

Report on the status of Open Innovation in Living Labs:



SWOT ANALYSIS and summary of key ideas

Partner Responsible
Technological Corporation of Andalusia

Authors:
Vanesa Quintano (CTA)
José María González (CTA)

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Project Coordinator	George Zissis and Marie-Pierre Gleizes (Coordinators) Lou Ackermann (Project Manager) lou.ackermann@univ-tlse3.fr
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1. Introduction

Tr@nsnet project aims to contribute to the Ecological Transition (ET) challenge by defining a new Living Lab (LL) model in the context of Open Innovation (OI). The objective is to create a **generic, transferable and profitable model** of LLs so that it can also be used by universities.

The Tr@nsnet project is divided into 3 working groups (TG), with group 3 being in charge of designing the new Living Lab model to address the challenges of the ecological transition. This report is part of the deliverables foreseen in TG3 (composed by CTA, Funseam and CIRCE) that will feed into the design of the new Living Lab model resulting from the project. The aim of the report has been to analyze the status of OI in LL: SWOT analysis of the current situation of innovation in the framework of the National Energy and Climate Plans (NECPS) of European countries.

2. Status of OI in LL within the framework of the energy transition

The open innovation is based on collaboration between different agents for the development of new technologies and business opportunities. It involves employing all the mechanisms that allow access to knowledge and existing opportunities outside the limits of a single agent. The open innovation model arises in response to the growing demand for increasingly innovative and multidisciplinary solutions, which require development capabilities and agility that a single agent can hardly provide.

Open innovation models allow to accelerate innovation processes, shortening development and commercialization times, while at the same time allowing a real perception of technological trends and the market's needs.

In this context, startups emerge as a vehicle for innovation, being a transfer instrument that allows collaboration among a wide variety of agents. The startup concept is directly linked to the growth potential, understanding as a start-up all those companies of new creation and technological based, which present a high potential for growth.

For the purpose of this report, open innovation is considered as a collaboration model focused on the creation, development and commercialization of innovative technologies and business models. We will restrict the analysis to those that are characterized by using startups as a vehicle for technology transfer and innovation.

Open innovation models are much broader than traditional schemes, since they bring together a greater number of agents of different natures, such as corporations, innovation providers (accelerators, venture capitalists, Living Labs, etc.) and public funding and promotion agencies. The participation of diverse agents in the open innovation model allows the minimization of the risks associated with innovation. It also allows to provide specific knowledge and different capacities that, individually, a single agent would not have the capacity to offer.

In the open innovation model, agents play different roles with the purpose of stimulating innovation. Universities and technology centres become sources of knowledge and

generators of talent to nourish the ecosystem. Corporations provide their specific knowledge, infrastructure and capabilities, with the aim of generating new business or stimulating markets. In turn, innovation providers seek to obtain financial returns by providing development and innovation services, while public agents seek to generate social impact.

Open innovation is today a reality in almost all sectors of activity. However, the existing differences between sectors as distant as banking, the health sector and the industrial sector have promoted that open innovation models evolved in very different ways in each sector.

QUESTIONNAIRE

We aim to explore technological, social and regulatory innovation in different aspects of organisations' innovation strategy before and after the start of the NECPs.

To meet the EU's energy and climate targets for 2030, EU countries need to establish a 10-year integrated national energy and climate plan (NECP) for the period from 2021 to 2030. Introduced under the Regulation on the governance of the energy union and climate action (EU/2018/1999), the rules required the final NECPs to be submitted to the Commission by the end of 2019.¹

For this purpose, a questionnaire has been developed from CTA (Rocío de la Rosa Gilabert) and Funseam (Manuel Villa-Arrieta). The objective of this questionnaire is to know the general opinion about the state of innovation in the framework of the energy transition. We asked the participants to analyse whether the innovation strategies that their organization are aligned with the objectives of the energy transition. The following scheme has been followed:

¹ https://energy.ec.europa.eu/topics/energy-strategy/national-energy-and-climate-plans-necps_es

