

A Work Project presented as part of the requirements for the Award of a Master Degree in  
Management from the NOVA – School of Business and Economics

*Exploring the Potential of the Living Lab as an Addition to the Open Innovation Ecosystem  
of the Firm: A Case Study for EDP Open Innovation*



Filipa Gomes de Castro Santiago, 3364

Katie-Pia Moran, 3625

A Project carried out on the Master in Management Program, under the supervision of:

Professor Leid Zejnilovic

EDP Representatives: Antonio Vidigal (CEO of EDP Inovação) and Jorge Simões

(Advisor to Board of Directors EDP Inovação)

3<sup>rd</sup> of January 2018

**Abstract:**

The firm of 2018 must not only remain agile in its innovative offerings, but must also recognise trends of peer-to-peer sharing, which begs the question: where do utility providers envision their business models amidst new demands to remain innovative in the new wave of collaborative consumption? If providing consumers with products via innovative services is the new currency upon which a firm is to be valued, then the extent of potential streams of innovation research available to a firm ought never be underestimated. Through a comprehensive analysis of the firm and the DNA of its open innovation ecosystem as well as a thorough investigation into the objectives driving Living Labs, we begin to discuss the feasibility of the Living Lab as a potential addition to the ecosystem of the firm in context.

Keywords: *Open Innovation, Innovation management, User Innovation, Living Labs.*

## Table of Contents

<b>1. INTRODUCTION</b> .....	<b>4</b>
<b>2. BACKGROUND</b> .....	<b>6</b>
2.1 COMPANY BACKGROUND .....	6
2.2. LITERATURE REVIEW .....	7
<b>3. METHODOLOGY</b> .....	<b>10</b>
<b>4. OPEN INNOVATION AT EDP</b> .....	<b>14</b>
4.1 ORGANIZATIONAL STRUCTURE OF EDP INOVAÇÃO.....	15
4.1.1. INNOVATION AREAS.....	16
4.1.2. MANAGEMENT AREAS .....	17
4.2. EVOLUTION OF INNOVATION ECOSYSTEM AT EDP:.....	18
4.3. VALUE CAPTURE MECHANISMS.....	25
4.3.1. <i>Startups’ perspective on EDP’s innovation ecosystem:</i> .....	27
4.3.2. <i>The importance of aligning business and innovation goals</i> .....	30
4.4. OTHER OPEN INNOVATION INITIATIVES .....	31
4.5. EVALUATION OF EDP’S OPEN INNOVATION INITIATIVES: .....	33
<b>5. LIVING LABS</b> .....	<b>34</b>
5.1. WHAT IS A LIVING LAB?.....	34
5.2. THE LIVING LAB IN PRACTICE.....	37
5.3. LOCATING A LIVING LAB IN THE EDP ECOSYSTEM .....	41
5.4. OBSERVATIONS AND ALTERNATIVE LIVING LAB INVOLVEMENT .....	43
5.4.1. <i>Objectives and Resources</i> .....	43
5.4.2. <i>Mechanisms to Sustain User Motivation &amp; Participation</i> .....	44
5.4.3. <i>Organisational Challenges –Adjustments</i> .....	45
5.4.4. <i>Alternative Involvement in the Living Lab</i> .....	45
<b>6. RECOMMENDATIONS</b> .....	<b>47</b>
<b>7. REFERENCES</b> .....	<b>51</b>
<b>8. ANNEXES</b> .....	<b>53</b>

## 1. Introduction

As technology persists in advancing and re-inventing itself, so too must the means of the firm to advance their capabilities in remaining innovative, keeping their focus steadily fixed on the uncertainty of the future. For many firms, this often means embracing the more distributed and decentralised approach of openly sharing knowledge and innovations. Co-founder of Sun Micro Systems, Mike Joy, put this rather pertinently when he stated that, “*no matter who you are, most of the smartest people work for someone else*”, framing a dilemma faced by many companies today, which is that most valuable knowledge will reside externally to the firm boundaries, leaving it in the hands of those responsible for innovation to find ways of accessing this knowledge (Lakhani and Panetta, 2007).

Henry Chesbrough broke ground with his pioneering work on open innovation and firm boundaries back in 2003 defining it as the use of purposive inbound and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively (Henry W Chesbrough, 2003). However, the firm of 2018 irrespective of their product or service will typically require a high and consistent influx of new ideas that demands various ongoing innovation ventures and processes within a single organisation alone to survive intensifying global competition.

As business models of open innovation become rooted as a norm within the structure of the firm and no longer considered a passing trend (Chesbrough and Brunswicker, 2014), it becomes clear that a deeper analysis into the idiosyncrasies of a firm’s innovation culture is highly worthwhile for the sustainability and long-term innovation goals of the firm. In understanding the challenges faced from a managerial and organisational perspective of the firm regarding open innovation we can analyse the scope for new open innovations ventures or additions to the current ecosystem.

This paper explores Living Labs as an additional stream of innovation for EDP's innovation strategy. Living Labs introduce strong approaches of user-centric innovation, the benefits of which have included for example, the mitigation of business risks regarding the invention and acceptance of products, services, and applications (Schumacher and Feurstein, 2007). If we are to consider the integration of user innovation vis-à-vis the principles of the Living Lab as a means of boosting a pre-existing open innovation strategy at a firm such as EDP, we will first need to profile the current open innovation ecosystem of the firm.

Understanding the driving forces which influence the evolution of innovation at EDP will not only provide us with a more holistic vision of the open innovation framework underpinning EDP's open innovation ecosystem, but it will help us frame our next discussion regarding Living Labs. We will be discuss the environment of the Living Lab as a means to improve innovation processes through a more research driven focus. The reason for considering Living Labs in this specific context is that out of many emerging innovation initiatives, Living Labs are the most focused upon methodological user innovation and are underpinned by their focus on the real-world dynamic and experience coupled with the collaboration of research experts. Furthermore, Living Labs have gained ongoing policy support and recognition from the European Commission as of 2006 with a full network of listed Living Labs collaborating globally under the European Network of Living Labs. The recognised contributions and involvement of the user could potentially bring something new to the EDP ecosystem, however this will need to be further investigated during the company profiling to determine if such a venture may in fact bring additional value to the existing initiatives.

We will examine the EDP ecosystem not only to consider the feasibility of a Living Lab within the current ecosystem considering the available resources of the firm, but also to explore whether it would serve as a meaningful asset to increase and improve their innovation processes.

We will examine the major work on open innovation and current literature available on Living Labs to best understand their contribution towards value creation within distributed innovation to fully grasp how they are implemented and sustained over time. Having a full picture of the internal culture of innovation at EDP we will then set in motion the potential scope or opportunities we identify for Living Lab practices as an addition to their stream of inbound innovation.

## **2. Background**

### **2.1 *Company Background***

EDP - Energias de Portugal, SA is a company focused on the generation, distribution, and supply of electricity as well as the supply of gas. Founded in 1976 as Electricidade de Portugal, the group's activities today are carried out across Portugal, Spain, and Brazil, with headquarters in Lisbon, Portugal. EDP employs approximately 11,798 people and is a vertically integrated company. Besides gas and electricity, EDP also works in the field of solar photovoltaic energy with generation carried out in Portugal and Romania as well as Brazil. EDP can be subdivided into 5 main business sectors: Iberia liberalised activities, Iberia regulated networks, EDP Brasil, EDP Renovaveis and Iberia long-term contracted generation. Iberia liberalised activities accounts for the company activities pertaining to the non-regulated supply of electricity and gas in Spain and Portugal. The Iberia regulated networks sector focuses on the distribution of gas and electricity in Spain and Portugal and extends to other companies such as EDP Distribuicao – Energia, EDP Serviço Universal, EDP Gas Serviço Universal and Naturgas Energia Distribucion to name a few. As the name suggests, similar activity to the above mentioned is carried out in Brazil under EDP Brasil. EDP has also diversified activity into the renewable energies segment under EDP Renováveis. Finally, the Iberia long-term contracted generation segment

“includes the activity of electricity generation of plants with contractual stability compensation and special regime generation plants in Portugal and Spain”.

## **2.2. Literature Review**

To achieve a thorough understanding of the current empirical research of our niche within open innovation research, we carried out a review of the available literature pooling together some of the most cited papers in the field. This was initially done by searching the phrases “Open Innovation”, “User Innovation” and “Innovation Management” and later “Living Lab” into our University Library meta-search (NOVA Discovery) across multiple resources including full-text articles, eBooks, library holdings, and theses. Results were filtered from the year 2003 forward, where Open Innovation gained increased interest across academia (with the work of Eric von Hippel during 1986 regarding lead users as an exception) and from there included with respect citations and journal rankings in the case of articles.

Based on our previous studies of open innovation and his overwhelming contribution to innovation literature, we chose to frame our research against the theory of Open Innovation first championed by Chesbrough. Open Innovation processes can be characterized as inbound (outside-in) or outbound (inside-out) with respect to how ideas flow from and out of the organization. Open innovations focus not only in acquiring and integrating external knowledge within the company’s research pool and later on setting innovations in their path to market, but also how unused knowledge and unutilized ideas should be externalized and commercialized (Deck, 2008).

We also refer to the User innovation framework advocated by Eric von Hippel as early as 1986 in recognising the user’s rapid ability to identify a need faster as opposed the assumption that manufacturers yielded superior product innovations (von Hippel, 1986, 1988). While experimenting with open innovation many companies can have issues with value capture, creation and

ensuring the sustainability of their business models and this will be explored further within the context of a Living Lab in the EDP innovation ecosystem (Chesbrough and Appleyard, 2007). Eric von Hippel also spoke of free-revealing from lead users with respect novel improvements to products and services and this will further come into our discussion with respect the incentivizing and motivations of users in a potential EDP Living Lab (Von Hippel and Von Krogh, 2006). The role of user involvement in innovation continues to gain relevance as some of the most lucrative innovations have been developed by users aiming to adapt existing products to fit their needs as they see best fit, Open Source software is a prime example of this. Chesbrough further validates this opening of the firm boundaries on to users recognising the advantages onset by having multiple perspectives and the power they can offer processes of development (Chesbrough and Brunswicker, 2014). In this sense, both theories of open and user innovation will provide a backdrop for our study and serve to fit the model of the Living Lab as an external source of inbound knowledge for EDP in Open Innovation.

Recognising the contributions of Chesbrough and von Hippel however, we explore specifically the role of the user across the unevenly distributed landscape of knowledge of Open Innovation, as this is a fundamental aspect of the Living Lab. Whilst von Hippel laid the foundation for the role and importance of the Lead user and how their needs and access to them can lead to a marketplace advantages, the issue remained as to how one could identify the lead user. This led to the identification of users cast from a wider pool beyond the lead user, where it manifested that not all users types may have a given skill or subset of knowledge required or sought for certain new product development (Nambisan, 2002). In light of this it was recognized that the firm could pair a specific stage of product testing to a profiled user to best encourage a productive co-creation (Jespersen, 2008). No longer was the exclusive lead user the only subset desired for co-creation but now a much wider range of everyday user, thus opening up further the vistas for user innovation. Most recently this new focus on the potential



of wider user involvement or aversion to lead user perspective has been investigated on how best to bolster the ‘regular’ user with an emphasis on various methodologies and to best encourage such regular users and how the lead user may in fact hinder the co-creation and creativity within user innovation processes (Kristensson, Matthing and Johansson, 2008). This focus also gave new consideration for the modern tools of user innovation such as online crowdsourcing, toolkits and the wider potential for ICT giving rise to the concept of self-selection and motivation among users. From their extensive empirical research, Kristensson et al. discovered real life experiencing of certain situations was a of deep relevance for users in the creation of new products stating, “*as users are experiencing various situations in which they encounter difficulties (their own and those of others, specific cognitions and emotions are triggered. Through experiences such as these, users become aware of their needs, then stimulate ideas connected directly to these experiences*”. This “real-life’ context where the user is involved in a structured yet realistic setting offered by the Living Lab could thus potentially elevate the current practices of innovation to be found across the matrix of open innovation at EDP as we will now begin to examine more closely against this backdrop of literature.

Following the critical review of the literature outlining the backdrop of our research, and applying the appropriate theory, we discuss our research proposal. Within the broad topic of open and user innovation, innovation management and Living Labs within the firm, we pinpointed our two research questions: “***What is the landscape of EDP’s open innovation initiatives and how do they capture value from these?***” and, given this, “***What is the potential feasibility of a Living Lab as an extension to the current open innovation strategy of EDP?***”

To investigate how such a Lab may (or may not) serve as a feasible but equally meaningful addition to the OI strategy at EDP, it is necessary to clarify the concept of the Living Lab and

understand the landscape of EDP's open innovation ecosystem, focusing on the evolution of open initiatives at EDP and how they attain value added from them.

The research questions entail several **research objectives** that will outline the steps taken in the quest to answer our research questions.

*Objective 1: Understand what is the landscape of EDP's open innovation initiatives and the underlying factors influencing their evolution.*

*Objective 2: Understand EDP's value capture mechanisms for their open innovation initiatives and what factors influence those mechanisms. More specifically focusing on how value is derived from their initiatives and integrated into their own business model.*

*Objective 3: Gather more insights and analyse perceptions of the participant's regarding EDP's innovation ecosystem. Particularly in what concerns motivations to participate, help and resources obtained, new capabilities and expertise acquired, and aspects to improve.*

*Objective 4: Gain a holistic understanding of what a Living Lab is and the advantages and/or benefits the addition of a Living Lab can offer private enterprises with open initiatives of Open Innovation.*

### **3. Methodology**

Research follows a qualitative nature for both research questions, due to the subjectivity of the phenomenon, the need to operate within a natural setting and obtain an in-depth understanding of the topic. *“Qualitative research studies participants' meanings and the relationships between them, using a variety of data collection techniques and analytical procedures, to develop a conceptual framework and theoretical contribution”* (Saunders, Lewis and Thornhill, 2016).

Data collection processes will be non-standardised, particularly semi-structured interviews, so that questions and procedures may alter and emerge during the research process.

One of our sources of primary data consists of data gathered in interviews with several members of EDP Inovação - the CEO of EDP Inovação, the head of innovation area Data Leap, the head of Special Projects, a member of the committee governing ClickIdea, the head of EDP Ventures, and a member of the Startup Support team. Interviews were conducted in-person, with a duration of 30 to 40 minutes on average, and were audio recorded for later analysis. The goal of the interviews with key persons at EDP Inovação was to gain a deeper understanding of EDP's open innovation initiatives, specifically what concerns their path of evolution, their functions and strategic goals, and the way in which EDP group captures value from them. Each interview had a specific interview guide (*Annex 1-6*), tailor-made for each interviewee and focusing on the aspects that were directly closest to them. These interviews were analysed using content analysis (*Annex 7-12*), where several themes were identified, grouped and analysed to be integrated into this body of work.

A similar process was conducted to obtain primary data sources concerning the topic of Living Labs. Dr. Dimitri Schuurman – leading expert on Lead User research at IMEC Living Lab, Koen Vervoort – User Involvement Evangelist at IMEC Living Labs, Ines Vaitinen – International Project Manager at the European Network of Living Labs, and Pedro Ferreira – Coordinator for the Department of Innovation, Commerce and Entrepreneurship at Municipality of Penela, each of whom are experts on the topic of Living Labs and were interviewed in a semi-structured manner, using VoIP [voice over internet protocol] technologies, due to the geographical dispersion of the interviewees and the impossibility of conducting interviews in-person. The duration of these interviews was set to minimum one hour, and the aim was to gain deep insights into their specific roles within Living Labs, whether as coordinators, policy supporters, or researchers. IMEC Living Lab was focused on as it has played a critical role within the global Living Labs community providing Living

Labs as a service, and with up to 80% of collaborations being with firms. Furthermore, it is internationally regarded as exercising a ‘best practice’ across Living Lab methodologies and user management. Whilst contact was made on several occasions via email with Portuguese Living labs as Listed under the current ENoLL network, only one Living Lab replied and was thus interviewed. ENoLL was also focused upon for interview as it is considered the apex of the Living Lab movement in Europe as founded by the European Commission in November 2006.

As was the case for EDP interviewees, these interview guides (*Annex 13-16*) were made specific to the work of each participant depending upon the scope of their involvement. Whilst questions were open-ended and adapted per expert, the guide was designed such that opening questions were fixed for each participant to collect data specific to certain Living Lab elements, for example, every participant was first asked to offer their own explanation or definition of a Living Lab. These specific interviews were then analysed through the methods of Affinity Diagramming (*Annex 17-22*), a tool often used in brainstorming where large amounts of language data (ideas, opinions, issues) can be organised into groupings based on their natural relationships. Affinity diagramming is a useful process to try work on a creative level to address more complex issues such as the subjectivity of Living Labs in theory and from this process the opinions and views of participants could be pooled together to generate meaningful and more comparative Living Lab insights.

