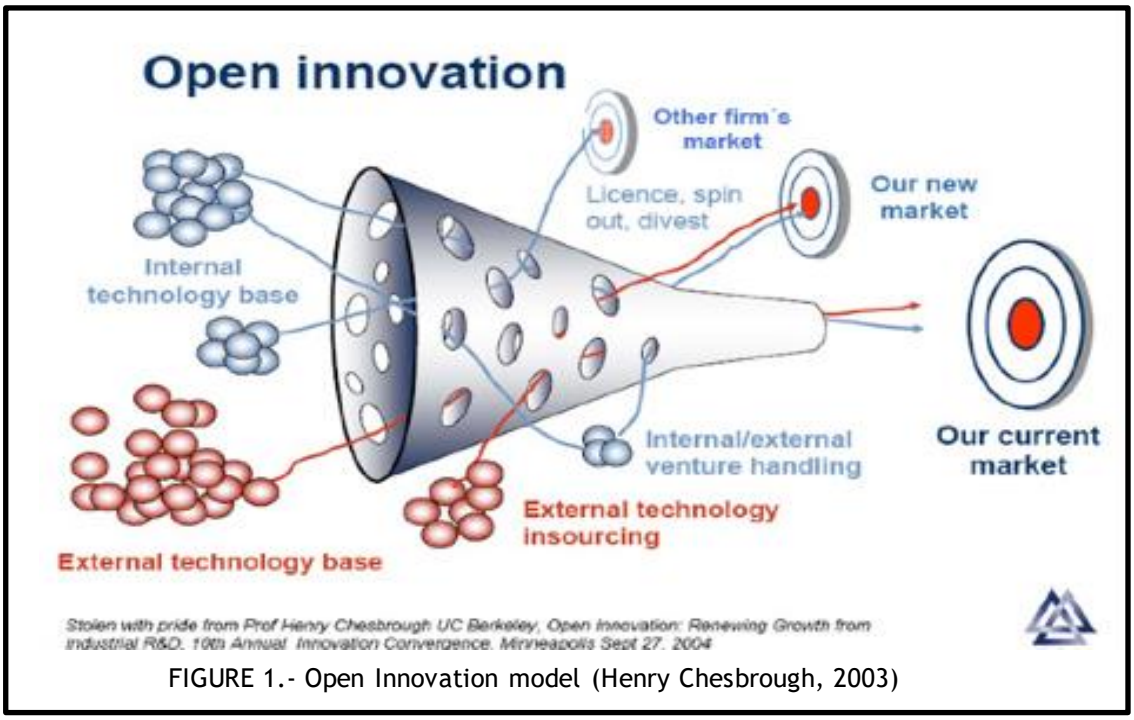

FIGURE 1.- Open Innovation model (Henry Chesbrough, 2003)

Open Innovation Labs therefore provide an answer to the need to include users, customers, the general public and researchers in the innovation processes at a firm.

1.7. Living Labs: Types

The European Network of Living Labs (ENoLL) defines a Living Lab as a working system and setting for creating a future economy, in which the approach for co-creation of new products, services and infrastructures in society entails user-centred innovation in a real-world context. Living Labs can be classified based on demographic, geographical and value chain factors and on context (Corelabs, 2007).

While all Living Labs have a key role, which is to facilitate user engagement in the innovation process, major differences can appear and emerge between them. Some have a geographical or demographic focus, focusing on rural or urban areas or targeting young people or the elderly, for instance. Other Living Labs are closely connected to a branch or to an industrial value chain, in the health or automotive sectors for instance. Others, however, focus on a particular context. Analysing emerging and existing Living Labs is a step towards detecting a need, or is a feasible way of dividing or mapping Living Labs into different categories.

ENoLL distinguishes several types of Living Lab:

- **Investigation Living Labs**
- **Corporate Living Labs,** focusing on establishing a physical location where stakeholders can be invited to co-create new concepts.
- **Organisational Living Labs**, where members of an organisation develop new concepts on a co-creative basis.
- **Intermediary Living Labs,** where different partners are invited to collaborate in a neutral space.
- **Time-restricted Living Labs** to support an innovative process for a Pilot. The Living Lab is closed when the Pilot is completed.

In a Living Lab, the purpose is to manage the Quadruple Helix by coordinating the innovation processes between the four major participants: companies, users, public organisations and researchers. These participants can benefit in many different ways from the Living Lab approach: companies can learn new, innovative ideas, users can find the innovation that they want, researchers can hold case studies and public organisations can obtain a better return on investment from innovation research.

1.8. Open Innovation 2.0 in Industry: Toward Innovative Ecosystems

With advances in ICT, innovation processes and practices are evolving at a constantly accelerating rate. As demonstrated in Figure 10, innovation as a discipline has moved on from being something invented by a brilliant researcher to an era of open innovation, and now to a vision centred on **innovation ecosystems**, where the ecosystem is the distinctive success unit, not universities or companies operating on their own.

Justin Rattner, CTO of Intel, has been preaching the concept of **Industrial Research** in the 21st century, characterised by **envisioning, inventing, validating and venturing**.

This type of innovation occurs when research laboratories and companies jointly share resources, risks and decisions. The team works together to develop product roadmaps identifying the paths from research to results.