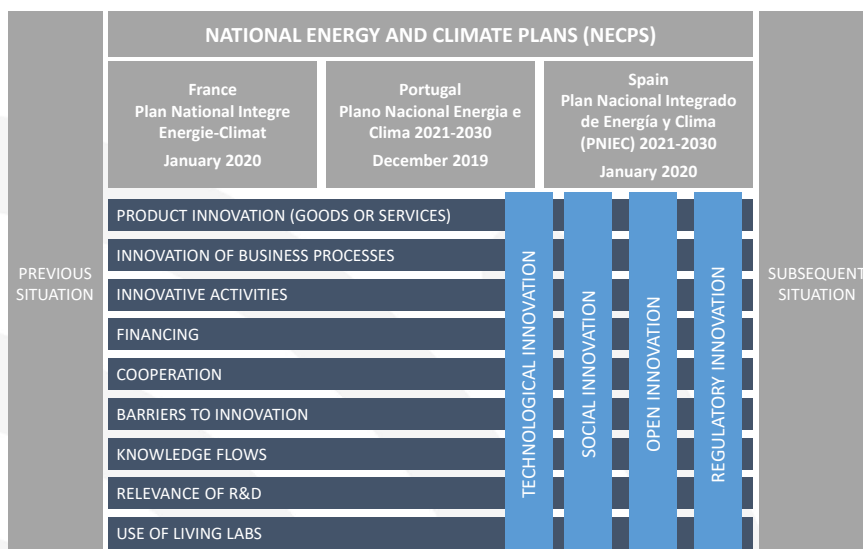


Figure 1. Conceptual scheme of the questionnaire on the state of innovation in the framework of the NECP (National energy and climate plans) in Spain, France and Portugal.

The main players present in the ecosystem have been categorized in order to determine which innovation models most faithfully represent the innovation ecosystem in the SUDOE space.

As a result of the analysis carried out, **corporations**, **universities** and **technology centres** are the **players with the highest degree of participation** in the ecosystem, with the innovation models of these players being the most representative of the ecosystem.

In order to analyse the existing models of open innovation in the SUDOE area and the status of those LL within the NECPs, a search for exhaustive information has been carried out with the aim of cataloguing and characterising the agents present in the innovation ecosystem who present open innovation initiatives in the field of energy.

These agents have been collected in a database and characterized according to a series of criteria such as their typology, the number of venturing tools used, their geographical location, the main lines of technological innovation approached, in order to obtain an overview of the state of the art regarding the ecosystem of open innovation in the SUDOE area. Participants were asked questions such as: whether they had an innovation strategy prior to the NECPs or if the entry of the NECPs has influenced the innovation strategy.

3. *SWOT analysis*

After studying the responses of the innovation questionnaire, we proceeded to make an analysis of the Strengths, Weaknesses, Opportunities and Threats of OI in LL: current situation of innovation in the framework of the National Energy and Climate Plans (NECPs) of European countries.

The complete result and analysis of the entire questionnaire will be presented in another document: **Innovation and Energy Transition: Status and Recommendations (Funseam)**

RESULTS

The TG3 partners of the Tr@nsnet project have finalised their analysis of the **strengths, weaknesses, opportunities and threats** (SWOT analysis) of OI in LL: current situation of innovation in the framework of the National Energy and Climate Plans (NECPs) of European countries. This is an important step that will help us to focus the next phases of the project.

In this respect, the main tool we have used is a **questionnaire** in which a total of sixty-four entities from Spain, Portugal, France, Belgium and Netherlands, participated. There has been also a small contribution from international entities (Japan, USA and Colombia). Each partner translated the English questionnaire into its own language and was responsible for collecting the responses from institutions/companies in its territory.

Before going into detail with the SWOT analysis, it is worthwhile to highlight few aspects regarding the data collection from the questionnaire:

1. Most of the questions were multi-choice, so the total amount of responses does not match the total number of participants (63). For the SWOT analysis, the independent total of answers was considered.
2. No distinctions have been made between the type (Universities, private companies of different sizes, research groups...), size or location or other characterization

issues of entities participating in the survey. However, large private companies from Spain are the most participative profile of the entities surveyed.

3. The questionnaire included a branching according to the answer given to the question of whether or not the entity had an innovation strategy defined prior to the NECPs. Although they have been taken into account in order to draw conclusions, specific values given will correspond exclusively to those that did have an established strategy. Based on that and after analysing the results of the questionnaire, the interviews and the literature, we obtain the following **main conclusions of the SWOT analysis:**

Firstly, regarding the activities based on the innovation strategy, respondents select from a short list the ones they have carried out. Clearly dominate those who have developed activities related to technological innovation (TI). From the list of proposed activities, it stands out the generalized majority of IT, especially remarked in the activities related to the product (good or service), R&D activities, activities related to software development and those related to product design.

Over those activities related to social innovation and those developed where regulatory barriers were encountered, activities related to open innovation (OI) are the second typology most developed by the respondents. Those activities with the highest number of people involved, match with the ones related to TI and these are the ones related to product (good or service) and to R&D in general or on circular economy. However, relative to the total number of responses within each activity, the lowest percentages of activities related to OI are the innovative activities abandoned with only 13% and those related to product design, 17%.