Table 1 - Interviewees

Open Innovation at EDP	António Vidigal - CEO of EDP Inovação	30-40 minutes	In-person
	Jorge Simões - Head of innovation area "Data Leap"	30-40 minutes	In-person
	Tomás Moreno - Head of Special Projects	30-40 minutes	In-person
	Venceslau Parreira - Member of ClickIdea's committee	30-40 minutes	In-person
	Frederico Gonçalves - Head of EDP Ventures	30-40 minutes	In-person
	António Baptista Lopes - Member of Startup Support's team	30-40 minutes	In-person
Living Labs experts	Dr. Dimitri Schuurman - leading expert on Lead User research at IMEC Living Lab	60-90 minutes	Skype
	Koen Vervoort - User Involvement Evangelist at IMEC Living Labs	60-90 minutes	Skype
	Ines Vaitinen - International Project Manager at the European Network of Living Labs	60-90 minutes	Skype
	Pedro Ferreira - Coordinator for the Department of Innovation, Commerce and Entrepreneurship at Municipality of Penela	60-90 minutes	Skype

Finally, to wrap up primary data collection sources, we interviewed nine start-ups present on EDP's innovation ecosystem. The interviews focused on the motivations behind the participation on EDP's open innovation initiatives, the help and/or resources EDP extended to the start-ups, the acquisition (or not) of new expertise and know-how, and lastly what aspects the participants felt could be improved in what concerns the initiative processes and its management.

Interviews with the participants followed a more structured interview guide with questions remaining the same for all participants (*Annex 23*). These interviews were conducted in some instances face-to-face, and in other cases through VoIP technologies, depending on the location of the startups' headquarters and the interviewer's time and money constraints.

Participant's interviews were analysed using content analysis (*Annex 24-26*), where the main themes were identified, and information was grouped and analysed in several categories.

Primary data collected in this research was supported with secondary data using the literature available and additional information supplied by EDP.

#### 4. **Open Innovation at EDP**

Since the creation of EDP Inovação (EDPI) in 2007, the innovation model followed by EDP was one which relied on open innovation. However, the question remained, what makes a company such as EDP pursue an innovation strategy such as this? According to EDP's Inovação CEO, António Vidigal, the visionary behind the creation of the open innovation strategy, and one of its biggest supporters, "we have great engineers, but there is always someone better in the world, more motivated, that works tirelessly (...), and we want to work with them.

The decision to follow an open innovation model was one that arose from the combination of the will to break with the traditional business model of a utility company, one that relies on the idea that "what is invented outside is wrong", and the growing debate surrounding open innovation at the time. Mr. Vidigal himself mentioned reading about the topic in major publications, like the Harvard Business Review, and mentioned several cases of companies, like P&G and Cisco (Henry W. Chesbrough, 2003), that he views as successful cases of open innovation adoption in corporations.

This open innovation approach is well illustrated in the purpose of EDP's innovation strategy, a strategy which clearly aims at absorbing new sources of knowledge from the exterior, following the understanding that "the next big thing" will probably come from the outside. As such, EDP searches for new opportunities, new solutions and new interesting technologies that could possibly bolster their competitive advantage. The company supports the development of those innovations in order to capitalize on them, create synergies amongst their several business units, and to ultimately capture value alongside two axes, financial and strategic.

This is not to say that EDP does not develop projects that have their origin internally, this is not the case. However, even in these cases of internal innovation external partners are involved and there is an active search for external know-how. EDP's innovation strategy focuses largely on challenges and goals relative to the energy sector and its business activity. In recent years, the integration of communication technologies and IT has been shaping the needs of energy consumers and therefore creating a growing need for companies to keep up with technological advancements to provide the best solutions to its customers. EDP believes the future of energy retail will be outlined by solar generation at households, combined with static storage, and integrated management of loads of electrical devices. The relationship between energy customers and utilities is being reshaped by trends like peer-to-peer trading of energy, electric cars, and other technological phenomena. EDP is aware of these changes in their business landscape and is focusing on addressing them in order to provide customers with a service where comfort, mobility, and sustainability will be powered by a multitech approach supported in emerging IoT, machine learning, and big data technologies.

EDP's open innovation strategy is very dispersed and involves various stakeholders, each involved in what could almost be called a "chaos" of innovation. The landscape of initiatives, past and present, is vast and initiatives can take many different forms. However, our research indicated that at the core of their open innovation model is the collaboration with startups, around which exists a complex innovation ecosystem comprised mainly of, but not all, of EDP's open innovation initiatives. In fact, the organizational structure of EDPI – addressed next – was created to materialise this innovation ecosystem. The remaining initiatives involve different stakeholders, namely collaborations with employees and universities.

#### ***4.1 Organizational Structure of EDP Inovação***

EDP Inovação is organized in a matrix form, with five innovation areas – cleaner energy, smarter grids, data leap, client-focused solutions, and energy storage - also called sub-

committees of innovation, and three management areas – startup support, corporate venture capital, and special projects. This matrix form of organization entails that the several areas work alongside in the development of innovation projects, in accordance with the type of project. The innovation areas are verticals as they are aligned with the value chain, the management areas are parallels that touch every other area.

The activities of the above-mentioned areas are supported by several overhead areas, that together constitute the management support, namely planning and control team, board advisor and human resources team, and executive assistants' team. These areas are not directly connected to innovation initiatives, but they support EDP Inovação's activity.

#### 4.1.1. *Innovation Areas*

EDPI's role involves helping EDP answer the question “*what comes next?*”. Answering this question demands upkeep with imminent trends which may influence EDP's business activity and also involves leveraging them for the sake of the company's competitive advantage. As such, there were five key areas identified which represent upcoming and existing market trends and opportunities, not only in the energy sector but with an obvious focus on it. As for what concerns their open innovation strategy, EDPI is actively looking for new ideas and opportunities in these five areas, independently from the stage of maturity of the innovation.

**Client-focused solutions** focuses on creating innovative products and services with the goal of improving customer satisfaction and increasing customer engagement through innovation.

This innovation area works closely with EDP's corporate marketing, customer management, and retail business units creating initiatives which “*materialize EDP's customer-centric vision*”. **Smarter grids** revolve around the identification and adoption of technologies to improve the grids' infrastructure making it more efficient and up to date with the sectors' needs. As such, the smart grids group cooperates closely with EDP's distribution infrastructure business units enabling them to promote energy innovation given their central



role in the energy system. The **cleaner energy** area focuses mostly on one of EDP's objectives aiming to progressively reduce their CO2 emissions through the adoption of new and renewable power technologies. As such, the sourcing and trial of alternative renewable technologies, as well as improving the overall footprint of conventional generation power plants are some of the functions confined to this area. The cleaner energy group works closely with EDP's generation business units to develop "alternative solutions that improve the technical and economic efficiency of power plants". **Data Leap** appears as a cross-functional area that aims to leverage IT and communication technologies' latest developments to "accelerate innovation in all business areas". Recurrent topics like big data, cloud computing, advanced analytics, machine learning, AI and IoT are explored in this area that is permanently looking for opportunities to optimize operations and business development "through digital innovation and data exploitation".

Finally, **energy storage**, also somewhat a cross-functional area, focuses on the sourcing and trial of battery technologies, alternative storage solutions, as well as the development of storage control tools to improve efficiency in the energy value chain.

These areas are innovation and R&D centres that comprise a mixture of internal and external projects, and they are the bridge between EDPI and other business units ensuring the alignment of innovation goals along the value chain.

#### 4.1.2. *Management Areas*

**Startup support** is the epicentre of the innovation ecosystem, it conducts several initiatives to support startup development from the moment they discover them until startups solutions are mature enough to conduct a pilot project testing the technology, that if successful may lead to the incorporation of the startup's technology into EDP's business unit's activities. Startup's support identifies, develops, promotes and scales start-ups, national and international, by leveraging their global resources, and through their valuable network of partners, including

several incubators and accelerators that are responsible for the biggest contribution to EDP Inovação's deal flow. Under the supervision of this area, one can find EDP Open Innovation, EDP Starter, and FabLabEDP.

The **corporate venture capital**'s team manages EDP Ventures, which is EDP's capital risk fund for cleantech.

Finally, the **special project**'s team is responsible for all projects that do not fit directly into a specific area, functioning almost like an internal consultant. Besides this, the special projects' area has two direct responsibilities. The organization and management of the innovation committee and sub-committees, which are meetings held every trimester between each of the five innovation areas and representatives from the business units, including other geographies. The idea behind these meetings is to analyse market trends, understand what are the challenges and goals of EDP, and present and approve projects to attain those objectives and challenges in each innovation area.

Also of the responsibility of special projects' team is to conduct cost-benefit analysis of innovation projects. This entails working closely with the business units in the development of projects, which are usually conducted in partnership with them not only to obtain their "buy-in" on the project and ensure the maximization of synergies but also so they can capitalize on what each is doing in terms of the development of new opportunities. And the area of Special Projects manages that.

#### ***4.2. Evolution of innovation ecosystem at EDP:***

EDP Inovação was created in 2007 and was very much aligned with EDP's mentality of pursuing the increasing bet in renewable energy sources, as well a consequence of the growth of EDP Renováveis. EDP Inovação had a clear mission to understand new market trends, find new strands of innovation, and new growth avenues that could translate into added value for the EDP Group.

The creation of EDP Inovação is linked to EDP Renováveis success as a result of the exponential growth and the important role and scale that it achieved having relied on the fact that EDP was able to foresee and act on a trend prior to competing big market players. This phenomenon revealed a newfound importance for the need to constantly look ahead of the horizon and adopt an openness toward less conventional approaches with respect the landscape of emerging market trends. By encouraging a dynamic and forward-thinking approach such as this, EDP could avoid potentially missing out on opportunities, and so EDP Inovação was created.

Over the course of ten years EDPI was able to create a vast set of open innovation initiatives, however, EDP Inovação started out more on a smaller scale serving as a mere observatory for new technologies and a factory for pilot projects. From 2007 onwards, new initiatives were created and integrated into EDP's innovation ecosystem with the goal of coming upon innovation at different stages of the value chain. In this way, the focus has been on developing a set of tools, that go from "idea" stage to "investment" stage, passing by "prototyping", "incubation", and "pilot testing" stages, to fully support the innovation ecosystem. The goal is to be a **one-stop shop for innovation**, which is the current positioning of EDP Inovação. EDP's five-stage innovation ecosystem – idea, prototyping, incubation, pilot project, investment – as it exists now, was the result of the creation of several initiatives since the creation of EDP Inovação. As was mentioned above, in 2007, EDP Inovação only conducted pilot projects, the fourth stage of the current innovation ecosystem, and in the years that followed focused on completing the path to the five-stage ecosystem. EDPI sought to create an ecosystem of companies surrounding EDP, in order to have access to new ideas, and above all to implement promising solutions into their activity. So, in 2008 EDP Ventures was created as an instrument to attract start-ups to the ecosystem. Venture capital is considered as a high-risk activity, such activity which is rather uncommon for a utility based

company which veers towards being risk adverse. In this sense, the creation of EDP Ventures in 2008 was a kind of cultural rupture in the utility business model. With the disruption in the energy market, utility providers corporate culture has shifted as they are nowadays much more aligned towards this activity and as a result are more vulnerable to risk. The year 2009 saw the creation of Prémio EDP Inovação (currently EDP Open Innovation) with a clear emphasis on the idea stage. The new objective was to connect with new ideas and introduce them into the ecosystem, even if not yet fully developed. Parallel to this the objective also worked towards the added visibility to EDP's ecosystem. The contest was created as a means to attract start-ups with which it would be interesting to work with, and that could possibly be invested in by EDP Ventures, also ensuring the "deal flow" of the premature corporate venture capital. In 2010, FabLab EDP was created, the first in Portugal and among the first to be launched in Europe. The FabLab was created as an outlet to enable easy prototyping. Many of the start-ups across EDP's ecosystem only had their products represented in paperwork or were still just conceptualizations, the FabLab allowed for the creation of prototypes to assist in the full materialization of these ideas.

Following the creation of EDP Ventures, there was the realization that many ideas that were arising in the ecosystem, whilst very interesting, were not yet developed nor ready for investment. Also, there was a noted high rate of mortality of start-ups with which EDP Inovação contacted but whose ideas were again, premature for investment. With a goal to help and support start-ups during their initial development phases, EDP Starter was founded to help in the maturing process of startups' technologies.

In 2013 the Interim Management program was launched. Upon noticing that many start-ups encounter various difficulties during the early stages of their lives, an invite was extended to EDP's employees to assist in the development of their ecosystem's startups during their spare

time. The goal of the program remains to help start-ups overcome the initial challenges small entrepreneurs may face with the help of experienced professionals from several areas.

Once the five stages of the innovation ecosystem were in place, the new focus shifted toward a more global strategy of expanding the EDP ecosystem overseas to international markets. So, in 2016 EDP Starter Brazil was created, following generally the same guidelines as EDP Starter in Portugal, and the program was also expanded to Spain. Building upon the success of this international outlook, in 2017 EDP partnered with seven other utilities around the world to create the Free Electrons program.

Having established the path of evolution of EDP's innovation ecosystem, which focuses on startups as the main stakeholders, it is important to comprehend further each initiative and tool used by EDP Inovação to create a collaborative relationship with them.

**EDP Open Innovation** consists of a mini-acceleration program, and contest, designed by EDPI in partnership with Grupo Impresa, and works mostly as a call for new startups, and new ideas for EDP Starter. The program consists of 3 or 4 weeks of acceleration where startups from all over the world have the opportunity to gain expertise and know-how from one of the biggest players in the market, receive a monetary prize of 50 thousand euros and become integrated into EDP Starter. In the last two years' winners also have the chance to showcase as alphas at Web Summit.

**FabLab EDP:** A fab lab (fabrication laboratory) is a small-scale workshop offering digital fabrication, that is generally equipped with an array of flexible computer-controlled tools that cover several different length scales and various materials, with the aim to make "almost anything", namely laser cutters, 3D printers and CNC routers.

FabLab EDP was installed in 2011 in Sacavém, and it can be used by both the outside community and employees or associates of EDP to develop prototypes of products. The main goals of the Fablab EDP are reinforcing the promotion of innovation and creative culture in the

EDP Group, interacting with society, leveraging entrepreneurship and encouraging participatory citizenship. They provide unique resources that can be used for developing projects and exploiting new ideas. Fablab EDP acts mainly in promoting innovation, through the provision of unique resources that can be used both for exploring new ideas, namely from university students enrolled in technical programs, or in the development of ideas that can come from EDP's business units or from "Starters" already part of EDP's incubation, acceleration or venture capital programs. The focus for Fablab is actually the latter, with most the resources being preferable available to people with existing ties to EDP, namely ones currently participating in the innovation initiatives.

**EDP Starter** is EDPI's incubation program with focus on startups in the energy sector. EDP Starter offers participants several benefits, namely a 600 sqm co-working space, (although it is not free, requires the payment of a small symbolic "rent"), support and training in key areas, co-presence in energy tech fairs and summits, access to relevant conferences and events, close contact with EDP group in 15 countries, a big corporation network, access to EDP's suppliers and clients, **Interim Managers** and mentors, unlimited access to **FabLab EDP**, possibility to participate in **Seed Race**, (a competition between the incubated start-ups of EDP group with an award of 100 thousand euros), the possibility of a financed pilot project through EDP Ventures, and access to **EDP's business units**.

EDP Starter supports startup projects from the initial idea stage to the venture capital investment stage. The network of partners is carefully selected as it will be a catalyst for the success of startups, guiding and supporting them throughout the incubation process. What's more, through their partnerships, EDP Starter has the capability to offer transversal support to the startups in several areas. Partners include other accelerators and incubators, universities, consultants, legal offices, communication (brand) agencies, venture capitalists, and business angels.

**EDP Ventures** is an early-stage corporate venture capital (CVC) for investments in cleantech – during the seed phase or series A round - that supports EDP’s process of open innovation. The CVC invests in national and international startups following a strategic and financial objective. All investments follow a logic of financial return -investing so that in the future there is an “exit” event and the gain of financial returns-, but while that’s a necessary condition it is not sufficient, there is also an underlying goal of extracting strategic benefits from the investments. EDP Ventures invests directly into companies or projects, that can be inserted into one of the five strategic areas of innovation, which results in a portfolio of innovative technologies and business models, that allows the capture of interesting growth options while promoting knowledge transfer from innovation projects relevant for EDP. EDP Ventures offers medium tickets, with follow-ups included, between half a million and five million euros, but always non-majority investments, as it is usual for capital risk, and there is no interest for EDP in having control over the startups. Besides the financial investments, EDP Ventures provides startups with access to their incubators and accelerators network, their network of other VCs, CVCs and business angels, training and mentoring, and access to the Interim Management Program. EDP Ventures also offers the possibility of financing startups’ pilot projects through their mechanisms of convertible debt.

When deciding upon which startups to invest in, EDP Ventures follows a criteria decision that focuses on several aspects. While most of them are general to venture capital investments – strong IP, quality of the team, market dimension and scalability, the existence or not of an MVP, and if it is a value-added innovation – one aspect is more particular to EDP’s case, the buy-in from EDP’s business units. EDP Ventures only invests in startups which make sense or are more relevant to the activity of EDP’s business units, and also where future collaboration may be expected.