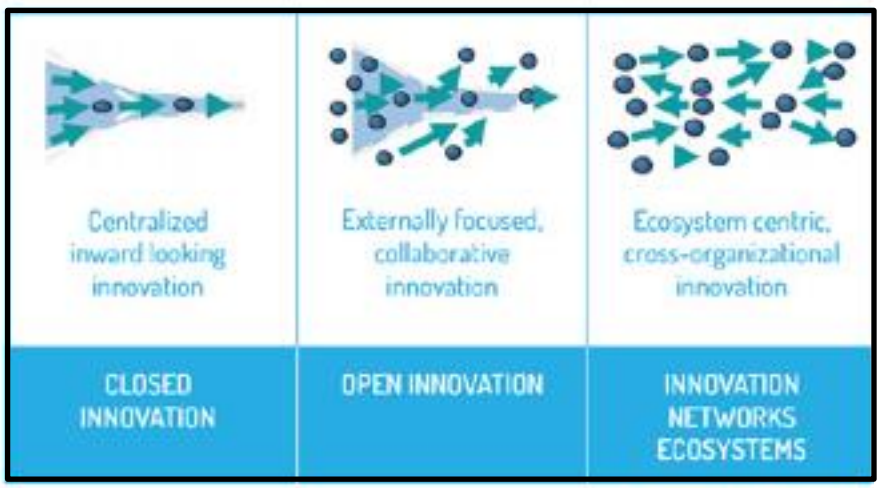

FIGURE 2.- Evolution of Innovation – EU 2013

Several core ideas emerge under this concept:

1. **Shared Vision and Value:** this is the value created at the intersection of corporate performance and society when major problems are resolved.
2. **Innovation Quadruple Helix:** Industry, Government, Academia and Citizens work together to co-create and drive structural changes far beyond the reach of what these organisations can do on their own.
3. **Management of Innovation Ecosystems:** Innovation has moved beyond the laboratory into an ecosystem crossing organisational limits. Innovation networks are the driving force.
4. **Co-Creation of Innovation and Commitment Platforms:** Co-creation incorporates all stakeholders, including users, providers and clients, in the development of innovative solutions. A participation platform provides the necessary ambiance for co-creation, including the persons and resources.
5. **Central role of the user:** The role of the user has changed from being an object of research or a research collaborator to becoming a co-innovator.
6. **Focus on Co-Opting:** Schrage "Innovation is not innovators innovating; it is adopting clients."
7. **Toward Sustainability:** Co-creation of services and solutions that add value, improve resource efficiency and collectively set a course toward sustainability.
8. **Simultaneous Technological and Social Innovation:** With changes that affect technology, business models, organisations and all of society.
9. **Innovation in the business model:** Innovation is about the definition and design of new business models to capture value for the company.
10. **Hybrid Innovation:** Disruptive ideas emerge at the intersection of fields, disciplines and cultures.

1.9. Success Cases in the World

During its 6th Framework Programme, the European Commission decided to finance five pilots related to Living Labs research. The Competitiveness and Innovation Programme (CIP) was also launched, including a specific line of action dedicated to working specifically with the Living Labs concept. This strong interest resulted in the creation of the European Network of Living Labs – (EnoLL), currently with about 300 members in different sectors.

And so, the first 20 Living Labs were created all over Europe under the coordination of the CoreLabs Pilot, joining forces to establish a sustainable development network and to gradually offer a combination of Living Labs service networks. The objective of this European Network of Living Labs (EnoLL) is to become a tool for more efficiently and dynamically supporting industrial innovation processes and involving citizens in the development of new services, products and social infrastructures, and is a step forward to a New European Innovation Infrastructure. The creation of similar Living Labs networks in other regions such as America, Africa and Asia should also be noted.

Notable is the 22@Barcelona Urban Lab model, cited by Bloomberg Philanthropies and Nesta as one of the 20 best urban innovation initiatives in the world in 2014, where the Innovation District is a Pilot testing ground of the Municipality of Barcelona, open to Corporations, Entrepreneurs and Universities to test their innovative proposals in real environments.

1.10. International organisations and associations

IASP – International Association of Science Parks and Areas of Innovation

IASP (International Association of Science Parks and Areas of Innovation) is an international organisation promoting Open Innovation with 400 parks around the world, sponsoring the "Open Innovation Market Place" concept to create events that build bridges between company demand and innovation supply by entrepreneurs and innovators through direct contact between the entities involved.

- LINK: www.IASP.ws

ENoLL – European Network of Living Labs

There is also ENoLL, mentioned above, an international association of Living Labs in Europe and all over the world. Through its active members, ENoLL directly enables co-creation and user involvement in experimental confirmations and talents, focusing on innovation through various sectors like energy, the media, transportation, health, agriculture, etc. ENoLL also provides a platform for the exchange of best practices, learning and support and the development of international living lab Pilots.

- LINK: www.openlivinglabs.eu

Living Lab Global

The Copenhagen (Denmark) based non-profit organisation "Living Labs Global" for the promotion of innovation in urban services should also be mentioned. It supports the contribution of international awareness in different sectors of the International market through innovative solutions. Its mission is to collect and present solutions to make city spaces more attractive, inclusive, efficient and diverse through the Living Labs Global Showcase. Membership is free and it provides recognition, visibility and new opportunities for Pilots.

- LINK: www.livinglabs-global.com

2. ENEL- ENDESA OPEN INNOVATION LIVING LAB MODEL

2.1. General objectives

Open Innovation Living Lab (OILL) is a testing and validation tool that provides a space for piloting products, processes and solutions in real-world scenarios with an impact on innovation in the Company's business.