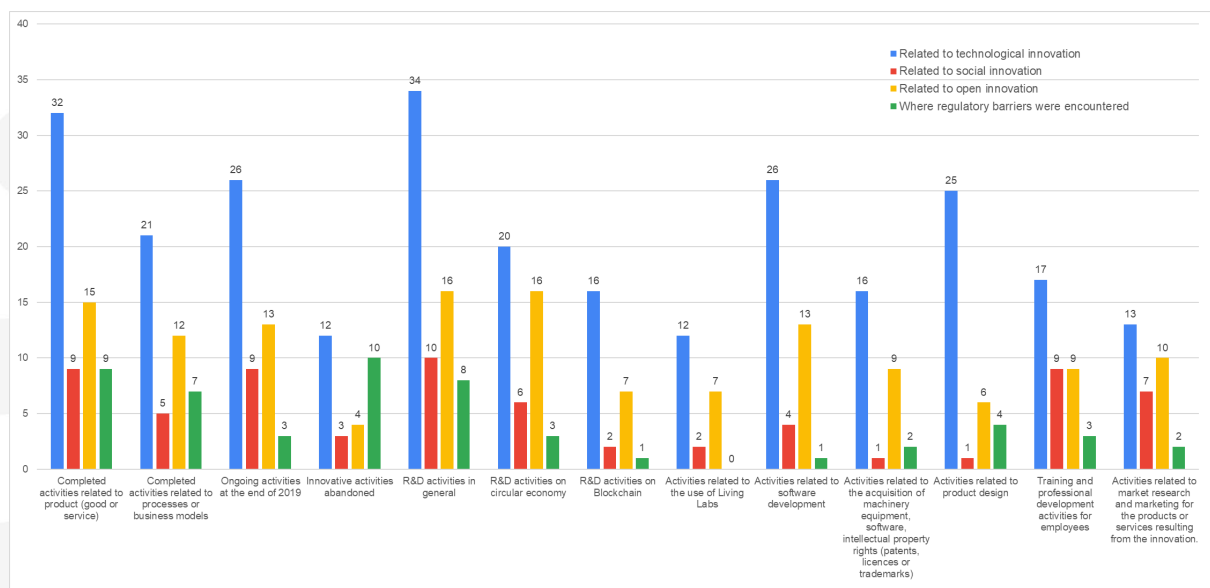


Figure 2: Carried out activities by type of innovation

As for the financing received by the participating entities to carry out the activities described above, the questionnaire provided different sources of funding and the main conclusions are as follows:

By far the most funded activities (72%) are those related to technological innovation followed by those related to open innovation (18%). For both cases, funding mainly comes through tax credits or deductions, grants or subsidised loans. Within this method of funding, the questionnaire differentiated between local government loan guarantees, loan guarantees from the EU's HE2020 programme for R&D and guarantees from another EU institution, excluding public procurement in all cases. The distribution was similar among these three options.