Besides the financial results, which are easy to measure and evaluate - analysis of valorisation expectations and return -, there is a qualitative component to the evaluation of EDP Ventures' investments. Every year "the state of affairs" is presented to the CAE (Conselho de Administração Executiva) – a description of what was achieved, which strategic benefits came from the investments, understanding if EDP is using the solutions or not, and how those solutions impacted the business units.

**Free Electrons** is a global energy startup accelerator program that brings together promising startups around the world and eight leading utility companies to "co-create the future of energy". Currently, the program is supported by eight utilities spread worldwide – EDP, AusNet Services, Dubai Electricity & Water Authority, ESB (Electricity Supply Board), Origin, Innogy, SP Group (Singapore Power), and TEPCO (Tokyo Electric Power Company). These utilities are witnessing the disruption in the energy market, from new methods of energy generation to new business models that promise to compete and disrupt with the traditional business model of the past century. So, there is a common wish to capture that intelligence and technology in order to face the challenges ahead. What allows for the collaboration of these competitors, is the belief that they are not in direct competition. In fact, what enabled the creation of this partnership was the understanding that whilst all in the same market, they did not compete directly because they are geocentric and are focused in their own geography.

The program allows startups which are organised into specific categories from clean energy to IoT and digitization - to be in contact with one another in a way that wouldn't be possible outside of the program, or would take longer, with some of the biggest utilities in the world, where they have the possibility to match their offerings to the utilities' needs, and not only develop a proof-of-concept, but also a pilot project at the end to validate their technologies. There is also the opportunity for the startups to become suppliers for the utilities and the



possibility of receiving investment. Through Free Electrons EDP has the opportunity to extend their global startup database and obtain relevant data about the enrolled startups. A database containing information about all relevant startups, that allows EDP to have an overview of the players in the market, their innovative ideas, and their maturity state.

It also allows EDP to get to know better the finalist startups and understand how their solution could be incorporated inside the company, guide them during the product/solution development and, if necessary, direct it to more interesting paths.

#### 4.3. *Value capture mechanisms*

After the overview of the landscape of EDP's innovation ecosystem, we will now focus on how EDP group captures value from it. Value from the collaboration with startups arises mostly through working with them in the development of their solutions and technologies with the end goal of making them commercial.

As such, EDPI develops projects with the startups which usually go through three stages of maturity, however, this is not a stiff process and stages can be jumped over.

The first stage, proof-of-concept (POC) consists of an initial analysis to understand if a certain technology works and if there is a match with the business unit's goals. This technical due diligence is usually conducted by the innovation areas, that try to find a fit with EDP's activity.

This stage is usually simpler and requires less effort than subsequent stages. Also, it does not require the direct involvement of the business units, which makes it faster, since it is possible for EDPI to run a POC by themselves. Once the proof-of-concept is run and if the technology is considered validate, EDPI may propose to a business unit the execution of a pilot project.

A pilot goes beyond the initial validation of the technology, it involves testing it in a "real" scenario, and there is usually a bigger involvement from the business units since most of the times it is necessary to have access to their assets, which makes this process, most of the times, slow and bureaucracy filled.

The enormous corporate structure of EDP, allied with the necessity to use assets owned by the business units, makes it difficult to conduct fast pilot projects, which is usually both frustrating for the startups and for EDPI. There is the involvement of several people, at different decision levels, and sometimes it is necessary to convince different stakeholders that the result will be interesting. This is especially true for innovation projects, whose expected value is not immediately perceived by senior stakeholders which are more sensitive to actions that impact the bottom line directly. Adding to the above-mentioned factors, there is also the issue of regulation and other external factors that drag down the process of pilot testing. Some of EDP's business units are particularly sensitive to regulatory issues, and so an internal due diligence is necessary to make sure there is no regulatory risk in conducting a certain pilot.

Once the pilot is over the business unit itself decides if the technology will be scaled further and the development process continues until it becomes market-ready and commercial.

In EDP's startup portfolio it is possible to find startups that integrate into different groups, concerning the way in which their solutions/technologies will impact EDP's competitive advantage.

1) **Start-ups whose solutions are directly incorporated into EDP's activities.** These solutions can be directly integrated into EDP's activity, they are passive to solve a problem or challenge, improve the quality and efficiency of operations and/or propose an alternative business model.

2) **Start-ups whose solutions materialize EDP's customer-centric vision.** These are usually customer products or customer-oriented services. Despite not contributing directly to the improvement of EDP's activity, they contribute to EDP's competitive advantage by bringing EDP closer to the customer, improving customer relations, and placing EDP on the consumer's mind.

3) **Start-ups whose solutions' benefit EDP by being incorporated into supplier's activities.** Startups' solution benefits EDP by being incorporated into the activity of EDP's suppliers. (E.g. A sensor to monitor wind turbines needs to be placed inside the turbine, which means that the companies that integrate the sensor are EDP's suppliers.)

Another important aspect to consider when talking about open innovation in general, and specifically EDP's collaboration with startups, is the protection of intellectual property. In cases where EDP invests in the startups, it follows a model of capital risk, where EDP enters the shareholder structure of the startup through minority stakes, so the intellectual property is owned by the founders, it is not owned by EDP nor is it shared. There is no interest for EDP to acquire the startups, or their technology, the basis of this relationship is grounded on a collaborative process that aims at creating shared value. In fact, when a startup's technology is unprotected EDPI helps the start-up in the process of protecting it, namely through its legal partners that specialize in IP protection.

#### 4.3.1. *Startups' perspective on EDP's innovation ecosystem*

To comprehend further EDP's open innovation initiatives, it is necessary to understand the perspective of the main stakeholders involved in the innovation ecosystem, the startups. As explained in the methodology, several interviews were conducted with the participants to gain further insights into their collaborative relationship with EDP, especially in what concerns the support EDP extends the startups in the ecosystem, the startups' motivation to participate in the initiatives and their perceptions of the management and process of initiatives.

One of the first conclusions that arose from the analysis of the interviews was the fact that startups can enter EDP's ecosystem via different paths. As such, the nine startups interviewed had to be grouped into four types of groups. Two of the startups were incubated in EDP Starter, two participated in EDP Open Innovation and were later incubated into EDP Starter, four only participated in EDP Open Innovation and one was only invested by EDP Ventures. According

to these characteristics, changes occurred in the interview guide, specifically the elimination of some questions that did not apply to some cases.

In what concerns the **motivations to participate** in the initiatives the startups presented several reasons, including the opportunity to validate and receive feedback on their solutions, access to know-how and infrastructure, the fact that they saw EDP as a potential client or partner, the opportunity to receive investment and gain market and business insights, the networking possibilities, gain visibility and exposure, the chance to know executives from EDP – more experienced people with valuable inputs-, access to a company present in the market (big player), probing the international and European market, and gaining credibility and trust from their clients.

In terms of the **help and resources extended by EDP**, the most mentioned aspect was by far the opportunity to receive direct and fast access to specialized know-how and expertise that allows for the validation (or not) of startups' solutions – namely access to the relevant business units and people of interest inside EDP, with vast experience and specialized know-how. Being inside the ecosystem allows for a fast process of technical feedback from experts and validation of their solutions.

Also, a topic widely mentioned was the help received in prototyping and testing their solutions, where the access to the FabLab EDP, relevant infrastructure, data, and financial resources were mentioned as important factors in that process.

Startups mentioned receiving legal support and help in the improvement of the business plan, mainly through the participation in several events, workshops, talks, and conferences, but also through training and educational opportunities extended to some team members. Other mentioned aspects included close support provided to the startups, also through mentoring programs in place, the access to valuable networking possibilities, partnerships and business deals, and overall brand exposure and visibility.

In what concerns the **new capabilities and expertise acquired**, most startups emphasized business and management know-how, as well as market know-how, in detriment of technical capabilities, concerned with the technology per se. Participants mentioned acquiring internal business insights, namely into the energy market, operational know-how, critical and strategic thinking skills, vision and mindset of international markets, and skills to approach clients and suppliers.

The table below presents a summary of positive and negative aspects of the innovation ecosystem, mentioned by the startups:

*Table 2 - Summary of Positive and Negative Aspects*

Positive Aspects	Negative Aspects
<ul style="list-style-type: none"> <li>-Receive direct and fast access to specialized know-how and expertize;</li> <li>-Help in the validation of technology/solution;</li> <li>-Access to the relevant business units and people of interest inside EDP;</li> <li>-Existence of a physical incubation space;</li> <li>-Opportunity to prototype their solutions (access to FabLab EDP);</li> <li>-Opportunity to test their solutions (conducting pilot projects);</li> <li>-Access to relevant infrastructure and data;</li> <li>-Access to financial resources;</li> <li>-Access to legal support;</li> <li>-Improve the business plan and business skills;</li> <li>-Access to several events, workshops, talks, and conferences;</li> <li>-Access to training and educational opportunities;</li> <li>-Day-to-day support and access to mentoring programs;</li> <li>-Valuable networking possibilities;</li> <li>-Opportunity for partnerships and business deals;</li> <li>-Overall brand exposure and visibility;</li> </ul> <p><b>EDPs support is transversal in all areas of the business.</b></p>	<ul style="list-style-type: none"> <li>-Process of adopting the technologies is slow and sometimes frustrating;</li> <li>-Lack of understanding common problems of startups and aggregating them;</li> <li>-Slow and bureaucratic process during contract negotiations;</li> <li>-Slow and bureaucratic process to obtain internal answers - articulation between EDPI and business units;</li> <li>-Corporate structure unadapted to the startup environment;</li> <li>-Slow process to test solutions, and understand their viability while in development;</li> </ul>

It is easy to understand that most negative aspects mentioned by startups relate to the fact that internal processes at EDP are somewhat slow and bureaucracy filled. This can translate into an

obstacle to innovation and it's an obvious contrast with the fast-paced and dynamic world of startups, where time is the worst enemy and there is a certain impatience to the way business is conducted.

Despite all this, there has been a tendency for the acceleration of this process mainly due to a shift in the mentality of stakeholders at the business units, who are becoming more aware of the value added inherent to innovation projects. The recent change in culture at EDP, to what concerns innovation and the necessity to be aware of market trends, adding to improvements in the accuracy of the alignment between innovation and business goals, resulted in a shift of the paradigm of conducting pilot projects at EDP. For several years EDPI was the one financing the startups' pilot projects, and it still does, however the fact that EDPI is increasingly finding solutions that better fit the priorities of the business units – particularly solutions that fit with their annual goals and budget -, has resulted in a growing interest of the business units to work with the startups and to actually contribute with their annual budget to the realization of some pilot projects. This also contributes greatly to make the pilot project phase faster. When business units recognize their own necessities and are involved in the process of searching for new ideas and technologies the process is more fluid.

#### *4.3.2. The importance of aligning business and innovation goals*

One interesting result from our research is connected to the importance of the alignment of goals between EDPI and the business units, not only to expedite the process of conducting innovation projects but also to maximize value capture.

Maintaining a relationship of shared opportunities with the business units is very important when aiming at the alignment of business goals and innovation strategy, which pertains, mainly, the incorporation of new technologies and business models within EDP's activity.

One of the aspects that makes this alignment more evident is that change in the financing model of EDPI. Prior to 2013, EDPI would get a portion of the annual budget, after that year the model changed, and EDPI started to function as an internal consultant that charges for innovation projects internally, which means that business units pay for their services. Since the business units are hiring EDPI to oversee a project then there is an obvious interest to align objectives.

Also, important for the maintenance of this relationship is the necessary for the two parties to contact regularly and update each other. Every two months, more or less, the five innovation areas meet with key stakeholders from the business units, and their executive sponsor – a member of the board assigned to the area. They report on what they have been doing and pitch new ideas to the business stakeholders, who are there to guide them in their innovation projects. And it is also important to say that one of the main roles of the innovation areas is to translate the necessities arising in those meetings to the other areas within EDPI.

Besides this, business units are also involved in the decision process of the startups to support and integrate into the ecosystem, and sometimes business units are the ones bringing new startups in.

#### ***4.4. Other open innovation initiatives***

As mentioned before, EDP has a plethora of other initiatives that involve other stakeholders, besides startups, that are different in their nature, and in their strategic value, and seem to be loose somewhere in the open innovation “chaos”.

Table 3 - Overview of miscellaneous initiatives

	ClickIdea	EDP University Challenge	EDP Re:dy Challenge	IoT Hackathon
Information about initiative	ClickIdea is EDP's idea management system, created in 2008 - and currently in its second version since 2012 - used across the entire Group. Ideas posted in the platform are evaluated, on a trimestrial basis, by a committee where all business units are represented. Ideas are chosen according to their adequacy to EDP's context and are then forwarded to the relevant business unit to be developed and later implemented.	Targets college students from different backgrounds by presenting them a challenge, that changes every year. Launched in 2007 it already counts with the participation of 3221 students and 262 universities.	A contest that promotes the competition between teams around the topic of energy efficiency, and is oriented to the services made available by the Re:dy technology. Re:dy is a service that allows clients to manage the energy consumption of their homes no matter where they are.	Created by EDP and Microsoft the challenge proposed was to find an inexpensive end-user solution for home energy monitoring that is easy to install and use.
Aim	<ul style="list-style-type: none"> <li>-Challenging collaborators to contribute with innovative ideas that could have a positive impact on EDP's activity;</li> <li>-Create value for the EDP Group;</li> <li>-Involve and empower collaborators in the innovation process.</li> </ul>	<ul style="list-style-type: none"> <li>-Shorten the distance between the company and academical talent;</li> <li>-Provide a setting for future generations to contact with the business world;</li> <li>-Have access to new ideas and opportunities coming from an external perspective.</li> </ul>	<ul style="list-style-type: none"> <li>-Potentiating the development of innovative products and services;</li> <li>-Identifying talent amongst participants;</li> <li>-Stimulating investigation in the energy efficiency area;</li> <li>-Foster a close relationship between EDP and universities.</li> </ul>	<ul style="list-style-type: none"> <li>-Explore new business models that can include open-source approaches to commercial products;</li> <li>-Access to specific knowledge and talented users.</li> </ul>
Type of participants	<b>Internal.</b> It is open to all employees in all geographical areas.	<b>External.</b> College students from various backgrounds.	<b>External.</b> Each team must represent a University and/or startup.	<b>External &amp; Internal.</b> Participants must prove to have technical and management skills.
Motivations of Participants	<p><b>Extrinsic:</b></p> <ul style="list-style-type: none"> <li>-Receive gifts available for winners;</li> </ul> <p><b>Intrinsic:</b></p> <ul style="list-style-type: none"> <li>-Contributing to the improvement of the company;</li> <li>-Being recognized amongst colleagues (reputation);</li> <li>-Self-development.</li> </ul>	<p><b>Extrinsic:</b></p> <ul style="list-style-type: none"> <li>-The award, which includes a monetary prize and an internship with EDP.</li> </ul> <p><b>Intrinsic:</b></p> <ul style="list-style-type: none"> <li>-Gaining experience and developing the CV.</li> <li>-Contact with the corporate world and one of the biggest companies in Portugal.</li> </ul>	<p><b>Extrinsic:</b></p> <ul style="list-style-type: none"> <li>-Award of 5.000 euros.</li> </ul> <p><b>Intrinsic:</b></p> <ul style="list-style-type: none"> <li>-Intellectual challenge;</li> <li>-Fun and enjoyment;</li> <li>-Development of skills.</li> </ul>	<p><b>Extrinsic:</b></p> <ul style="list-style-type: none"> <li>-Microsoft Surface Pro 4, Microsoft Lumia 640 &amp; IoT Kits (Raspberry PI's);</li> </ul> <p><b>Intrinsic:</b></p> <ul style="list-style-type: none"> <li>-Intellectual challenge;</li> <li>-Respect from the community;</li> <li>-Credibility and reputation.</li> </ul>



#### ***4.5. Evaluation of EDP's open innovation initiatives***

It is indeed no easy feat to measure innovation, there is no conventional formula or universal measure to do so. Many times it is a matter of betting whether or not to follow a trend which supposedly will impact EDP's activity, even though the actual benefits from following it are typically unknown and often hard to predict. When it comes to this issue there is an extensive analysis and due diligence conducted to foresee future trends and opportunities to bet on. Once this knowledge is gathered EDP follows a portfolio strategy in which it balances potential losses and wins.

However, there are some metrics and KPI's that can be used to gather quantitative data about the initiatives' performance. Unfortunately, EDP does not seem to be following this reasoning, where most of their initiatives suffer from lack of performance measurement, which leaves us with the question: What is, in real terms, the value added that EDPI's activity brings to the group?

To what concerns EDP's innovation ecosystem, being it the core of EDP's open innovation strategy and where most of the value added to the group lies, it would be the first place to start implementing some metrics in order to properly evaluate its performance in terms of value capture. There is some statistical information about the ecosystem as a whole. EDP has 14 investments, that amount to 24 million euros, the startups in the ecosystem have jointed revenues of 40 million (predicted to be 60 million by the end of 2017), and have created 300 jobs (predicted to be 400 by the end of 2017).