The OILL is a functional area of the Company that field tests technologies, services, systems, etc. in real-world operating conditions, and:

- Works in different areas (network automation, telecommunications, microgrids, storage, e-mobility, etc.)
- Operates at several sites (e.g. Bogotá, Málaga, Barcelona, etc.)
- Has a number of objectives (proprietary technology testing, collaboration with external agents, research, adaptation of existing technology, certification, etc.)

This document defines and models the implementation of the Living Labs process, test spaces and validation of technologies, products, production processes, commercial processes and innovation Pilots for the Enel-Endesa or associated, related or accredited entities.

Enel-Endesa uses this tool to implement the Open Innovation strategy adopted to carry out Pilots that are of interest to the company, and subsequently decide on whether they can be scaled up and replicated across or outside the organisation. The OILL will provide economic, environmental and social impact indicators.

2.2. Specific objectives

This document sets out the specific objectives of an OILL:

Integration of OILL ecosystem

Establish the best fit for the OILL in the Enel-Endesa Organization Model and its overarching Open Innovation strategy.

Promotion of OILL as a test space

Put forward strategies for using the OILL, promoting culture of innovation and positioning the Company as a benchmark for Open Innovation.

Formalised receipt of pilot requests

Establish a formal system for receiving internal and external requests to use the OILL as a test space.

Drawing up of an OILL Innovation Pilots Methodology

Create an internal methodology for innovation pilots at the OILL, which is effective and adopted by the Company.

Design and functioning of OILL Centers

Establish an OILL Center model standardising operating practices at the centres and the procedure for opening new permanent or time-limited OILL Centers.

OILL Scorecard

Avail of a series of indicators which can be used to monitor the progress of Pilots and the activity performed by the OILL Centers.

Reporting and dissemination of results

Establish a Communication Plan to disseminate the outcomes of the Pilots through in-house and external channels.

OILL assessment, certification and seal of approval

Establish a formal assessment system for certifying and accrediting Pilot outcomes for the benefit of the Company and third parties.

Digitalisation of the OILL process

Create a single IT application for all OILL Center processes and management of the Pilots.

OILL Service Portfolio

Define portfolio of services performed by OILL Centers as test spaces, showrooms and situation rooms.

2.3. Beneficiaries and agents involved

The OILL is an open innovation tool at the disposal of the Enel-Endesa and external agents interested in validating or evaluating their solutions at the OILL:

In the case of Endesa, beneficiaries are classified in this regard as follows:

Principal internal agents

- I&N (Infrastructures and Networks)
- NT (Network Technologies)
- Company
- Company staff

Open to external agents

- Customers, suppliers and partners
- Public authorities
- Universities and technology centres
- The media
- Consumers and the general public

The following figure provides details of the agents involved in the Open Innovation Living Lab:

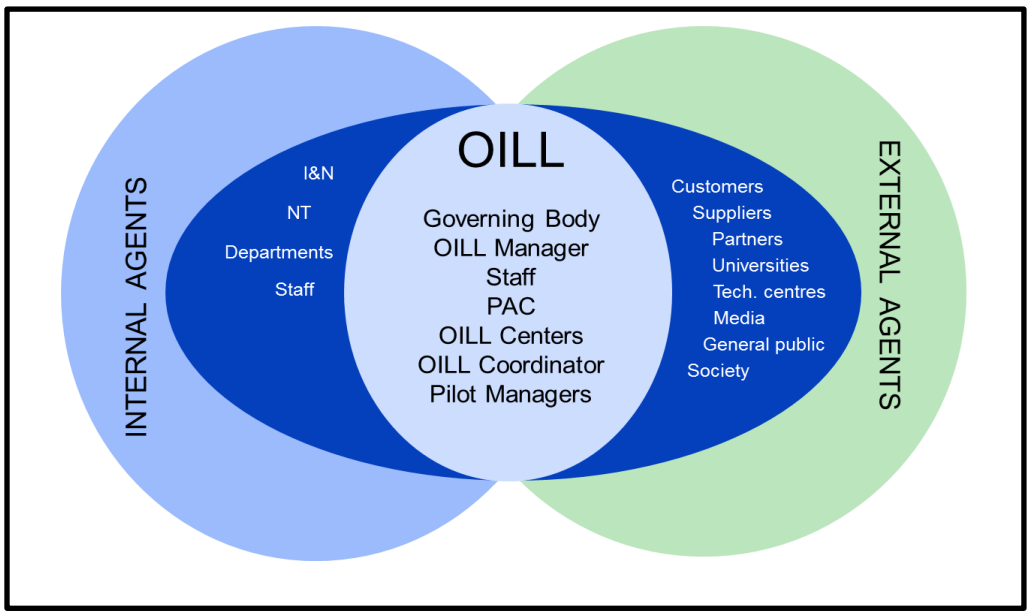

FIGURE 3.- Agents involved in the OILL

2.4. OILL in the Enel-Endesa Innovation Model

The Open Innovation Living Lab performs testing and validation and demonstration services within the framework of the Enel- Endesa Innovation Model, contributing a fast, systematic and reliable process.