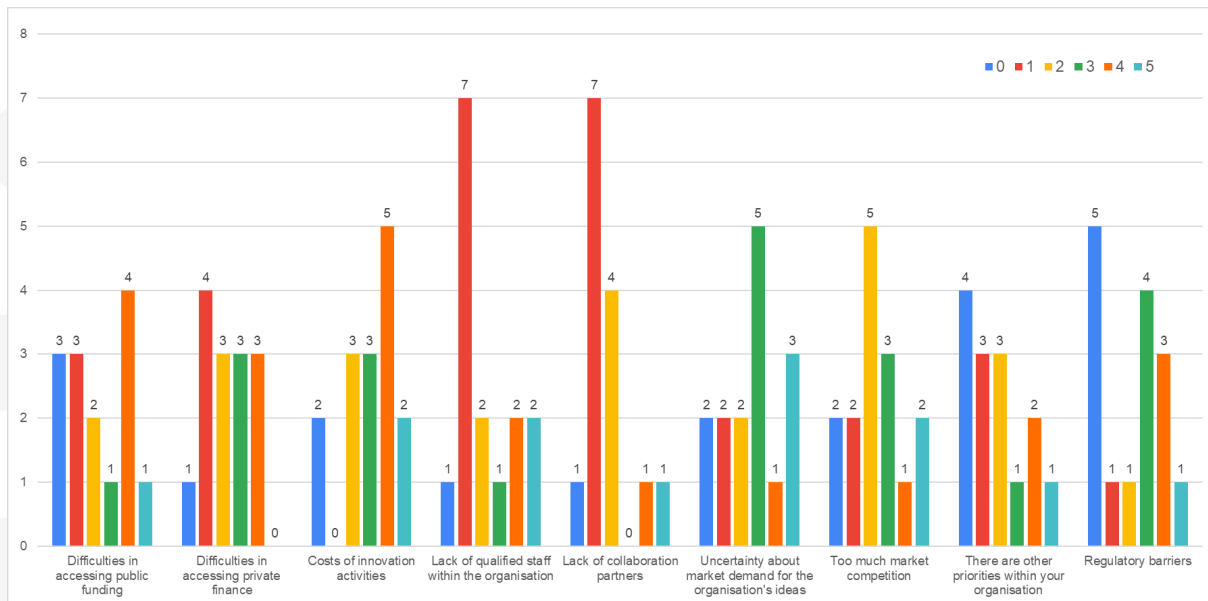


Figure 3: Rating of barriers (0:null ; 5:High) to the development of OI activities

Concerning the specific analysis of the activities related to Open Innovation, the main barriers have also been consulted. Due to these questions, certain key factors that strengthen the activities can also be identified:

First of all, in terms of these positive outcomes, the qualification level of the staff within the organization (2,1/5), the collaborative skills of partners (1,6/5) and a good criteria when prioritizing processes (1,7) are considered quite favorable. On the other hand, the uncertainty about market demand for the organization's ideas (2,7/5) and the costs of innovation activities (3/5) exhibit obvious barriers within the OI activities.

After confirming that most of participating entities had an innovation strategy prior to the NECPs, the expected influence of such a strategy over the next decade was asked, as well as the influence that it has had so far. The majority of participants expect that it will have a strong influence in the near future (81%) regardless of the innovation category. Participants believe (70%) that influence regarding the OI will be high in the next years. However, the impact on Technological and Social Innovation is even more expected. This highlights the general perception that the NECPs will incentivize innovation across the board, although in a more uncertain way in terms of OI.

Although, detailing the aspects in which the NECPs has influenced the participating entities so far, a generally low influence can be detected, in which the most considered aspect has been the strengthening of OI activities, while the lack of reduction of regulatory barriers is the negative conclusion obtained.

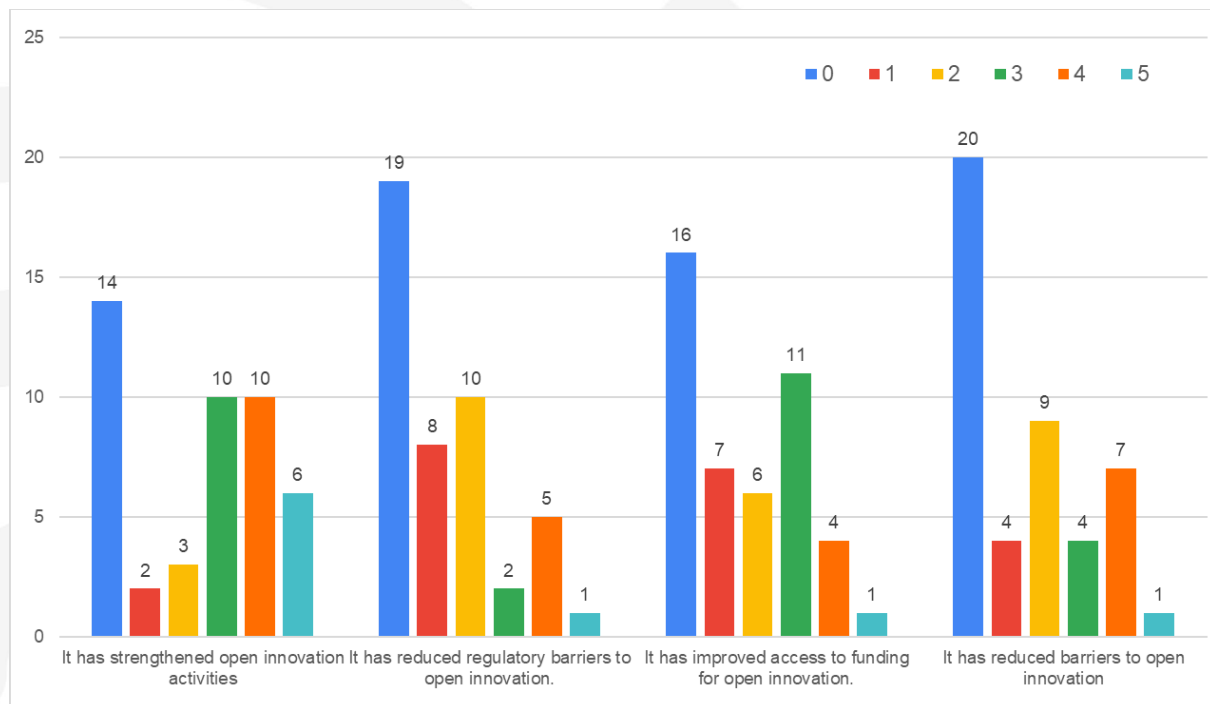


Figure 4: Rating of NECPs level of influence over OI issues included in previous innovation strategies

It is also interesting to note that for those entities that declared not having an innovation strategy defined before the NECPs, the accessibility of financing is considered very low, and represents an obvious barrier to carrying out innovative activities, while this aspect is much softer for those that did have such a strategy.