However, there is no data on the number of projects currently being conducted with the startups and no overview on the number of projects in each stage of maturity. Also, there is no information on the number of startups that end up becoming EDP's suppliers, and no analysis is conducted to understand if, in fact, their incorporation has created additional value, either by creating new revenue streams or by diminishing production costs. Considering this lack of

metrics and issues regarding the measurability of success in their open innovation projects, the approach of a Living Lab which is noted for adhering to rigorous methodologies, evaluation and research, may help introduce a new culture of metric driven innovation at EDP that would fit across each business unit as well the current ecosystem.

## 5. Living Labs

### 5.1. *What is a Living Lab?*

In the Open Innovation Literature, openness is related to the opening of the innovation process through inbound and outbound flows of knowledge. The inbound position of knowledge is concerned with capturing and benefiting from sources of knowledge external to the firm. In addressing Living Labs in Open Innovation, we situate it on the inflow axis as multiple stakeholders are invited to contribute to processes of innovation, particularly the user.

One issue undercutting our research regarding the Living Lab was the lack of common agreement on a definition, this varied depending on the nature of the paper and the perspective with which it treated Living Labs (for example, the Living Lab as an approach to user innovation, as a feature of a wider project, the Living Lab itself as an organisation). Whilst many papers converge on the fact that a Living Lab is underscored by the “*users as innovators*” approach it is equally critical to recognise that the user is not in this regard a test subject of the Living Lab, but rather the fundamental premise to begin with in constructing the interaction with the user to access their ideas and knowledge (Niitamo *et al.*, 2006; Schumacher and Feurstein, 2007).

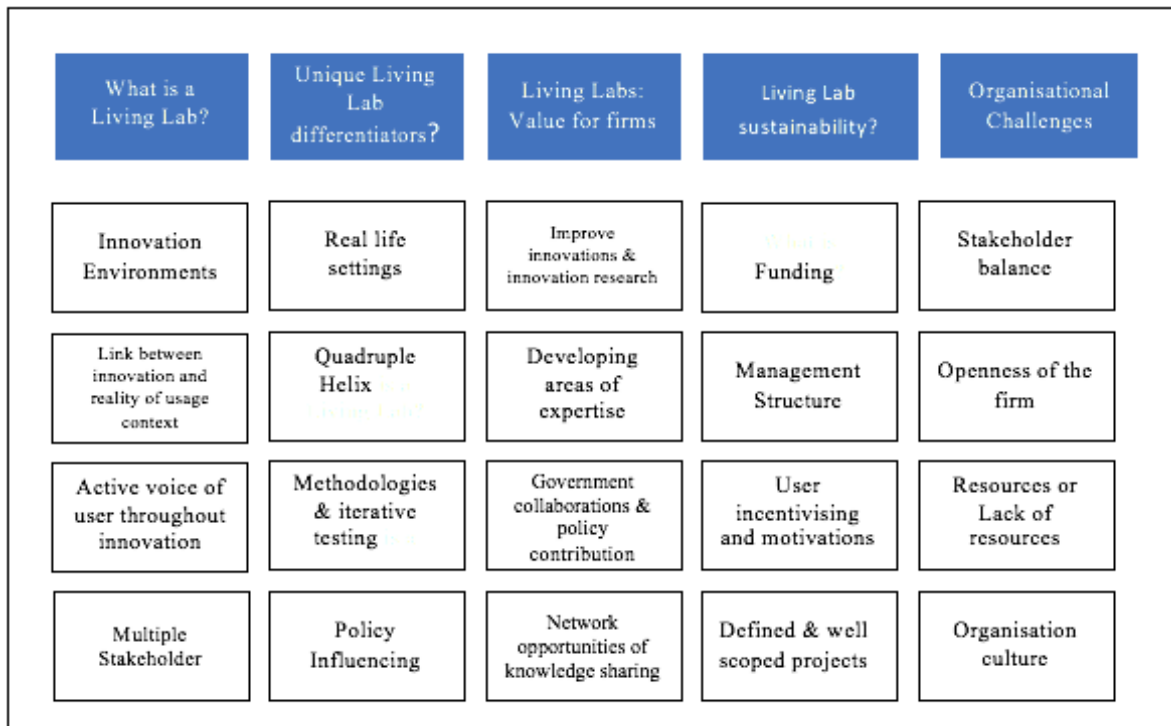
The concept of the lab also diverges across available literature with a dichotomy appearing between the idea of an American Living Lab and a European Living Lab. The first Living Lab is credited to Prof. William Mitchell of MIT and demonstrates the more American approach to Living Labs as a physical space for prototyping, in this case the lab was designed to replicate the home living space where the routine activities and interactions of everyday home life can be

observed, recorded for later analysis and experimentally manipulated enabling the volunteer users to reside and interact with it as if it were a real home (Eriksson *et al.*, 2005). For instance, rather than recreating a physical space, the European approach of Living Labs is more concerned with the natural context of the Living Lab, in this case the space or activity itself is dependent upon the nature of the Living Lab project and at the fore of the design is the methodology supporting the Living Lab project itself.

One of the most thorough descriptions capturing the activity of a Living Lab was found to be that constructed by Schuurman in 2015 defining the Living Lab as a model of three layers: *“Living labs are an approach to innovation consisting of three separate, but interrelated levels of analysis. On the Macro level, Living Labs are a Public-Private-People partnership organised to exchange knowledge and conduct innovation projects. These Living Lab innovation projects are characterised by active user involvement, co-creation, multi-method and multi-stakeholder, at the Meso level. These projects consist of different research steps that are aimed at generating user input and contribution to the innovation process, comprising the Micro level”* (Ballon and Schuurman, 2015).

Taking the available literature into account coupled with the extensive interviews with experts we can look to Living Labs as an innovation environment capturing the active voice of users throughout the innovation process incorporating multiple stakeholders and the dynamics of real life.

Table 4 - Affinity Diagram: Factors driving Living Labs



The core principles of Living Lab are outlined by the European Network of Living Labs as follows:

**Value**, such that they support value creation in preferably two ways, for their partners in terms of business value and for the presumptive customer or user of the developed innovation in terms of user or societal value. **Influence**, viewing users as active, competent partners and domain experts are vital since their involvement and influence in innovation processes is fundamental. To motivate participation and engagement among users it is critical to illustrate the impact of the interaction that the users has on the innovation. **Openness**, this principle stresses the importance of having an innovation process that supports a bidirectional flow of knowledge and resources between stakeholders (Gassmann, Enkel and Chesbrough, 2010). The idea that multiple views brings power to the development process and contributes to the achievement of rapid progress. However, to be able to cooperate and share in a multi-stakeholder environment, varying levels of openness is often a requirement.

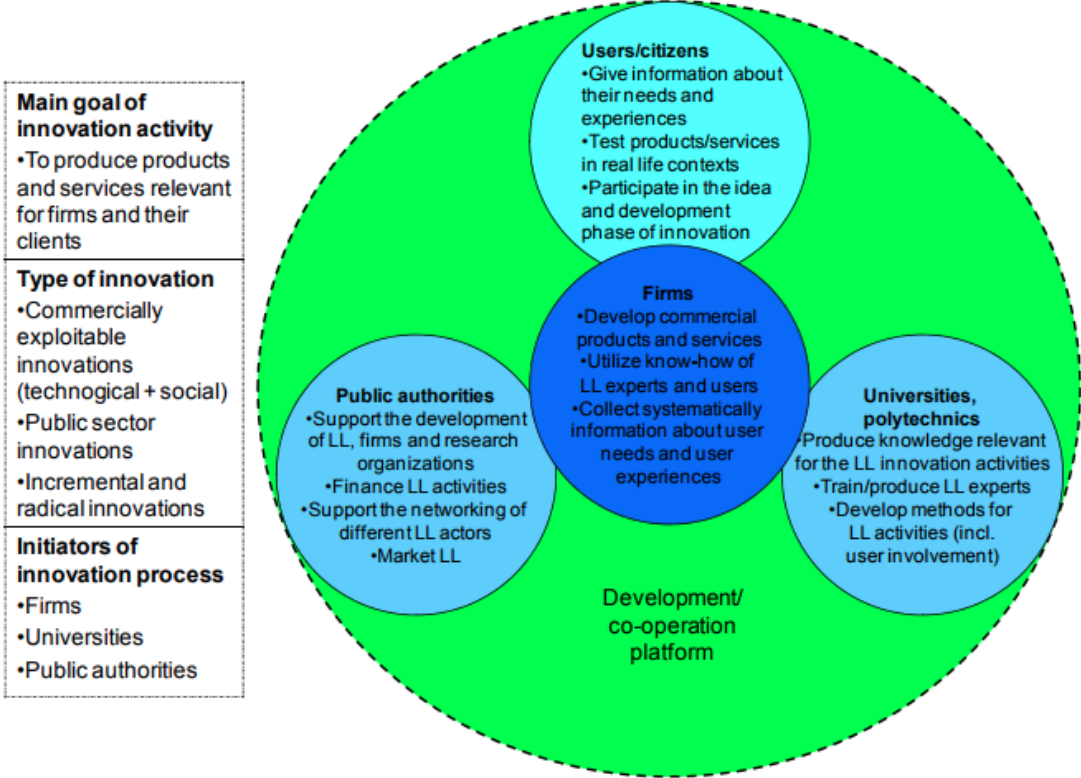
**Sustainability**, the Living Lab can be also described as an approach which meets the need of the present without compromising the ability for future generations from an economic, social and ecological perspective. This is also a cornerstone for the ongoing cycle of learning within Living Labs. **Realism**, of utmost importance to the Living Lab is that activities should be carried out in a realistic natural and real life setting. This is important because people cannot experience anything independent of the experience they get from being embodied in the World.

### *5.2. The Living Lab in practice*

Having a defined understanding of the Living Lab in theory, we may ask what in fact differentiates it from other streams and models found in innovation research and how they work in practice. One major observation which emerged from interviews with participants was the focus on the user from the very beginning of the innovation process framed in a real-life setting. Speaking with the International Project manager of the European Network of Living Labs Ines Vaitinen, she underlined that rather than being more technology-driven, Living Labs are aligned with being socially focused. For example, in a Living Lab, a user would not be handed a prototype and asked their views about it, they would be asked their views prior to the creation of any kind of prototype to best identify the real needs the prototype serves to address. By involving the users and stakeholders in initial stages, the Living Lab can capture, understand and validate the user's interactions with the product or service. In this sense, we begin to see that Living Labs require first a certain mindset in how the user is treated and viewed. Users cannot be regarded as guinea pigs in a laboratory but as co-creators in a process. Further to this mindset and treatment of the user, the real-life dynamic is also a core differentiator. Brainstorming, focus groups, outdoor walks, real life outlets fitted with sensors to monitor behaviours, these each ensure a realistic context capturing user experiences.

Living Labs are also concerned with going a step further than atypical activities of corporate innovation to create value. Rather than focusing innovations on the business and internal operations of the firm and firms customers, the Living Lab looks outside to the current state of the economy, of culture, of citizens and geopolitics at large to address issues that go beyond the arena the firm locates itself in. Living labs seek to leverage on meaningful societal interaction encouraging participation from four specific groups of stakeholders – government, industry, citizens and research (academia), forming a quadruple helix model of stakeholders as illustrated below, in this case where the firm lies at the apex (Arnkil *et al.*, 2010).

Figure 1 - The firm within the quadruple helix model

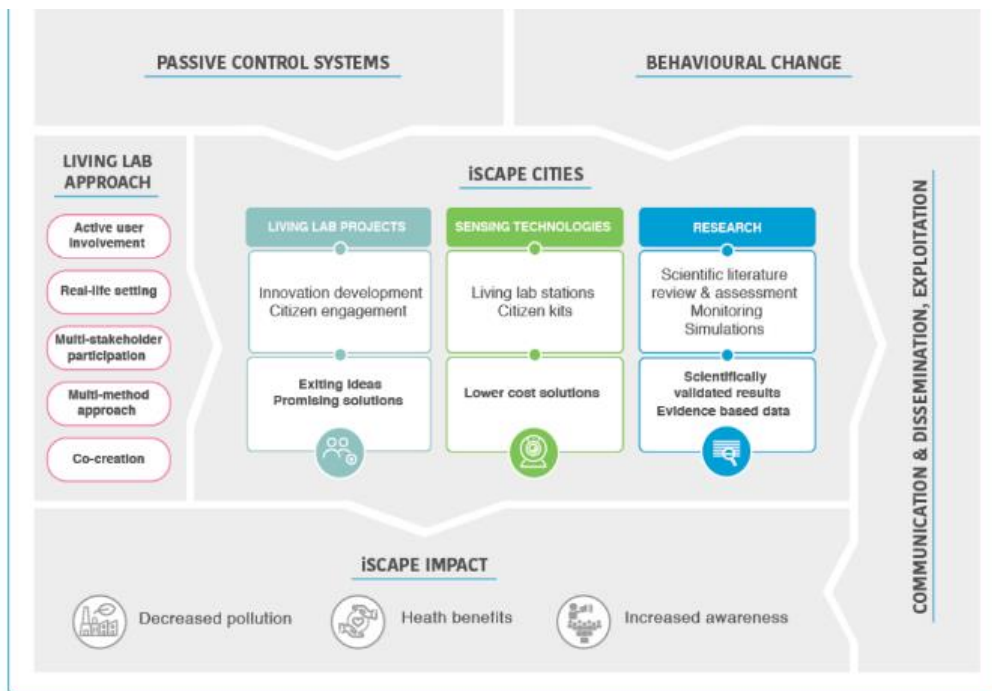


Whereas innovation at EDP has a strong emphasis and core competencies in developing start-ups and the overall promotion and support of entrepreneurship and venturing, Living Labs can leverage this further by shifting the focus of the company towards issues of policy and current

user needs as well as fostering a new culture of know-how from the network of Living Lab experts. As a major utility provider of gas and electricity, EDP has a focus steadily fixed on the future. The future of energy retail, the future of cleaner energy, the future of static storage and most importantly the future of the customer and their relationship with utilities. One of the fundamental drivers of this future will inevitably be policy and research and we may argue that if EDP were to consider integrating a Living Lab and its practices into their innovation strategy, it may provide them with core advantages in understanding the greater landscape of utilities and their users, thus protecting their market position. Rather than diversify risk by investing and supporting in an array of startups, the company could mitigate this risk by instead dedicating an outlet that is focused on their users of energy whether B2B or B2C to gain specific expertise through more research-focused innovations.

With respect Living Labs, Energy and utilities serve as an excellent example due to the wide array of users given that virtually everybody is a consumer of energy. The potential for research and societal outreach is overwhelming and perhaps one example that highlights this potential very well is the work being done by iScape, the European research and innovation project to improve the smart control of air pollution in Europe. This initiative leverages on the work of Living Labs in one case by providing the users (citizens) with Smart Citizen Tool kits or sensors. These small and robust sensors are inexpensive to produce, capable of being hung from a backpack and use an ambient sensor board to measure levels of temperature, humidity, noise, carbon monoxide and carbon dioxide levels to allow for real-time ambient monitoring of data analysis. Users then have access to an online platform to help monitor and aggregate data collected and overall develop a more personal understanding of how pollution impacts them in their day to day life. This research approach is illustrated below demonstrating the core Living Lab values we have discussed (iScape project, 2016):

Figure 2 - A Living Lab Research Approach to the Smart Control of Air Pollution



Another effective example of energy driven Living Labs has been the major research undertaken in the city of Eindhoven and the lighting company Philips to overhaul urban lighting by 2030. This participatory planning involves direct engagement with citizens to improve the quality of life in their community through innovative lighting applications in public spaces including LED street lighting as well as overall maintenance of public lighting systems. The municipality had initially approached the project alone following issues raised by voters of violence in certain darkly lit streets with concentrated nightlife and students. While the first reaction of the government was to introduce intense floodlights to brightly illuminate the dark corners of the street, it was found that this in fact further aggravated individuals and increased levels of violence at night. The municipality has now enlisted Philips as a partner to help pursue the Living Lab project of local urban street lighting through more careful stakeholder collaboration and user engagement. Thus, in a sense we may now envision the potential that such approaches may hold for EDP in citizen and government participatory approaches.