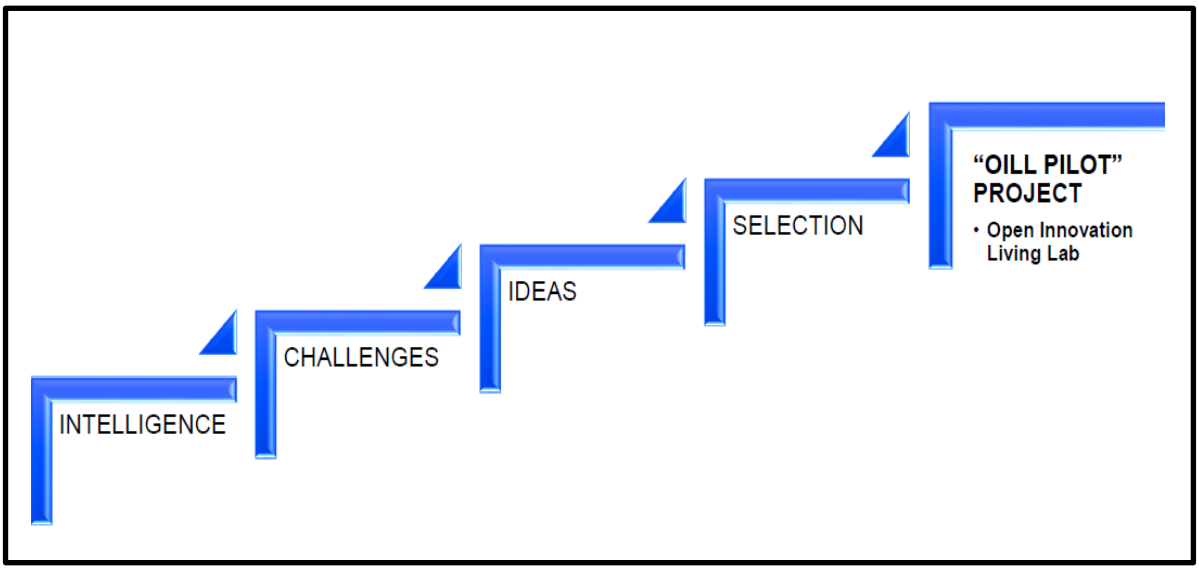

FIGURE 4.- I&N ENEL-ENDESA Innovation Model

PHASE 1 - Intelligence

Trends are analysed, technological intelligence criteria drawn up and the strategic lines of the Innovation Model agreed.

PHASE 2 - Challenge

The Company's technological priorities and challenges are determined.

PHASE 3 - Generation of ideas

Mechanisms are put in place to encourage the generation of ideas and channel internal and external sources of ideas.

PHASE 4 - Selection of ideas

Ideas are chosen by Evaluation Committees.

PHASE 5 - Execution of Pilots

The selected ideas will be implemented in house or through industrial or technological partners or other organisations.

OILL is part of the innovation process and activity in the Innovation Pilot phase or as a Pilot.

PHASE 6 - Market

In this phase, the value of Pilot outcomes is unlocked through commercial agreements or patents or through internal use.

2.5. OILL Governance: Structure and organisation

Open Innovation Living Lab Governance is based on a structure that coordinates the activities of all the OILL Centers now or in the future.

Pilots at the different OILL Centers must therefore be coordinated by sharing the same organisation processes and following the same operating methodology.

The OILL unified digital platform will ensure processes are coherent and will bring together data, information and know-how.

Each OILL must report to its agreed senior organisation.

The general structure would be as shown hereon:

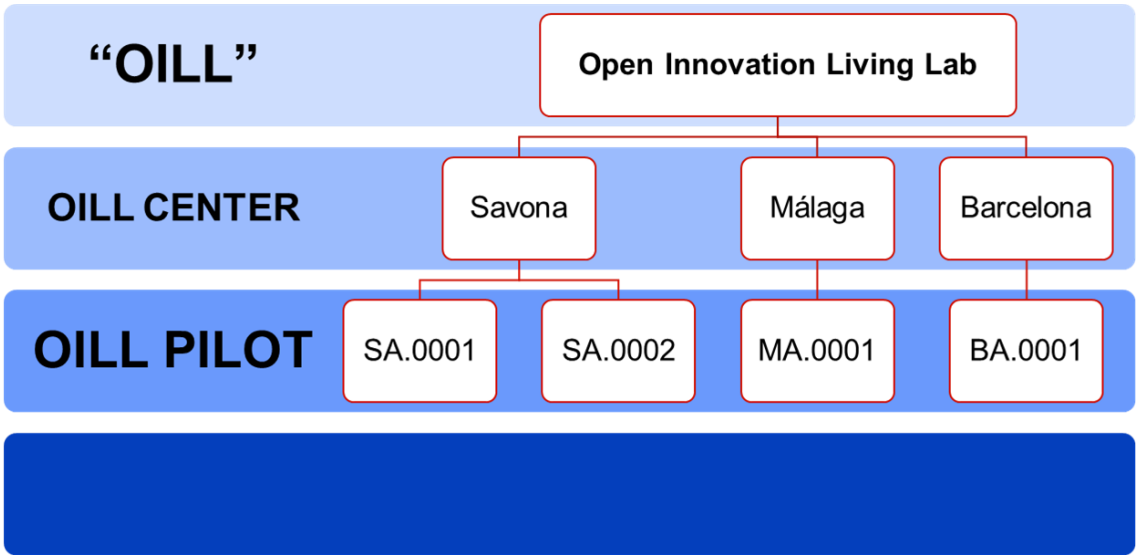

FIGURE 5.- OILL structure

OILL – Open Innovation Living Lab

Functional area that designs Innovation Pilots to be tested in real environments for validation, assessment and dissemination of the outcomes thereof.