	Helpful to achieving the objective	Harmful to achieving the objective
Internal origin Attributes to the technology	Strengths <ul style="list-style-type: none"> - R&D activities strongly promoted in innovation strategies - Qualification level of the staff within organizations - Collaborative skills of partners - Good criteria when prioritizing processes - Wide range of OI-related activities carried out based on innovation strategies 	Weaknesses <ul style="list-style-type: none"> - Blockchain, Living Labs and activities related to product design are poorly integrated into innovation strategies - Lack of funding dedicated to OI activities - Very low accessibility to both public and private funds for OI activities for those entities without an innovation strategy defined before the NECPS
External origin Attributes to the environment	Opportunities <ul style="list-style-type: none"> - Medium-high accessibility to both public and private funds for OI activities for those entities with an innovation strategy already defined - Wide diversity of useful sources of funding available - NECPS succeeds in further promoting the strengthening and emergence of OI-related activities 	Threats <ul style="list-style-type: none"> - Uncertainty about market demand for the organisation's ideas - Costs of innovation activities - NECPS continues weakly influences (e.g. regulatory) current barriers to open innovation

Figure 5: SWOT table

Measures and future work

There is little emphasis on the assessment and evaluation on the performance of living lab activities, and thus it must be reinforced integrating a new model to accelerate the transition and reduce the barriers to OI.

Business model concerns must also be addressed to foresee LL survivability and economic sustainability, to ensure they can continue their activity and contributing to the ecosystem along time.

The final LL model of the Transnet project seeks to enable these test environments for technological and social innovation to also be test environments for regulatory innovation. All this, integrating LL methodologies with Regulatory Sandboxes.

Thus, the Tr@nsnet project partners are working on a final product: **TR@NSnet Living Lab Model** to Accelerate the Ecological Transition. From the Harmonized Cube Methodology to close it in the framework of the ecological transition: Generic, open and harmonized.

Definitions:

The following definitions were used in the questionnaire in order to help the reader:

ENERGY TRANSITION:

This refers to the long-term structural change of energy systems that allows for the economy to be decarbonised. The measures related to this process that are used in this questionnaire are defined in National Energy and Climate Plans 2021-2030, NECPs, (France: Plan National Integre Energie-Climat. Spain: Plan Nacional Integrado de Energía y Clima. Portugal: Plano Nacional Energia e Clima).

The NECPs is based on the European Commission's long-term strategic vision for "A clean planet for all" (COM (2018) 773 end), in order for the EU to achieve a prosperous, modern, competitive and carbon-neutral economy by 2050.

INNOVATION:

This refers to the process by which changes are implemented in the market, either by modifying existing elements in order to improve them, or by introducing entirely new elements.

For example: The creation of the smartphone to replace traditional forms of communication as well as provide us with a device to perform tasks remotely wherever we are.

R&D&I (Research, Development and Innovation):

This refers to the process of investing in Research to obtain knowledge that is Developed in order to obtain benefits through (mainly economic) Innovation in the market.

OPEN INNOVATION:

This refers to a model of innovation management based on collaboration between individuals and entities outside the company, building on research and development of external knowledge.

For example: Programs to promote collaboration between external companies to improve production processes in specific facilities.

TECHNOLOGICAL INNOVATION:

This refers to a new or significantly improved product or production process. It includes new or significantly improved techniques, components, materials or software.

For example: Creating printed solar cells using solar energy receptor inks in economical ways and with practical applications.

SOCIAL INNOVATION:

This refers to new ideas for products, services or business models that satisfy social needs and simultaneously create new collaborative relationships with society.

For example: Developing mobile applications that allow a group of neighbours to connect and help each other in their daily lives or to monitor shared spaces and their resources.

REGULATORY INNOVATION:

This refers to new regulatory ideas that are in line with technological and social innovations, making it easier for new products, services or business models to enter the market while also protecting consumer interests.

For example: Adapting the current regulations to allow applications to promote shared use of different means of transport to enter the market.