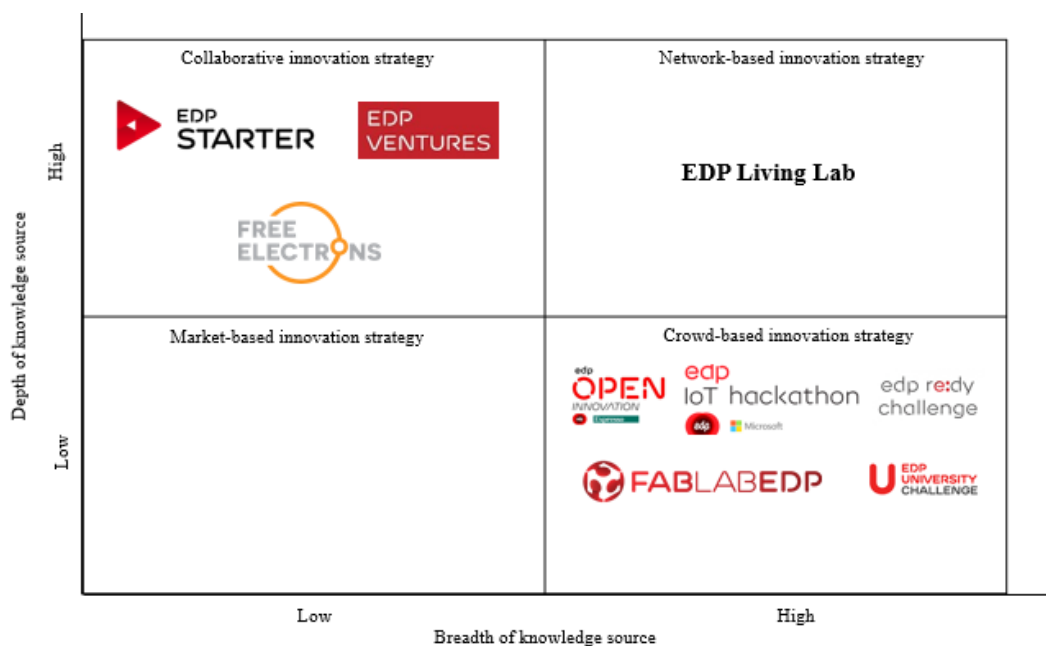
### 5.3. Locating a Living Lab in the EDP Ecosystem

It is worthy to note that currently all EDP's open innovation practices are identified as inbound, that is, where openness is related to the opening of the innovation process through inbound and outbound flows of knowledge.

Open innovation literature commonly differentiates inbound innovation strategies with regard their “breadth” and “depth” of knowledge source. As discussed in the article “Business models for open innovation: Matching heterogeneous open innovation strategies with business model dimensions” (2014) by Tina Saebi and Nicolai J. Foss, “*breadth of knowledge source captures the diversity of a company’s external sources of knowledge, often defined as the number of different types of external parties involved in the innovation processes of the company*”, and “*depth of knowledge source refers to the intensity with which companies draw knowledge from external sources and is often measured as the number of external partners that are deeply integrated into a company’s innovation activities*” (Saebi and Foss, 2015).

EDP's open innovation practices can be classified according to their breadth and depth in the following way:

Figure 3 - Depth and Breadth of Knowledge Source Matrix



As showcased in the above matrix, EDP's open innovation practices fall between two categories, **namely collaborative innovation strategies** and **crowd-based innovation strategies**.

Collaborative innovation strategies are characterized by a high depth and low breadth of knowledge sources, and consist of collaborative agreements with few knowledge-intensive partners that are deeply integrated into the company's innovation process. We believe that EDP Ventures, EDP Starter and Free Electrons fall in this category, as each initiative relies on a close relationship with startups, that results on the development of their solutions and later integration of them. *“Deeply integrating external partners into the company's innovation processes ensures the close and frequent interactions between partners and the development of mutual trust that eases the transfer of tacit knowledge across organizational boundaries”* (Saebi and Foss, 2015).

The remaining open innovation initiatives can be characterized by their crowd-based innovation strategies, due to their low depth and high breadth of knowledge sources. Amongst crowdsourcing practices we find innovation contests, where EDP Open Innovation, IoT Hackathon, Re:dy Challenge, and EDP University Challenge lie. Knowledge input comes from a variety of participants, and the company can access external knowledge of individuals and communities.

Following this logic and merging our research of open innovation at EDP with that of our knowledge of the Living Lab, we locate the Living Lab in the upper right quadrant of the ecosystem as being both high depth and high breadth with respect knowledge sources.

A network-based innovation strategy, characterized by its high depth and breadth of knowledge sources, consists on a company *“engaging and maintaining a network of relationships with several external partners. The company will end up becoming part of a larger innovation ecosystem of individuals, communities, and other organizations”*(Saebi and Foss, 2015). A

Living Lab would extend collaboration across a high breadth of knowledge sources as we saw in the quadruple helix and hallmark of Living Lab multi-stakeholder involvement. This widened collaboration of partners would equally be deeply integrated on a scale of high depth of knowledge as these partners together become part of a wider global network of knowledge sharing across Living Lab communities, specifically communities with similar interest and expertise.

#### **5.4. *Observations and Alternative Living Lab Involvement***

##### *5.4.1. Objectives and Resources*

As an approach, Living Labs are aligned with the objective that people are democratically entitled to have an influence over changes which may affect them, such as innovations. In this sense, the users are regarded as the experts regarding their own goals, context and activities (Leminen, Nyström and Westerlund, 2015). We can therefore take the end objective as being to increase user involvement throughout the innovation process as means to augment the success of innovations for their users. In terms of resources, these will be will be dependent upon the context of the goals and activities of the stakeholders concerned and project goal, some resources will of course vary such as the toolkits (user centered design, design thinking) however certain elements remain critical as resources irrespective of the Living Lab theme. For example, adequate funding for the implementation of the Living Lab and a strong management structure must be provided. To best ensure each of these, the end goal and objectives of the Living Lab project must be made clear from the outset.

As a process, the Living Lab represents a complex sphere of interactions as involved stakeholders endeavour to understand and learn more from one another, this will call for strong management and communication to ensure a culture of trust among the project or organisation. Without trust, the openness and reality of the Living Lab may be undermined. Likewise, without funding, the Living Lab itself cannot operate. Considering this, EDP may leverage upon pre-

existing elements of their innovation competencies and integrate them as Living Lab resources, such as the FabLab for idea generation phases, online crowdsourcing as a means of attracting and interacting with users and their relationships with Academia whether the University Challenge or various partnership and internship programs, as well as local municipalities to work towards the full stakeholder model of industry-government-citizen-academic actors.

As a separate entity in the ecosystem however it would be fundamental for the lab to have a well-equipped team with the Living Lab mindset to fill the following roles, which we believe EDP would have the means to provide, for example a Living Lab manager (point of contact for customers and stakeholders) a panel facilitator (coordinates with the end users) an innovation process manager (co-creates and implements processes together) and a researcher who implements new approaches and tools to implement in innovation process.

#### *5.4.2. Mechanisms to Sustain User Motivation & Participation*

As with various activities of user-centred innovation, the motivation, incentivising and ability of users to openly free-reveal their needs is fundamental to capture value. As such we must ask what mechanisms EDP as a company would need to sustain user participation and motivation within a Living Lab. Whilst for some, motivations and reward can be intrinsic to the users will to participate and the innate satisfaction of having contributed to problem solving, however extrinsic rewards should also be offered, these can be for example exclusivity in testing new products or even the event locations of the Living Lab activities coupled with celebratory closing activities upon the closure of the project and it's end results. It is recommended that Users be rewarded with non-monetary benefits such as tickets to events for example, in EDP's case we see a wide array of cultural assets which may be leveraged upon to reward and incentivise users given their strong Portfolio of cultural activities under Fundação EDP. One

example to reward users for example, could be an annual membership to the Museum of Art, Architecture and Technology (MAAT) inaugurated by EDP on October 4<sup>th</sup> 2016.

Again, the ability to motivate user participation in the long term will require a dedicated and organised management structure exclusively to deal with users, their participation and regular contact to cultivate a relationship of trust and community of interest for EDP Living Lab projects.

#### *5.4.3. Organisational Challenges –Adjustments*

While end users have proven to both meaningfully and positively contribute to innovation processes, their integration can prove challenging for companies and their current practices of operating as well as the differences which may arise across several stakeholders. The true challenge will lie in achieving a power balance that will enhance learning and dialogue between users and stakeholders (Ståhlbröst and Holst, 2017).

The main organisational challenge for EDP, who we have seen already exhibits a bold and open mindset towards new processes of innovation, will be to ensure that developers, managers, policy makers, end-users and affectees are each seen and heard throughout the Living Lab process. Part of establishing this will involve various phases of initially setting up the lab on an organisational level, for example determining a community of service/technology developers, a community of public/social stakeholders, a community of professionals and users, agreed upon Living Lab methodologies (which may shift over the course of the project) and perhaps most importantly user data protection and legal structure in place to determine the transparency, finality and proportionality aligned with the General Data Protection Regulation.]

#### *5.4.4. Alternative Involvement in the Living Lab*

##### **Innovation Partnership**

Should EDP choose to explore a Living Lab they may opt to first experiment through lighter involvement which we found was best illustrated under the various memberships offered by the

European Network of Living Labs. Should an organisation such as EDP for example, move forward in developing a Living Lab they may become an adherent member of ENoLL which equates to lighter involvement or “first step” with a view to more extensive involvement, this later may present the organisation with the option of becoming a fully involved and mature effective member with increased benefits and rights within the council of the network itself.

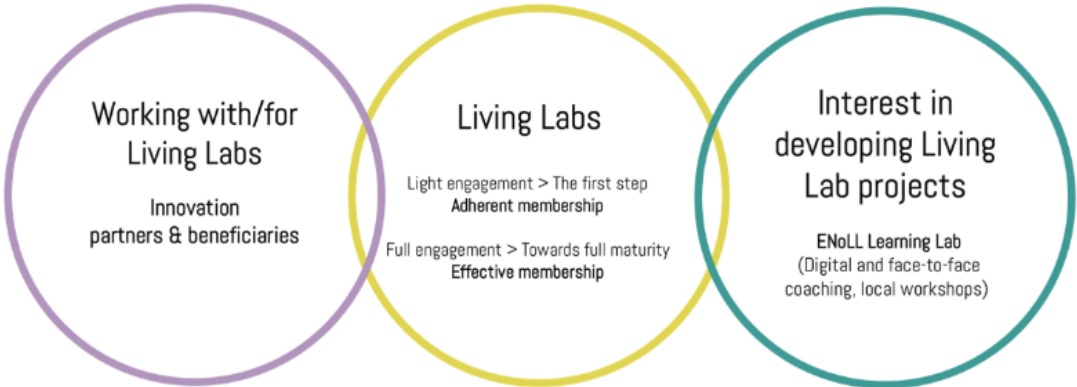
Alternatively, if EDP as an organisation chooses not to pursue a Living Lab of its own but has an interest in incorporating the principles of Living Lab activities into their Open Innovation Ecosystem, it may be a strategic first step to become involved as an innovation partner. As an innovation partner within the European Network of Living Labs EDP would become involved with the objectives and activities of the network with invitations to collaborate across the global network of partners and members. Whilst this would be subject to an annual fee as is necessary for fully involved effective members, the advantage in this respect is the room for flexibility it can offer as a stepping stone to experience the Living Lab values and introduce them into the pre-existing Ecosystem. Thus while a fee does exist, it would waive the need of setting up a new separate entity with its own management structure which would be a basic prerequisite in developing an EDP Living Lab.

### **Consultancy**

Another path toward Living Lab involvement may be to participate in the Learning Lab program designed by the European Network of Living Labs. EDP may take part in the program to further learn about the specific steps involved in Living Lab design, implementation and sustainability. This program serves as a kind of training consultancy that originally was created for applicants who had failed to meet the criteria to join the network as a means of discovering how they could further strengthen their abilities to become a functioning Living Lab. Activities include coaching via digital workshops and online tool kits as well as local face to face workshops. As this program went forward it was discovered that in fact multiple other bodies

and stakeholders were expressing an interest in Living Lab activities and principles, even if they were uncertain about becoming a Living Lab. The difference between this program and becoming an innovation partner is that this does not require any kind of membership or affiliation with the network, but rather an introduction, and likewise does not offer any further network benefits. Each of these alternative involvements are situated in the diagram below to illustrate their relationship to the Living Lab (ENoLL, 2016):

Figure 4 - Alternative Living Lab involvement as mapped by the European Network of Living Labs



**6. Recommendations**

From our analysis regarding open innovation at EDP and the scope for a Living Lab we made several observations resulting in the following recommendations.

One recommendation we consider important for EDP concerns the lack of performance measurement of their open innovation initiatives. While we understand this is an issue typical to many firms given the difficulty in measuring open innovation, we nonetheless propose the introduction of some practical metrics we believe would be beneficial for the evaluation of their open innovation initiatives and the overall innovation strategy.

To begin, we would suggest the creation of a **database outlying each initiative**, as well as its participants, to keep an updated overview of all initiatives conducted, past and present, as well as their number of participants, type of stakeholders involved, and the period of initiation.

Secondly, we would recommend creating a **database for innovation projects**. This database would include information about each innovation project carried out at EDP and their status.

For example, if they are complete, in progress or were killed off.

Projects in progress would also be grouped by their stage of maturity (proof of concept, pilot projects, commercialization/incorporation), as well as by the innovation area(s) they correspond to, creating a systematic overview of current and past innovation efforts across all maturities and project types. This analysis could help EDP avoid the repetition of any errors or projects which proved unfruitful, excel further in the projects where they have been successful, by benchmarking best practices, and hopefully, avoid missing out on interesting projects. The responsibility to update the database of innovation projects would be distributed by EDPI's members as it would depend on the team directly involved in each project, therefore we would recommend that specific individuals involved in projects are assigned with this task.

We also think it would be beneficial for EDP to seek feedback from the participants of their initiatives upon completion. This would allow for the comprehension of participant's perceptions, especially in terms of opportunities to improve and lessons learned.

Through the feedback received and the data gathered internally, EDPI could more rigorously design its innovation strategy by creating initiatives and developing projects based not only on bets and aspirational aspects, but also on historical data and past experiences that allow for a more accurate decision process.



One of the core take-home observations from open innovation at EDP is their organisational mindset regarding open innovation. EDP exhibits a highly advanced and committed open innovation strategy, with a very forward-looking mindset in their approach to new ventures. This is highly impressive given that utilities have previously been considered as traditional in their incumbent market positions. The internal synergies between business units and the ecosystem of open innovation at EDP demonstrates a strong will and openness to cross collaboration in a dynamic setting.

Taking this into consideration, we can make the following recommendations regarding a Living Lab within the EDP ecosystem. Taking the definition of feasibility, which denotes *the degree to which something can be easily or conveniently done*, we would observe that a Living Lab may feasibly be implemented into the EDP ecosystem. However, this is only considering the more arbitrary factors such as access to funding, proven ability to collaborate in a multi-stakeholder environment, strong management infrastructure as a global company and pre-existing protocol and experience in dealing with data protection and IP law. The true question we have discovered, is that although an endeavor may be feasible, can we recommend it as being a worthy investment for EDP?

Based on deeper exploration beyond practical resources we still argue that yes, not only would a Living Lab be feasible for EDP, it would also be a worthy addition and complement to their open innovation strategy. The methodological and iterative approaches applied in the Living Lab may have network affects for their ecosystem. The thorough project planning and organisation of Living Lab activities which apply the kinds of follow up and organised databases we recommended above, may foster a culture of applied metrics in open innovation initiatives.

We further noted an emphasis on the role of start-ups in EDP's ecosystem and believe that the increased stakeholder involvement seen in Living Labs would benefit innovation processes at

EDP to become more aligned with future policy and research affecting them. Furthermore, as the economy shifts to one where the consumer yields a stronger voice in how technologies are made and used, the Living Lab would present EDP an opportunity to be ahead of this trend by extending this kind of democratic interaction with their consumers, whether as businesses or end-consumers.

Taking these potential benefits offered by the principles of the Living Lab into account however, we would recommend that EDP begins with a light involvement into such activity before fully implementing a separate entity and management structure to indeed discover if this a best fit into their ecosystem. Our research has left us with the view that in beginning as an **innovation partner** and collaborating with current Living Lab projects under the European Network of Living Labs, EDP can explore the potential benefits offered by Living Lab activities prior to fully integrating one into their current ecosystem. In doing so, they can access and explore the network benefits and knowledge sharing of global Living Labs, particularly those of energy Living Labs, to best understand if they too may embody such principles into their open innovation ecosystem.