The OILL is available to internal and external clients wanting to field test their technologies, products, services and/or solutions.

The OILL contributes to the performance of Pilots, taking responsibility for carrying them out, reporting the learning points that are gleaned, and managing the knowledge acquired.

OILL CENTER – Open Innovation Living Lab Centers

An OILL operates through OILL Centers with the same processes and methodologies for conducting Pilots.

Main environments and functions of an OILL Center:

LIVING LABS: This area provides the right settings for carrying out Pilots and manages operations of the Pilots assigned to it.

SHOWROOMS: These offer demonstration spaces for disseminating the results of completed Pilots.

SITUATION ROOMS: These comprise spaces and the resources needed to oversee and monitor Pilots and visits to the OILL Centers.

OILL PILOT – Open Innovation Living Lab Pilots

The Pilots are carried out at OILL Centers as per an agreed Work Plan.

Pilots will be evaluated to validate their usefulness, while know-how will be generated that will be disseminated as per a pre-established communication plan.

OILL DIGITAL PLATAFORM – The OILL coordination platform

All processes will be digitalised through the OILL Digital Platform to ensure OILL Centers and OILL Pilots are coordinated and provide an efficient tool for operating OILLs.

This single platform will provide support for receiving, handling and evaluating requests for OILL Pilots; for managing OILL Center operations; and for reporting and disseminating details of the OILL's activities.

The organisational structure for coordinating the Open Innovation Living Lab is as follows:

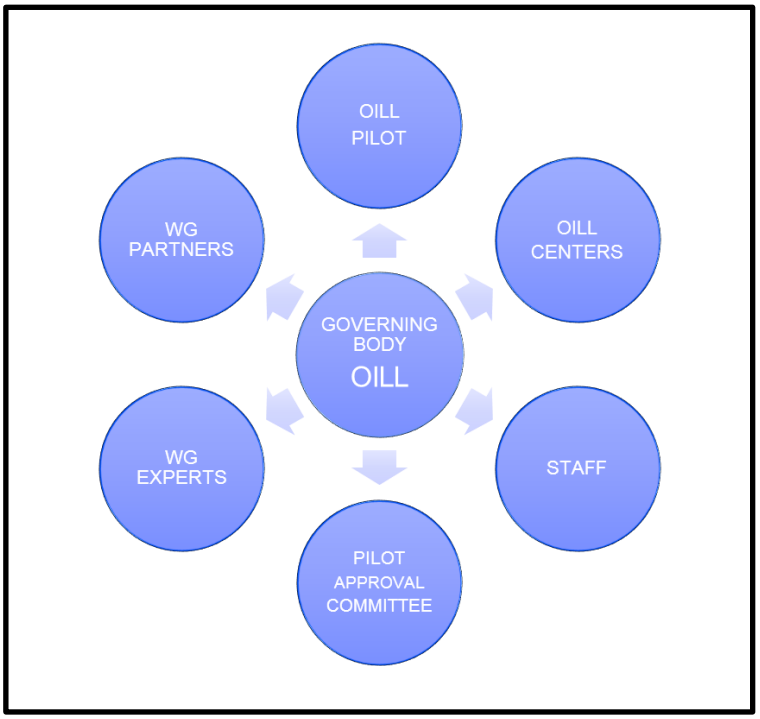

FIGURE 6.- OILL components

2.6. OILL Services

OILL Services

OILL Services must fulfil the remit of the Open Innovation Living Lab (OILL) as a testing and validation tool that provides the Group with a space for piloting products, processes and solutions in real-world scenarios with an impact on innovation in the Company's business.

Each OILL will operate as a ***Living Lab***, ***Showroom*** **and** ***Situation Room*** through local OILL Centers that share the same processes and methodologies for Pilots. The OILL Centers' goal is to provide the best setting for testing, validation, oversight and dissemination of information on Pilots proposed in the Enel Group's Open Innovation Living Lab.

- OILL CENTER – LIVING LAB FUNCTION

Geographical testing environment for Pilots to be conducted in the conditions approved by the Pilot Approval Committee.

- OILL CENTER – SHOWROOM FUNCTION

OILL Centers may have a specific showroom for the permanent dissemination of the outcomes of each Pilot, where the completed Pilots can be visited and enquiries made.

- OILL CENTER – SITUATION ROOM FUNCTION

A Situation Room is needed to monitor projects at an OILL, where all the projects connected to the OILL Center in question can be overseen individually or jointly. The Situation Room also avails of all the information on visits and delegations related with the associated Showroom.

All OILL Centers must at least serve as a Living Lab and perform a supervision and control function, and may optionally serve as a demonstration or showroom.

The basic services making up these functions are set out in the following table. Certain resources (human, economic and technological) are needed to perform these services.

2.7. OILL Pilot life cycle

An OILL Pilot's life cycle has four phases: Receipt of proposals, preparation of Pilot (Prepilot), performance of Pilot, and dissemination of results

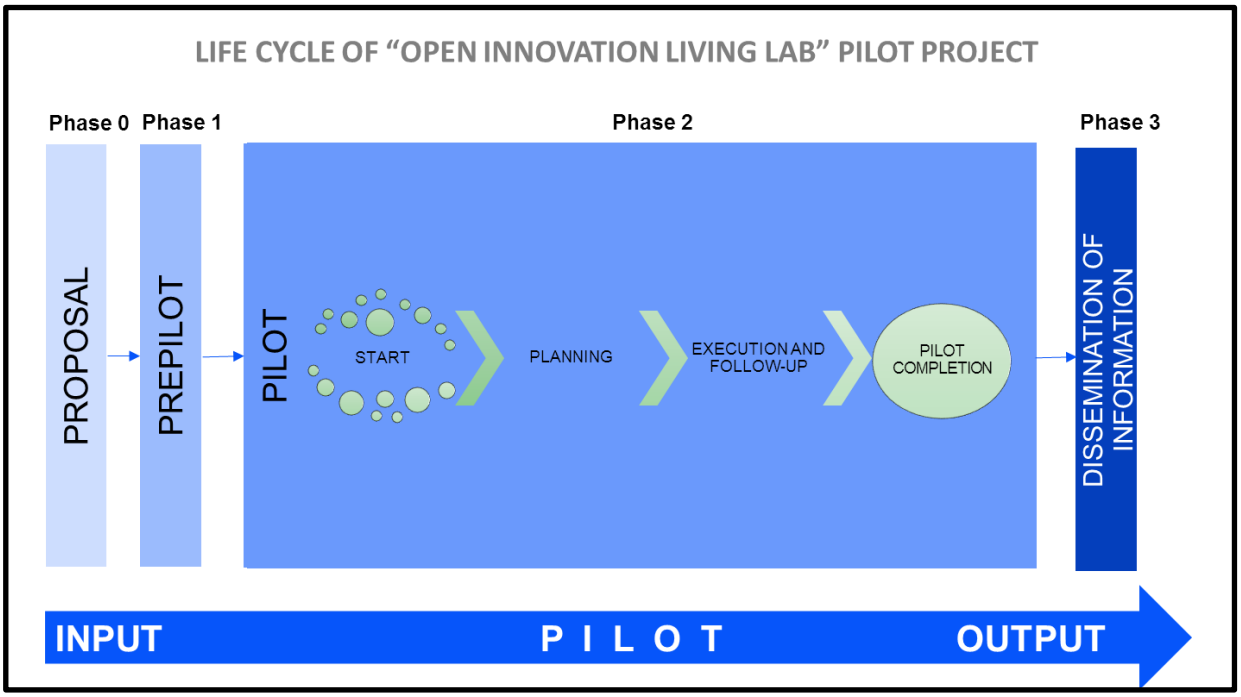

FIGURE 7.- Life cycle of a Pilot at an OILL

Management of an OILL Pilot will be organised as follows:

PHASE 0 – OILL Pilot proposal

a) Receipt of proposals

Proposals for Pilots are **received** by the OILL in a centralised manner (to avoid duplications and maximise synergies). A web-based application (OILL Digital Platform) will be used to describe the Pilots.

b) Evaluation of the OILL Pilot Proposal

A **Governing Body meeting** will be held to analyse each proposal and evaluated.

PHASE 1 – OILL Pilot preproject

c) Analysis of the Manager of the OILL Center

d) The OILL Pilot preproject sign-off

The Approval Committee will look at the information provided by the OILL Center Manager and approve or reject formally the Pilot.

PHASE 2 – OILL Pilot project

Once the Approval Committee has approved an OILL Pilot, it will be formally kicked off. To do this, an exhaustive plan is required on the execution, monitoring and formal completion thereof.

e) OILL Pilot project planning

f) Execution and Monitoring of OILL Pilot (IMPLEMENTATION)

The selected OILL Pilots will be **executed** as per the planned schedule.

g) OILL Pilot Completion

Once an OILL Pilot is completed, it must be **validated and evaluated**.

PHASE 3 – Knowledge management

h) Knowledge Management

Once an OILL Pilot is completed and outcomes assessed, the OILL must manage the know-how acquired to ensure it is disseminated.

2.8. OILL Centers: Model and operations

The OILL Centers' goal is to provide the best space for testing, validation and dissemination of information on the OILL Pilots proposed in I&N's Open Innovation Living Lab.

Its functions are those of a Living Lab, demonstration space, and monitoring and control, offering a portfolio of services and activities associated with these functions.

The Governing Body will decide on establishing an OILL Center, defining the conditions for scale-up for repeating at other geographical locations.

OILL CENTER – Living Lab function

Geographical testing environment prepared to receive OILL Pilot proposals to be conducted in the conditions approved by the Approval Committee.

Since the OILL Center offers a space for testing and validation, it will avail of the facilities that simulate or replicate the real-world settings for conducting OILL Pilots. Where appropriate, real-world setting outside the OILL may be used, which would be adapted to carry out the OILL Pilot. These include urban or rural, industrial or consumer settings, among others.

The physical space could already exist at current facilities, or spaces may need to be prepared for new OILL Pilots at the OILL.

OILL CENTER – Showroom function

OILL Centers may have a specific Showroom for permanently exhibiting the outcomes of each OILL Pilot, where the completed OILL Pilots can be visited and enquiries made.

Showrooms will be used to present the internal and external OILL Pilots as defined in the communication plan for each OILL Pilot and the Governing Body's instructions.