## 7. References

- Arnkil, R. et al.** 2010. *Exploring Quadruple Helix: Outlining user-oriented innovation models, Tampere: The CLIQ.*
- Ballon, P. and Schuurman, D.** 2015. 'Living labs: concepts, tools and cases', *info*, 17(4), p. info-04-2015-0024.
- Chesbrough, H. and Brunswicker, S.** 2014. 'A Fad or a Phenomenon? The Adoption of Open Innovation Practices in Large Firms', *Research Technology Management*, 57(2), p. p16–25.
- Chesbrough, H. W.** 2003. 'A Better Way to Innovate', *Harvard Business Review*, p. 12.
- Chesbrough, H. W.** 2003. *Open Innovation: The New Imperative for Creating and Profiting from Technology.* Boston: Harvard Business Publishing.
- Chesbrough, H. W. and Appleyard, M. M.** 2007. 'Open innovation and strategy', *California Management Review*, 50, pp. 57–76.
- Chesbrough, H. W.** 2006. *Open Business Models: How to Thrive in the New Innovation Landscape.* Boston: Harvard Business Publishing
- Eriksson, M. et al.** 2005. "State-of-the-art in utilizing Living Labs approach to user-centric ICT innovation - a European approach.", *Technology*, 1(13), pp. 1–13.
- Free Electrons.** 2017. *Who we are.* Available: <http://freeelectrons.co/who-we-are/>. Last accessed 20th Nov 2017
- EDP Inovação.** 2017. *EDP Inovação .* Available: <https://www.edp.com/pt-pt/inovacao-2>. Last accessed 31st Oct 2017
- EDP Open Innovation.** 2017. *EDP Open Innovation.* Available: <https://edpopeninnovation.edp.pt>. Last accessed 18th Nov 2017
- EDP Starter.** 2017. *EDP Starter.* Available: <https://www.edpstarter.com>. Last accessed 18th Nov 2017
- EDP University Challenge.** 2017. *EDP University Challenge, 11th Edition.* Available: <http://geracaoedp.edp.pt/universitychallenge/#/home>. Last accessed 20th Nov 2017
- EDP Re:dy Challenge.** 2016. Available: [https://www.edpstarter.com/wp-content/uploads/Regulamento\\_REDYChallenge\\_2016\\_Clean.pdf](https://www.edpstarter.com/wp-content/uploads/Regulamento_REDYChallenge_2016_Clean.pdf)
- Gassmann, O., Enkel, E. and Chesbrough, H.** 2010. 'The future of open innovation', *R and D Management*, pp. 213–221.
- von Hippel, E.** 1986. 'Lead Users: A Source of Novel Product Concepts', *Management Science*, 32(7), pp. 791–805.
- von Hippel, E.** 1988. *The sources of innovation.* Oxford: Oxford University Press

**Von Hippel, E. and Von Krogh, G.** (2006) 'Free revealing and the private-collective model for innovation incentives', *R and D Management*, 36(3), pp. 295–306.

**iScape** (2017). *Research Approach*. Available: <https://www.iscapeproject.eu/research-approach/>. Last accessed 30th Nov 2017.

**Jespersen, K.R.** 2008. *User Driven Product Development: Creating a User-Involving Culture*. Samfundslitteratur.

**Kristensson, P., Matthing, J. and Johansson, N.** (2008) 'Key strategies for the successful involvement of customers in the co-creation of new technology-based services', *International Journal of Service Industry Management*, 19(4), pp. 474–491.

**Lakhani, K. R. and Panetta, J. A.** (2007) 'The Principles of Distributed Innovation', *Innovations: Technology, Governance, Globalization*, 2(3), pp. 97–112.

**Leminen, S., Nyström, A. G. and Westerlund, M.** (2015) 'A typology of creative consumers in living labs', *Journal of Engineering and Technology Management - JET-M*, 37, pp. 6–20.

**Nambisan, S.** (2002) 'Designing Virtual Customer Environments for New Product Development: Toward a Theory', *The Academy of Management Review*, 27(3), p. 392.

**Niitamo, V.-P. V. et al.** (2006) 'State-of-the-art and good practice in the field of living labs', *Proceedings of the 12th International Conference on Concurrent Enterprising: Innovative Products and Services through Collaborative Networks. Italy: Milan, (September)*, pp. 26–28.

**Saebi, T. and Foss, N. J.** (2015) 'Business models for open innovation: Matching heterogeneous open innovation strategies with business model dimensions', *European Management Journal*, 33(3), pp. 201–213.

**Saunders, M., Lewis, P. and Thornhill, A.** (2016) 'Research Methods for Business Students', in *Research methods for business students*, p. 649.

**Schumacher, J. and Feurstein, K.** (2007) 'Living Labs - the user as co-creator', *2007 IEEE International Technology Management Conference (ICE)*, (January 2008), pp. 1–6.

**Ståhlbröst, A. and Holst, M.** (2017) 'Reflecting on Actions in Living Lab Research', *Technology Innovation Management Review*, 7(2), pp. 27–34.

## 8. Annexes

### *Annex 1 – Interview Guide: Advisor to the board and member of ClickIdea’s committee.*

- 1) Could you tell me about your functions in EDP Inovação? What are you in charge of?
- 2) Chronologically speaking, how do the initiatives (co-creation website; ClickIdea; open space) relate with each other?
- 3) How and why did ClickIdea arise? (date of beginning, purpose, expectations for this initiative)
- 4) How does the initiative function?
- 5) How do you integrate the ideas you receive into your activity?
- 6) Do you evaluate the initiative in any way? What KPI’s do you have?
- 7) What is the relation between ClickIdea and the open innovation ecosystem at EDP?
- 8) How does it integrate within EDP Inovação’s strategy?

### *Annex 2 - Interview Guide: Head of EDP Ventures.*

- 1) What was the purpose behind the creation of EDP Ventures?
- 2) Can you tell me about the role of EDP Ventures in the innovation ecosystem?
- 3) What are the main goals of EDP Ventures and how do you achieve those goals?
- 4) Who finances the fund?
- 5) What is your decision criteria for an investment? What are you looking for?
- 6) The process always involves the exchange of equity?
- 7) How is the collaboration between EDP Ventures and startups?
- 8) What help, and resources are provided for the invested startups?
- 9) How does EDP Ventures collaborates with other stakeholders? (clients, suppliers, other utilities, partner VCs, universities.)
- 10) How is evaluated the performance of EDP Ventures in terms of value capture? What KPI’s/metrics do you have?

### *Annex 3 - Interview Guide: Head of Special Projects*

- 1) Can you tell me about the Special Projects area? (functions, goals)
- 2) What was the purpose behind the creation of this strand inside EDPI?
- 3) Can you tell me about Free Electrons?
- 4) What was the motivation behind the creation of this initiative?
- 5) How does EDP obtain value from it? How do you integrate the new ideas/innovations?
- 6) How is the initiative evaluated in terms of value capture? What KPI’s/metrics do you have?

### *Annex 4 - Interview Guide: CEO of EDP Inovação*

- 1) Can you please explain to me the internal structure of EDP Inovação? How has it evolved since being founded in 2007?
- 2) What is the role of “management & support” (booklet pg. 21) in EDP’s innovation ecosystem? And what are its functions?
- 3) What motivated EDP Innovation to pursue a strategy of Open Innovation rather than other innovation models?

- 4) Can you take me through the process of the initiatives/programs evolution? Was there an underlying purpose/motive for creating each initiative or did they evolve naturally?
- 5) How do you capture value from these Open Innovation initiatives?
- 6) How do you evaluate each initiative? Who is responsible for this evaluation? Which KPI's are more relevant?
- 7) Have you considered creating initiatives to involve the end-user? If yes, with what communities would you like to engage with?

*Annex 5 - Interview Guide: Member of Startup Support*

**Interview Guide – Member of Startup Support:**

1. Can you tell me a little about Startup Support? (objectives, role in EDPI, role in the innovation ecosystem, functions.)
2. Who is the in charge of sourcing and contacting startups? How does that process work?
3. What type of help and resources do you provide the startups?
4. In terms of pilot projects/testing/validation technology, that is done by the business units, or you can do that inside EDP Inovação?
5. I heard some startups had to sign a contract. What is the objective of that contract?
6. How do you evaluate the performance of your initiatives in terms of value capture? What KPI's/metrics do you have?
7. What are the existing numbers on technologies/solutions integrated into your business unit's activity?
8. What is the reason behind your support of consumer products? (Since they can't be incorporated into your activity)

*Annex 6 - Interview Guide: Head of innovation area "Data Leap"*

1. What is the role of the technical areas in EDP's innovation ecosystem? (Functions, goals).
2. What is a pilot project and how is the process conducted?
3. How did the open innovation strategy evolve since the creation of EDPI?
4. What is the strategy behind your choice to support a start-up?
5. How do business units' goals relate with the startups you bring to your ecosystem?
6. How do you measure the success of your open innovation strategy? (What are your metrics/KPI's)
7. Some of your innovation initiatives are conducted in other geographies (Brazil and Spain), like the Acceleration Program. Are those under the umbrella of EDP Inovação?
8. Some of your start-ups are involved in other smaller contests/initiatives, in what way?
9. Why do you support start-ups which technology is not applied directly to your activity (solve an internal problem/need)?
10. Explain me a little bit of the following initiatives: EDP University Challenge; IoT Hackathon; Re:dy Challenge
11. Why do you do these smaller contests/ shorter duration contests?

12. How do you measure the success of these initiatives? How do you measure them in terms of value added?

Annex 7 - Analysis of Interviews with experts from EDP Inovação: Innovation Strategy of EDP Inovação

Interviewees/Main themes	FG - EDP Ventures	TM - Special Projects and Free Electrons	AV - CEO EDPI
Factors influencing the creation of EDPI	"(...) EDP Inovação was born in 2007, very much in parallel with this bet in renewable generation. (...) Because we were born as a consequence of Renováveis."		
	"What allowed for a mid-size utility, like EDP, to become number three globally in renewable generation was imply the fact that it was able to understand a trend and bet on that trend before the giants woke up to that reality. EDP Inovação was born with that mission, to try to understand new trends and new growth avenues for the EDP group before the others."		
Innovation Strategy of EDPI	"At the end of the day we want to be a <b>one-stop shop of innovation</b> , which is the positioning of EDPI, we want to try to have work tools that allow us to tackle innovation in different stages of the value chain, since an idea stage until and investment stage, going through prototyping, incubation and pilot projects, so we kept adding pieces throughout time."	"We bet on innovation. We don't typically do pure R&D, in the laboratory... hardware, what we do is very much open innovation that is looking for <b>startups that have done their own R&amp;D</b> , that have their idea, that was born somewhere and developed, or was something that came out of a Ph.D. (...) and we help develop that company and capitalize on it."	"We also considered we had to break with our traditional model, the traditional model of a utility and of the ancient corporations of the world that it's based on "nothing exists that wasn't invented in home, what's invented outside is wrong." [For example] "Cisco would buy several things that would appear, and it would search for ideas in the exterior. It was a big example that you can grow much faster by not doing everything at home."
	"(...) our mission is to try to find new strands of innovation that can bring value added to the EDP group."	"EDP Inovação is pretty advanced in terms of open innovation, even at a global level, because it understood that it is necessary to do open innovation."	
	"EDPI nowadays is not EDPI in 2007. EDPI in 2007 was merely, if you want, an observatory for new technologies and factory for pilot projects." <b>From 2007 onwards EDPI has been adding tools and initiatives to its innovation strategy.</b>	"(...) open innovation is being aware that despite that fact that we have great people inside the company, the next big thing will probably come from outside, so we need to be able to capture it. Otherwise, we will be left behind."	"We have great engineers, but there is always someone better in the world, more motivated, that works tirelessly (...), and we want to work with them."

Annex 8 - Analysis of Interviews with experts from EDP Inovação: Evolution of Innovation Ecosystem

Interviewees/Main themes	FG - EDP Ventures	TM - Special Projects and Free Electrons	AV - CEO EDPI	
Creation of Innovation Ecosystem	EDP Ventures (2008)	"(...)we added Ventures (2008) so we could address the theme of investments in startups."	"Funny enough, we started with EDP Ventures, it was one of the first things we did."	
	EDP Open Innovation (2009)	"(...) we launched in 2009 the Prémio EDP Inovação to raise the theme of ideas, for people who had ideas, but still had no prototype, it was merely an idea, a technology or a business model, so we launched that award."		
	FabLab EDP (2010)	"We launched the FabLab in 2010 which is a prototyping lab, it has 3D printers and some electronic counters, that is open to whomever wants to go there."		
	EDP Starter (2012)	"In 2012 we created EDP Starter that is our incubator."	"we realized that in Portugal we were receiving a lot of ideas, that were interesting, but were not ready for investment yet, and we didn't want to simply abandon them, so we created a tool so they could mature, so we could help them develop themselves until they reach a point of "either you go home, or we invest"."	
		"Then we expanded Starter to Brasil and Spain" (2016)	"Let's make something smaller, more early-stage, before the investment."	
	Interim Management (2013)	"We launched a program called Interim Management that basically consists of people at EDP that have availability to dedicate part of their time to collaborate with startups, either incubated or invested ones."		"After that we started thinking that companies we had in Starter and whom we were investing with Ventures, were very small and had a lot of difficulties, and EDP has a lot of people, some of who have time availability and so we started inviting – for example, one of our financial directors, if he/she has time, to be the CFO of one of the startups, or a marketing specialist ours. "Interim" meanings that is then replaced by someone inside the startups, but in order to give them a push we got a bourse of EDP employees that assume functions at startups to help them."
	Free Electrons (2017)		"It happens that these 8 utilities are aware that through the technological evolutions they are facing a disruption in their business, not only concerning energy generation, but also concerning new business models that can compete with the way that... with the way that the energy business has been run for the past 100 years, and they are looking forward to capture that intelligence, capture that technology so that they can face those challenges."	"now we are entering an international sphere" <b>Expanding the ecosystem internationally.</b>



Annex 9 - Analysis of Interviews with experts from EDP Inovação: Organizational Structure

Interviewees/Main themes	Organizational Structure					
	Overview	Innovation Areas	Management Areas			
			Overview	Startup Support	Special Projects	
TM - Special Projects and Free Electrons	"EDP Innovation is organized in a matrix form, it has five areas that we consider technical areas and three areas that are more related with management."	"The five technical areas are cleaner energy, smarter grids, data leap, client-focused solutions, energy storage."	"(...)the three management areas are the risk capital fund, EDP Ventures, EDP Starter, that consists more of startup incubation, and special projects."		"The special projects' team is basically almost like an internal consultant, all projects that do not fit directly in other people's functions are passed on to special projects."	
	"When I say that it works in a matrix form, it is because these teams work together, usually, meaning when there is a project they work together and each one brings its own valences, in accordance to the type of project."				"And it also has two concrete responsibilities. One is the organization and management of innovation committees and subcommittees, which are an important part of what we do here at EDP Inovação."	
					"The other function(...) is working with the business units, the technical areas, in the several internal projects trying to create a "management layer" on top of the projects. [which] is very much related with the attempt to conduct a cost-benefit analysis, which when it comes to innovation it is very hard, not to say almost impossible. An analysis of <i>how much does this project cost.</i> "	
AL - Startup Support	"EDP Ventures and EDP Starter are tools, the technical areas are centres of innovation and R&D, and a mixture of internal and external projects, we are innovation tools."			"Our goal is to find startups, either at a national or international level."		
						"we do several initiatives throughout the year that allow for the support of startups in their growth, from the moment we find them, find a fit for them to work with EDP, we bring them to our ecosystem so we can provide them with support and build a use case at EDP, at EDP's business units."
						"we are the bridge between the startup and the business unit, we make that bridge."
JS - Data Leap		"the technical areas are a bit like verticals in which they are aligned with the value chain."	"then obviously the "entrepreneurship support" area is a parallel area, that touches ours [innovation areas] because they source start-ups, but then the startups necessarily fall into one of these 5 areas, so the entrepreneurship support guys come and talk to us to validate the technical aspect of the startup."			