Showrooms will have an internal target audience (staff, departments and Group companies) and an external target audience (suppliers, customers and partners). Showrooms will also be open to visits and delegations from universities, learning centres, senior staff from public authorities, and the general public.

The OILL Center may arrange conferences and visits on matters of interest to the Company.

OILL CENTER – Situation Room function

A Situation Room is needed to monitor OILL projects at an OILL, where all OILL Pilots connected to the OILL Center in question can be overseen individually or jointly. The Situation Room also avails of all the information on visits and delegations related with the associated Showroom.

Situation Room information will be native digital so that it can be viewed remotely by other OILL Centers or the Governing Body, Approval Committee, etc.

2.9. Reporting and announcement of results

Open Innovation Living Lab (OILL) is a testing and validation tool that provides the Company with a space for piloting products, processes and solutions in real-world scenarios through OILL Pilots. Each OILL Pilot will generate **know-how**, which will be **disseminated** and the outcomes of the OILL Pilot may be **certified**.

To this end, a communication plan must be drawn up with the Communications Division for the OILL in general and for the OILL Centers in particular, to disseminate outcomes beyond just the party carrying out the OILL Pilot to ensure the learning points gleaned are shared as widely as possible.

Those OILL Centers with Showrooms may systematically disseminate the results of OILL Pilots, arranging visits for internal and external audiences wanting to find out about the centre's activities and the OILL Pilots carried out. It will be displayed at the site of the OILL Pilot that it is an I&N OILL Pilot and the purpose thereof will be explained (a QR code will be provided to obtain more information).

The level of confidentiality and strategic impact of each communications campaign will have to be determined to ensure only information that does not pose a threat to industrial and intellectual property in some cases is disclosed.

A brand must be created that connects the OILL Pilots with the Living Lab, as this will help the Company's communication strategy as a leader in innovation.

A chart summarising how the Open Innovation Living Lab's communications activities could be managed is provided below:

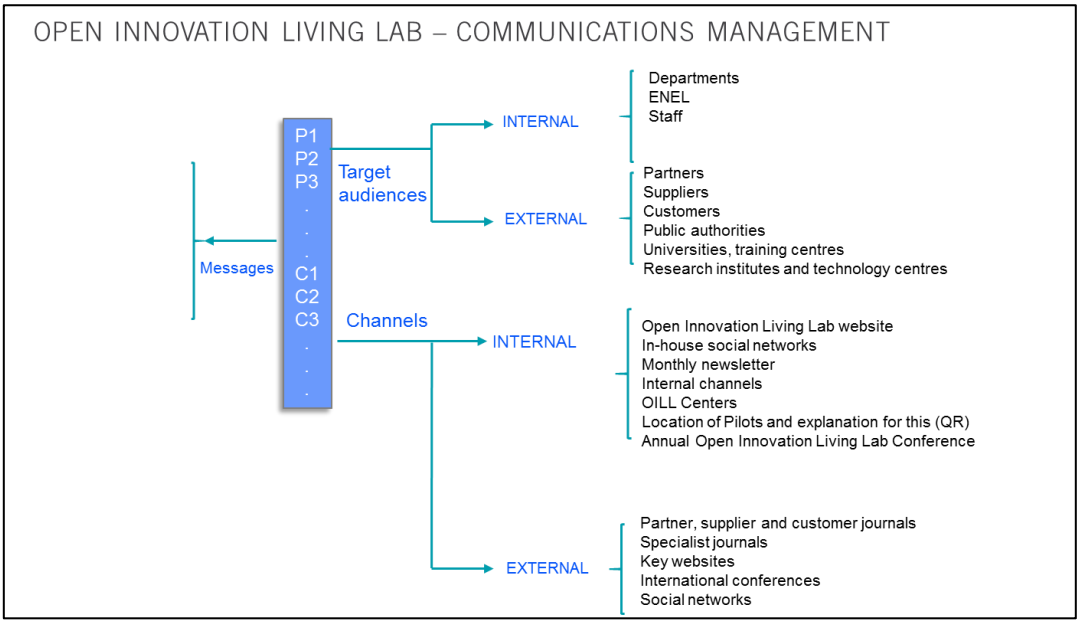

FIGURE 8.- OILL communications management

2.10. Roadmap for integrating an OILL into Company's structure

The Open Innovation Living Lab must be incorporated into Company's organisational structure.

A Roadmap is drawn up to integrate the Open Innovation Living Lab into the Enel-Endesa. As part of the open innovation processes, each OILL will carry out OILL Pilots, managing them in a way that is in line with the business's strategies.