Annex 10 - Analysis of Interviews with experts from EDP Inovação: Innovation Ecosystem

Interviewees/Main themes	Sourcing Startups	Information about the initiative(s)	Initiative's <i>Modus operandi</i>	Involvement with Startups
<p>FG - EDP Ventures</p>	<p>"A lot of the times the business units brings us startups they find. Other times is through conferences, in awards... sometimes other VCs, accelerators and incubators bring us some startups."</p>	<p>EDP Ventures is an early-stage corporate VC – investing during the seed phase or series A round - that supports EDP's process of open innovation.</p>	<p>EDP Ventures offers medium tickets, with follow-ups included, between half a million and five million euros. Their investments is always in non-majority stakes, as it is usual for capital risk. EDP Ventures never has the control of the startups, and it is not what they want, it is mostly a bet on a management team.</p>	<p>Startups have access to the EDP Group and EDP Ventures supports the collaborative process in search for new commercial and technological opportunities.</p>
		<p>They invest in national and international startups with a strategic and financial objective. All investments follow a logic of financial return -investing so that in the future there is an "exit" event and the gain of financial returns-, but while that's a necessary condition it is not sufficient, there is an underlying goal of extracting strategic benefits from the investments. The startups collaborate with the business units in order to incorporate their technologies, and business models, into EDP's activity.</p>	<p>In 2014 EDP Ventures added an option to finance pilot projects through a mechanism of convertible debt, allowing the startups to run pilot tests without giving up equity.* The debt could be converted in later equity rounds. "inside EDP Ventures we complemented a little our initiative of equity investments with the introduction of convertibles, convertible debt, that basically is target to finance pilot projects of startups that wanted to work with us/with our business units"</p>	<p>There is support to the management team so that they can improve their performance and became market leaders.</p>
		<p>"inside EDP Ventures we complemented a little our initiative of equity investments with the introduction of convertibles, convertible debt, that basically is target to finance pilot projects of startups that wanted to work with us/with our business units"</p>	<p>EDP Venture's decision criteria for an investment focus on several aspects. While most of them are general to venture capital investments – strong IP, quality of the team, market dimension/scalability, MVP, Value added innovation – one aspect is more particular to EDP's case, the buy-in from EDP's business units. EDP Ventures only invests in startups that make sense for EDP's business units, and where future collaboration is expected.</p>	<p>They give access to their incubators and accelerators network, their network of other VCs, CVCs and business angels.</p>
		<p>EDP Venture's decision criteria for an investment focus on several aspects. While most of them are general to venture capital investments – strong IP, quality of the team, market dimension/scalability, MVP, Value added innovation – one aspect is more particular to EDP's case, the buy-in from EDP's business units. EDP Ventures only invests in startups that make sense for EDP's business units, and where future collaboration is expected.</p>	<p>EDP Venture's decision criteria for an investment focus on several aspects. While most of them are general to venture capital investments – strong IP, quality of the team, market dimension/scalability, MVP, Value added innovation – one aspect is more particular to EDP's case, the buy-in from EDP's business units. EDP Ventures only invests in startups that make sense for EDP's business units, and where future collaboration is expected.</p>	<p>They also give training and mentoring, and access to the Interim Management Program</p>
<p>TM - Special Projects and Free Electrons</p>		<p>"Free Electrons is a company accelerator, a global cleantech accelerator, of technologies connected to the energy sector."</p>	<p>"The startups talk with the technical units and try to understand what are the necessities of the utility and the utility tries to understand what the startups can offer and try to create a match so that – and that is the goal - it is possible to create a proof-of-concept, a pilot at the end."</p>	
		<p>"the goal is that the startups, during the program (...) "enter inside the utilities" with the support of the areas connected with the program"</p>	<p>"this accelerator is composed by 8 utilities, coming from all geographies."</p>	
<p>AL - Startup Support (EDP Starter, EDP Open Innovation; FabLab EDP</p>	<p>"the biggest part of our deal flow comes from our partners and the events that they promote."</p>	<p>"Besides our incubation program that is continuous throughout the year, we also organize, in October or beginning of November, we organize a mini-accelerator called EDP Open Innovation, in partnership with Grupo Impresa, namely with Expresso. (...) it's almost like the entry door for new startups, a call for new startups or new ideas for EDP Starter."</p>	<p><b>EDP Open Innovation:</b> "Following the 4 weeks of acceleration, there is a demo day, a final pitch, and in the final pitch we, in accordance to the work developed by the startups during the Open Innovation, in the 4 weeks of acceleration, and in accordance with the pitch they made, we pick a top 3."</p>	<p>"We have an incubation program where we offer several benefits that include a physical space, formation – if they want to do some courses or something like that, we support them through partners we have – in this case we have partners like renown legal offices that allows you give the startup a package of free hours, we have hardware partners, we have consulting partners...several partners that help us a lot."</p>
	<p>"All of us, as EDPI we do scouting. If the cleaner energy area goes tomorrow to a fair, a conference in Amsterdam and finds there an interesting startups, of course they will bring us the name of it. We talk as a group, as EDPI."</p>		<p><b>EDP Starter:</b> "You will enter by EDP Starter's door, you will be incubated, and we, jointly with the technical area, are going to evaluate the fit of your technology. That is, its state of maturity, if it makes sense... because the technical areas, think about it as the bridge between EDP Inovação and the business units."</p>	<p>"Then we provide support through EDP Ventures of obtaining financing to do pilot projects with the startups."</p>
	<p>"We as EDP Starter every month do a catch up of all the startups we found that month, where we present to the technical areas and where they validate if they make sense or not."</p>			<p>"we have access to the business units, to the technical areas, we give access to EDP's clients and suppliers as well."</p>

Annex 11 - Analysis of Interviews with experts from EDP Inovação: Value Capture

Interviews/Main themes	Value for EDP					
<p>TM - Special Projects and Free Electrons</p>	<p>"Pilot is a validation of the startup's technology, and once validated (...), the startup becomes a partner – a supplier of that service to the company, and in the case that goes well an investment could happen."</p>	<p>"The final objective of the acceleration program, (...), is to apply what the startup does, possibly better than us, to our business."</p>	<p>"tangibly speaking right away in the initial call we got to contact with more than 300 companies (...), and through that we can amplified our data base of startups that are doing interesting things for us so that later they we can go and talk to them."</p>	<p>"through that contact (...) with these 12 companies, the main goal is to get to know them very well, to understand if, in fact, what they do is interesting for us or not, but also if work with them so that – even if what they do it is not interesting – but if they evolve a little bit to the left, or a little bit to the right, or if they focus on a specific point, or if they improve their product here, they can become very interesting."</p>	<p>"we want to work with them to understand if this is interesting for us, (...) help them develop a product that will interest us, and then if it goes well, bring them to do proofs of concept with us allowing us to acquire technical know-how about what they do and then to validate their product. The next phase is the use of their product effectively by the company, meaning, the company contracting the startup"</p>	<p><b>Sub-committees of innovation:</b> "Each trimester (...) each of the five technical areas has a meeting where representatives of the main business units are present, both from other geographies and from the several vertical areas, and the idea behind these meetings is to analyse market trends inside those areas, understand which are the objectives and challenges of EDP, and analyse, approve and present projects that address those objectives and challenges of EDP inside each technical area." "So this is a way for us to obtain the buy-in from the business units, not only assuring the maximization of synergies, but also so they can capitalize on what ones and others are doing in terms of the development of new opportunities."</p>
<p>AL - Startup Support (EDP Starter, EDP Open Innovation; FabLab EDP)</p>	<p>"All of them [innovation areas] have a notion of which are the objectives of the business units and they can translate those necessities to EDPI. (...) when you enter EDP Starter's program the technical areas will draw a priority profile, (...) and they start to build a use case with us to then present to the business unit."</p>		<p>"So more and more we are coming up with solutions closer to their [business units] priorities, so our startups are bringing value to aspects already considered in their budget, or projects they want to do as "KPI's""</p>	<p>"To make a fast pilot project happen, that is what we want – fast is important, and it is extremely difficult to achieve that in such a big structure like EDP."</p>	<p>"We function in a model of risk capital, that is we enter the stakeholder structure of the startup but the intellectual property belongs to the startups' founders, it is inside the startup, it doesn't pass on to us, nor do we share it. Sometimes startups come to us with their technology unprotected but with the objective of protecting it... we put them in contact with our partners in patents, in these case, they work for it."</p>	<p>"To prove that it creates value, a technology has to do a pilot project, but it takes time. I take years between finding startup, defining a use case, talk to the right people, develop the product and make them a supplier. It takes a lot of time."</p>
<p>JS - Data Leap</p>	<p>"There are usually <b>three stages of maturity of projects</b> here at EDPI. The least mature one is a proof-of-concept, (...) is something that is very fast (...) very small in terms of its requirements of effort (resources), and it doesn't necessary involve the business unit."                      "when we see that a proof-of-concept is... useful, and the technology is validated, we may propose to a business unit [to run a pilot]. (...) something that is beyond the initial validation of the technology, but is something that is not commercial yet."                      "Once the pilot is over and the business units itself decide "ok, this is something we want to do at scale" then it goes beyond the pilot and it goes forward. These are pretty much the 3 stages."</p>			<p>"You need to involve a lot of people, go through people at all decision levels, sometimes convince stakeholders at different levels that you are doing something interesting. With innovation projects this is especially true because when we talk about innovation we usually talk about stuff that doesn't exist yet, or people don't see the usability, the use of it."</p>	<p>"And then you have other external factors at work, like regulation for example. " "A lot of bureaucracy. Some is regulatory, some is just lack of agility internally, and some it's just necessary to make sure we don't blow something up."</p>	<p>"We try to involve the business units as much as possible in those decisions [startups to support]. (...) each of these areas [has] an executive sponsor, a member of the board, and they meet every 2 months (...) with that member of the board and a number of key senior stakeholders from the business units, so they help us keep on track, they help us keep aligned between the innovation strategy and the business strategy. " <b>those business stakeholders are there to basically help us, in giving direction, steering the innovation areas.</b>"</p>

Annex 12 - Analysis of Interviews with experts from EDP Inovação: Evaluation of Initiatives

Interviewees/ Main themes	Evaluation of initiatives - Metrics and KPI's			
FG - EDP Ventures	Besides the financial results, which are easy to measure and evaluate (analysis of valorization expectations and return), there is a qualitative component to the evaluation of EDP Ventures' investments.	Every year "the state of affairs" is presented to the CAE (Conselho de Administração Executiva) – there is a description of what was achieved, which strategic benefits existed, if EDP is using the solutions or not, how that impacted the business units.		"We have 14 investments, we invested more than 24 million. Our startups (...) have revenues of about 40 million per year, accumulated. They have already created 300 jobs. At the end of this year, in 17, this 40 will become 60, and this 300 will become 400. And that's where we are."
TM - Special Projects and Free Electrons	"It is hard because there is no formula to evaluate innovation. Nobody has it... and a lot of times it is simply a bet."	"when the project is hardware focused it is easier to do it. So, costs are relatively easy to identify. "This will cost x in human resources, x in technological resources, x in servers, etc." We can identify costs. In case it is a project that has a relatively tangible benefit we can identify also other potential benefits and in that case, we do a typical analysis that consists on "this project will reduce our cost in this way...and then there may exist other benefits, X, that we never identify, and in that case we can make that analysis... those are easier."	"We focus on soft benefits, meaning "this will improve the quality of this service... (and we set improvement levels)" and we have a matrix that we are trying to improve in that sense."	"we have to do, typically, a lot of due diligence analysis, we have to look at the trends and then use a portfolio strategy. We bet in a lot, for example 10, and we have to be comfortable with the fact that we may fail, it may go wrong. We bet on 10, we know that 2 will be mistakes, 5 or 6 will be average and 2 will be awesome. And those 2 that will be awesome will more than compensate for all the others. In terms of benefits to the company, that will end up translating, at the end, in euros."
AL - Startup Support (EDP Starter, EDP Open Innovation; FabLab EDP)	"So maybe the success metrics of EDP Starter are "how many pilot projects can you do per year dividing by all the startups incubated." If I have 10 startups and I do 7 per year I have a good rate of pilots."			"if you ask me how many pilots I know by heart. 7 this year, just this year. But I don't know how many are suppliers."
JS - Data Leap	"They know [board] as well as we do the difficulties of having KPI's in innovation, and they kind of accept" "I think that we should have some kind of KPI's. I don't buy the idea that we should just run without KPI's."	"We know that we are doing the right thing because the business units are involved in defining what we are doing"	<p>"Formal evaluation we don't. We do an informal evaluation (...) if we are talking about <b>big events</b> like the Web Summit (where we are sponsored) or Open Innovation, everyone considers a success if we can at least get one startup out of the event that we build a relationship with, we invest in them, or they join the Starter ecosystem"</p> <p>"In terms of <b>smaller events</b> (...) we don't put the stakes as high in terms of the strength of the relationship. I wouldn't expect from a Hackathon to get to know a company where I immediately invest, but I may create a relationship with them in terms of "let's explore if we can do business in the future, or if you can join EDP Starter" if we can build a relationship with one of the companies we consider the event a success."</p> <p>"If in the end we can get to know a couple of people in the event that stimulate us to think differently about something, a new business model, or a new tool that we may not have heard of, or a new way of thinking that is worth the [money] by itself."</p>	

*Annex 13 – Interview Guide: Living Lab Expert (Research based – Ph.D.)*

***Living Labs***

1. How would you best describe a Living Lab to someone who is unfamiliar with the concept?
2. How would you differentiate a Living Lab from other open innovation initiatives such as incubators, FabLabs and policy labs?
3. Could you tell me a little bit about the potential added value of a Living Lab for a firm?
4. Regarding the sustainability of Living Labs, could you describe some of obstacles which often face the implementation and success of Living Labs over time?
5. Are there certain organisational challenges stakeholders such as firms face when in the implementation of Living Labs?

***Users***

6. Can you explain how stakeholders can attract/incentivise users to the work of a Living Lab (in the case of open user involvement and self-selection) but also how actors may identify potential users (in the case of closed user innovation). Are there certain optimal means of communication or outreach to connect with a wider network of users and stakeholders?

***Reality-Usage Context***

7. Living Lab literature also reaffirms the importance of the reality-usage context and environment of Living Labs, can you explain a little as to how Living Labs are expected to embody experiences that are realistic and trustworthy to the user? Do you believe this to be a fundamental component of the Living Lab?

***Multi-Stakeholder***

8. Focusing on the potential for a Living Lab as part of a wider business development plan, while some firms are very proactive with respect their open innovation activities, user innovation can be lacking. Do you perhaps have examples of successful cases where businesses or companies have ‘discovered’ or captured new value from increased user involvement adopted through Living Lab approaches?

***IMEC Living Labs***

9. 5. Regarding your work at IMEC, if I understand correctly the concept of users in your Living Lab research comprises of a large sample or ‘panel’, could you tell me a little bit more about this, particularly the work of the panel management team?

At IMEC you also offer a variety of services to innovators such as access to back office platforms, business model tools and application prototyping expertise, could you tell me a little bit more about these services? For example who provides them and where they are provided (A physical space? An online platform?)

*Annex 14 - Interview Guide: Living Lab User Involvement Evangelist (User Manager)*

***Living Labs***

1. How would you best describe a Living Lab to someone who is unfamiliar with the concept?
2. How would you differentiate a Living Lab from other open innovation initiatives such as incubators, FabLabs and policy labs?
3. Could you tell me a little bit about the potential added value of a Living Lab for a firm?
4. Regarding the sustainability of Living Labs, could you describe some of obstacles which often face the implementation and success of Living Labs over time?
5. Are there certain organisational challenges stakeholders such as firms face when in the implementation of Living Labs?

### ***Users***

6. I see that your job role is referred to as a “*user involvement evangelist*”, could you perhaps give me a brief introduction to the nature of your work and the role it can play in Living Lab environments?

7. Living Labs are of course user-centric, however in some cases trying to identify who the user may be can become complicated. Considering this, I would love to hear more about the Panel of users that you manage, for example how you identify and attract certain users and incentivise or encourage their participation over long periods of time.

8. Can you perhaps explain a little on how having such a large sample of users can create value for those involved in new product development and open innovation initiatives?

9. Could you tell me about Digimeter and how this has evolved over time?

10. Beyond attracting and selecting users, does your work include a lot of scope to follow up with them after they have completed test-using or participating in Living Lab research?

11. Having such a large panel (20,000 people?) no doubt requires vigorous panel management, could you tell me a bit more about how you are able to manage various Pilot Projects or Field Trials with respect budgeting and reporting? Are there certain toolkits you offer users and innovators that you could tell me more about?

12. Living Lab research is often quick to highlight the advantages of having users closely involved across all phases of new product/service development. Do you have experiences of working with your panel of users in this way testing and helping in the development of new services and products for certain companies or businesses?

13. Finally, are there certain metrics or key performance indicators that your team applies to projects involving users to gauge their success?

## ***Annex 15 - Interview Guide: International Project Manager, European Network of Living Labs***

### ***Living Labs***

1. How would you best describe a Living Lab to someone who is unfamiliar with the concept?

2. How would you differentiate a Living Lab from other open innovation initiatives such as incubators, FabLabs and policy labs?

3. Could you tell me a little bit about the potential added value of a Living Lab for a firm?

4. Are there certain organisational challenges stakeholders such as firms face when in the implementation of Living Labs?

### ***European Network of Living Labs***

5. At ENoLL you have specific criteria as to what may be deemed a Living Lab under your network, however once a Lab is recognised and starts undertaking projects do you have certain metrics or key performance indicators to gauge their success? (I ask this because key performance indicators in innovation are typically very tricky to apply)

6. As ENoLL serves as a resource for benchmarking Living Labs I am sure you have seen some cases where Living Labs have declined or perhaps failed in remaining sustainable over time. Could you perhaps tell me some of the barriers or obstacles that face Living Labs regarding their long-term success?

7. Do you maybe have some examples of scenarios where the Living Lab exists alongside or within a greater innovation EcoSystem?

8. *Could you tell me a little bit about the advantages that an organisation may benefit from by being part of the European Network of Living Labs?*

*Annex 16 – Interview Guide: Regional Living Lab Expert (Coordinator for the Department of Innovation, Commerce and Entrepreneurship at Municipality of Penela)*

***Living Labs***

1. How would you best describe a Living Lab to someone who is unfamiliar with the concept?
2. How would you differentiate a Living Lab from other open innovation initiatives such as incubators, FabLabs and policy labs?
3. Could you tell me a little bit about the potential added value of a Living Lab for a firm?
4. Regarding the sustainability of Living Labs, could you describe some of obstacles which often face the implementation and success of Living Labs over time?
5. Are there certain organisational challenges stakeholders such as firms face when in the implementation of Living Labs?