The Roadmap has five phases:

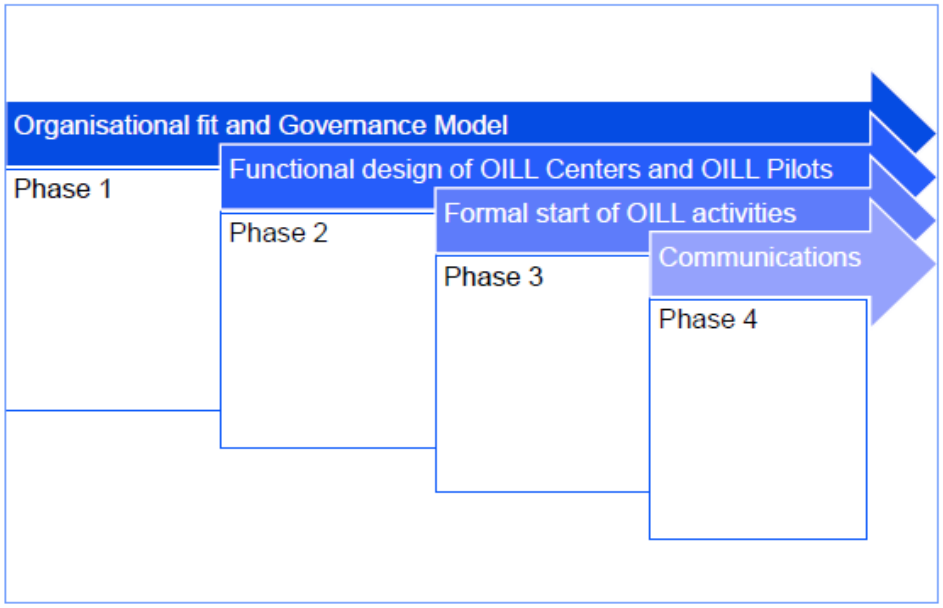

FIGURE 9.- Roadmap for integrating an OILL into the Company

FIRST PHASE - Organisational fit and Governance Model – Already completed

- The Open Innovation Living Lab's fit into I&N's organisation and a governance model aligned with the Company's structure.

SECOND PHASE - FUNCTIONAL DESIGN OF OILL PILOTS AND CENTERS

- Define how OILL Pilots performed at an OILL will be approved.
- Set out the standard OILL Pilot methodology.
- Draw up the operating practices of the first OILL Centers.
- Develop a first version of the OILL Digital Platform for managing the OILL Pilots and OILL Centers.

THIRD PHASE - Formal start of OILL activities

- Execution of the Communication Plan to raise awareness of an OILL and encourage internal and external clients to submit proposals to the OILL.
- Receipt of OILL Pilots and analysis thereof to approve them.
- Performance of OILL Pilots at OILL Centers.
- Evaluation of OILL Pilots.

FOURTH PHASE - Communication, knowledge management and certification

OILL Pilot outcomes will be published in this phase, and the know-how acquired at an OILL expanded. This will entail the following:

- The results of the OILL Pilots carried out at an OILL will be presented to internal and external audiences.
- The learnings gleaned will be further exploited through a strategy to transfer knowledge from the OILL to the rest of the Company.
- The features and functionalities of the OILL Pilots that have been evaluated will be certified.
- The OILL Digital Platform will be further developed as a repository for the accumulated know-how.

FIFTH PHASE - Celebration and acknowledgements

It is proposed that an annual event be held to foster a culture of innovation and acknowledge the individuals involved in the OILL Pilots at an OILL and the OILL Pilots themselves. Such events will serve to:

- Acknowledge the individuals involved in OILL Pilots at an OILL and the OILL Pilots themselves.
- Present the annual report on the OILL, including the OILL Pilots and the learning points thereof.
- Methodologies and mechanisms for using the OILL will be promoted.
- Open innovation will be encouraged both face-to-face and digitally.

3 – CONCLUSIONS

The Open Innovation Living Lab (OILL) of ENEL is a testing, validation and client feedback instrument that provides the organization a space to develop controlled experiences through Pilots of technologies, products, processes and solutions in real environments that have an impact of innovation in the company's business and value for customers.

The knowledge of the Smartcity Malaga Living Lab (Spain) and the methodology design through their experience allow to learn about how operate Open Innovation Living Labs as a strategy to replicate and scale in other Ecosystems of Innovation.

The new framework of Open Innovation Living Lab, combining the theory of Open Innovation and the model of Living Labs, provides new opportunities to Science and Technology Parks and Areas of Innovation for developing services for universities (research groups, student, entrepreneurs), industry (corporates, consortiums, clusters), government (cities, regions and nations) and society (citizens, users) to validate the pilots before to scale.

REFERENCES

Mavridis, A., Molinari, F., Vontas, A., and Crehan, P., (2009). *A practical model for the study of living labs complex environment.* 3rd IEEE International Conference on Digital Ecosystems and Technologies, DEST '09, 1-3 June, 1, pp. 563-567.

Chesbrough, Henry. Open Innovation: The new imperative for creating and profiting from technology. Boston: Harvard Business School Press. 2003

Mulder, I., Fahy, C., Hribernik, K.A., Velthausz, D., Feurstein, K., Garcia, M., Schaffers, H., Mirijamdotter, A. and Ståhlbröst, A., (2007). *Towards Harmonized Methods and Tools for Living Labs. In Proceedings of the eChallenge* 2008, 24-26 October, The Hague, Netherlands.

Van der Walt, Jacobus S., et al. "*Community living lab as a collaborative innovation environment.*" Issues in Informing Science and Information Technology 6 (2009): 421-436.

CoreLabs (2007). *Building sustainable competitiveness living labs roadmap 2007-2010.* Recommendations on networked systems for open user-driven research, development and innovation.

Mulder, I., Fahy, C., Hribernik, K.A., Velthausz, D., Feurstein, K., Garcia, M., Schaffers, H., Mirijamdotter, A. and Ståhlbröst, A., (2007). *Towards Harmonized Methods and Tools for Living Labs. In Proceedings of the eChallenge* 2008, 24-26 October, The Hague, Netherlands.