***Smart Rural Living Lab***

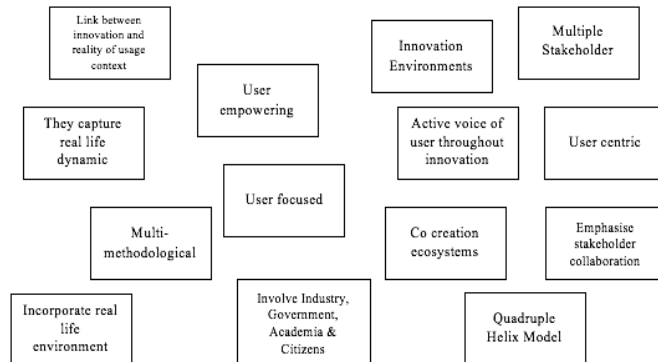
6. Could you tell me a little about the users of the Smart Urban Living Lab, for example who they consist of and how you identify them? Do you have a method for attracting or incentivising users to participate in the work of the Smart Urban Living Lab?
7. Can you describe for me the various stakeholders of the Smart Living Lab and perhaps a little about how each stakeholder is involved or contributes to it?
8. Living labs also function in a way that addresses the dynamics of real life, can you tell me about how the Smart Urban Living Lab incorporates the regional real life activities and issues into its research and practice?
9. As a lab created with a view to addressing rural territorial issues, do you believe you have made progress in identifying and maybe overcoming some of these issues?
10. Since the inception of the lab do you feel those working in it and collaborating with it have gained a certain level of expertise?
11. In terms of sustaining the work of the lab as an organisation, what would you consider some of your bigger obstacles?
12. Finally, has the Smart Urban Living Lab ever collaborated or been contacted to work with other Living Labs? (International or Portuguese)

**The Process of Affinity Diagramming in Interviewing Living Lab Experts**  
**Investigating expert thoughts and opinions regarding Living Lab definitions**

Step 1: Questions are organised to clarify specific concepts. Ideas surrounding a concept are generated across various in-depth interviews using open ended-questions.

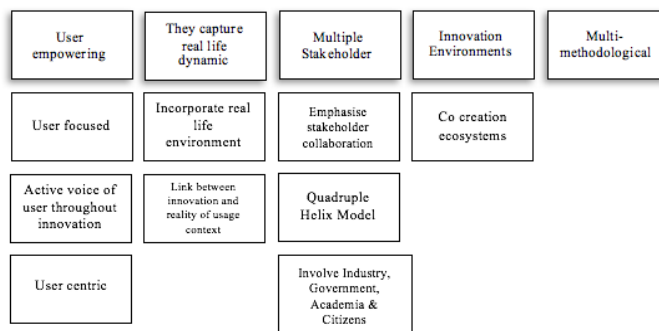
Step 2: Here, participants are asked a specific question and core ideas related to it are clustered together at random.

How would you define a Living Lab to someone unfamiliar with the concept?



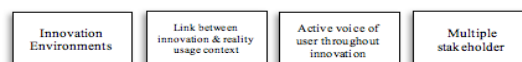
Step 3: Analysing the resulting clusters, an attempt is made to group them into related themes applying a method of headers and their related ideas beneath them. Each header captures the link of the idea beneath it to convey the picture being created.

How would you define a Living Lab to someone unfamiliar with the concept?



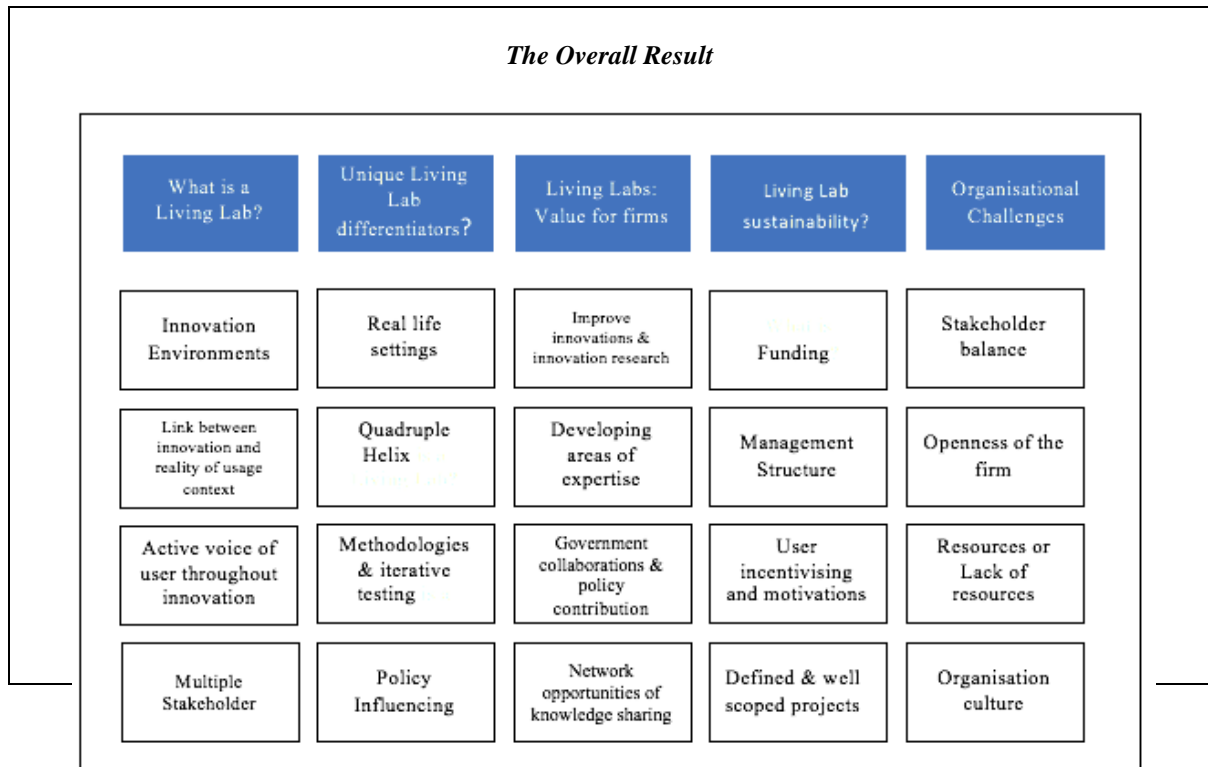
Step 4: Core header cards are identified in illustrating an overall affinity of the subject matter. This process is repeated was repeated for other concepts to create a large affinity of thought for the Living Lab as an overarching concept.

How would you define a Living Lab to someone unfamiliar with the concept?





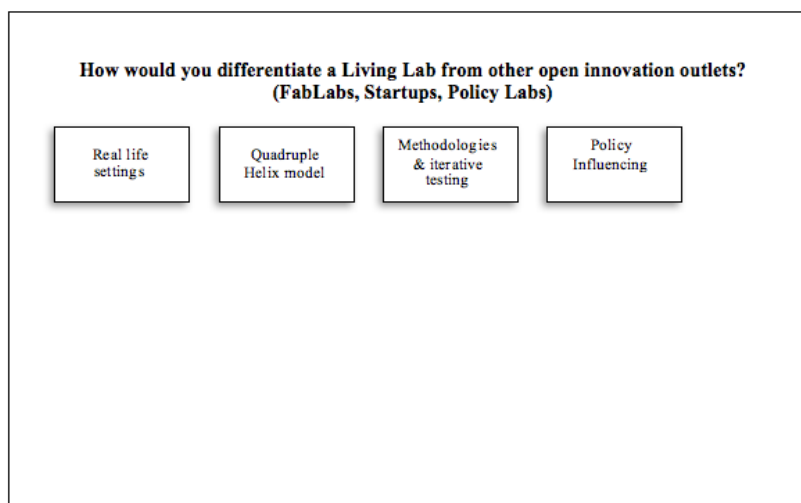
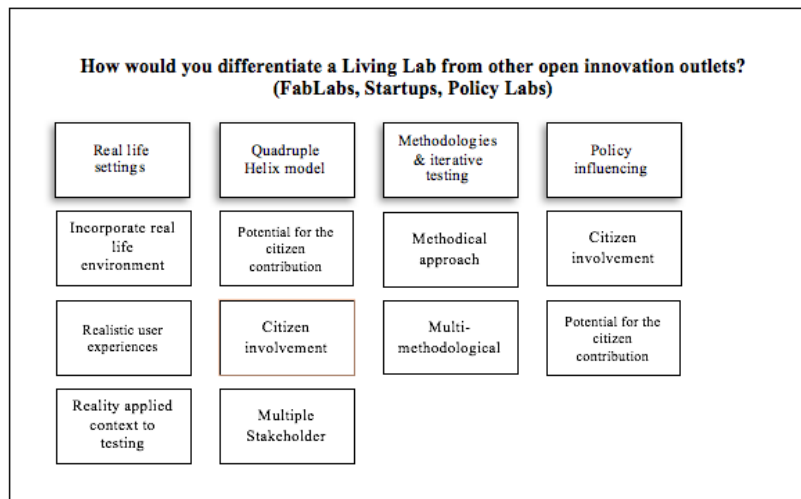
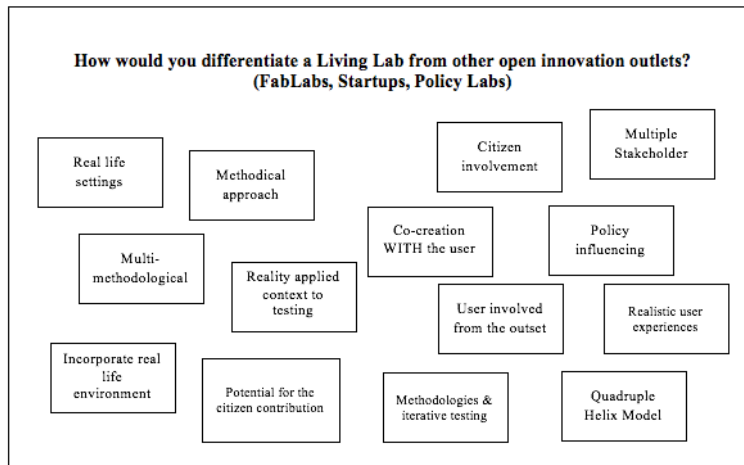
Annex 18 – Overall Result of Affinity Diagramming



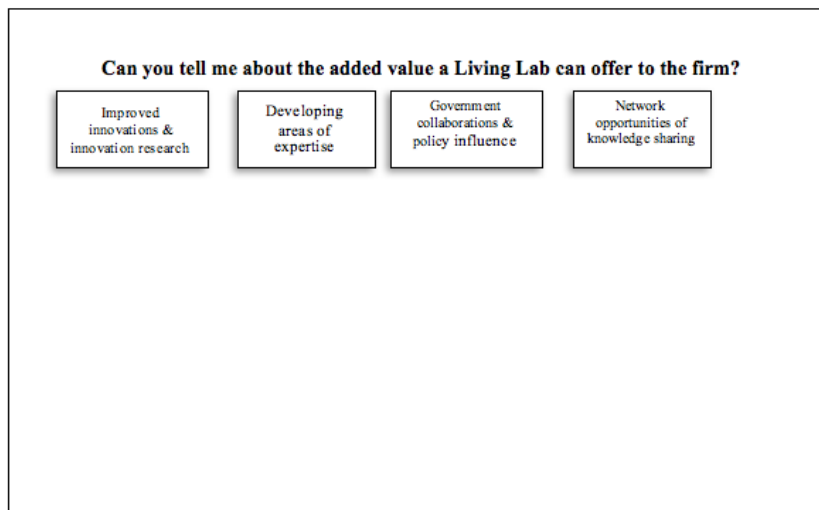
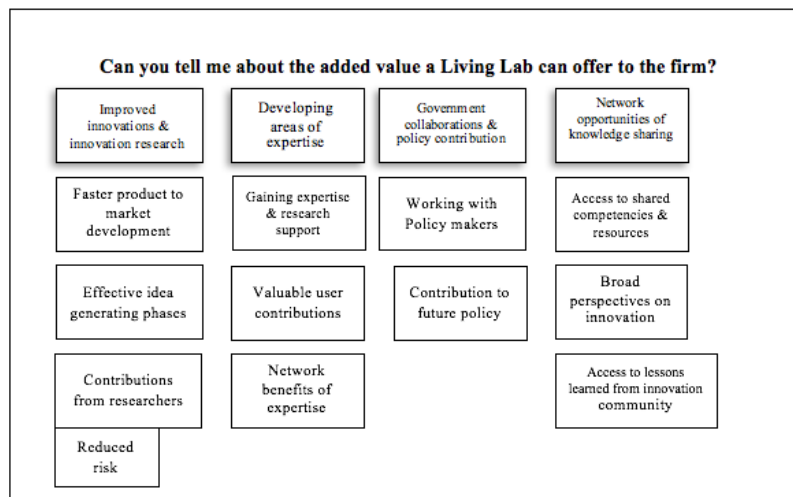
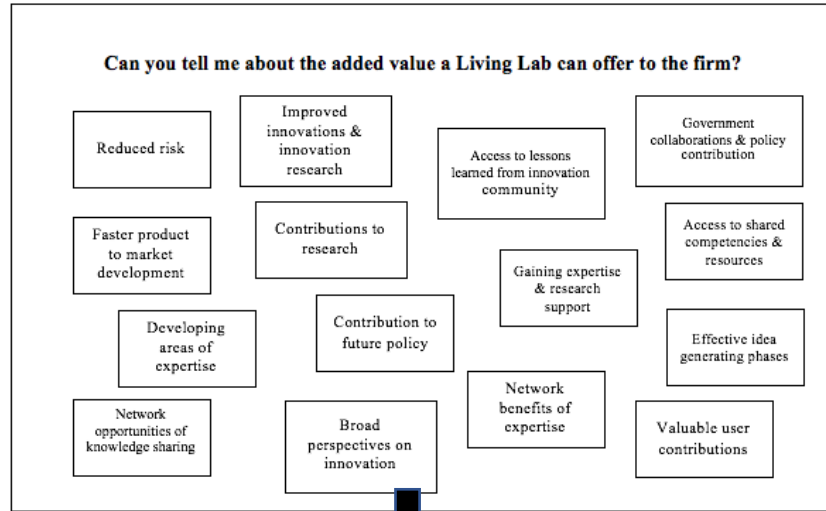
Step 5:

The finished Affinity Diagram is drawn to illustrate the core concepts as contributed from participants. For each core concept in the column steps 1-4 are repeated to achieve arrive at step 5.

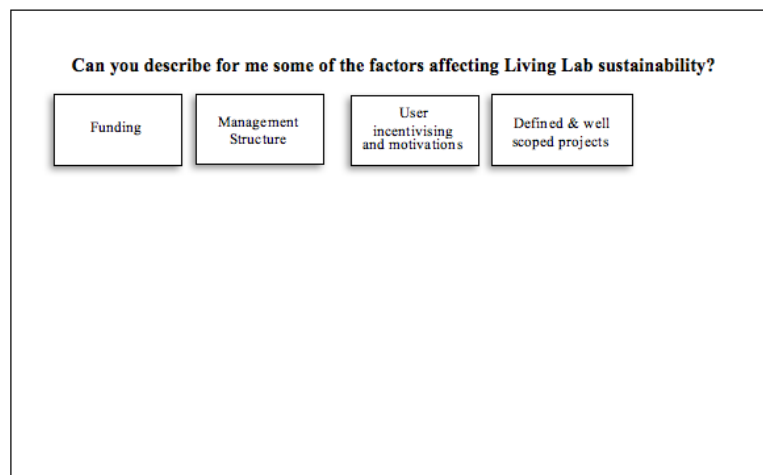
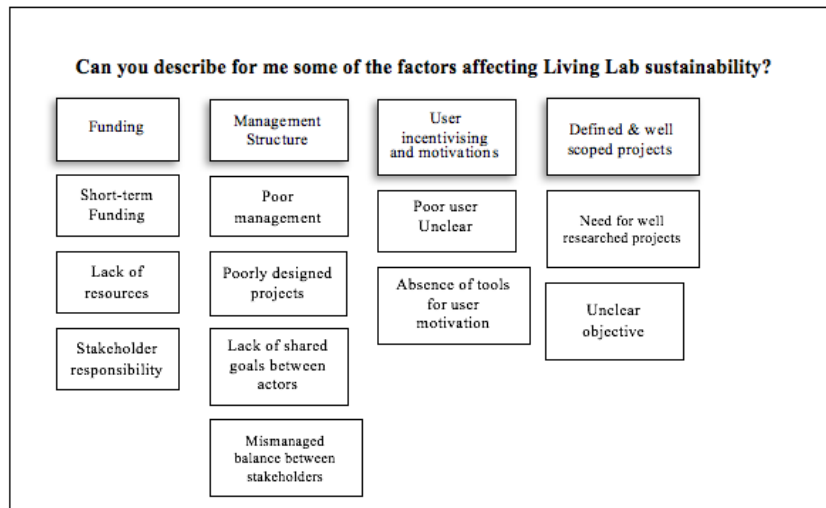
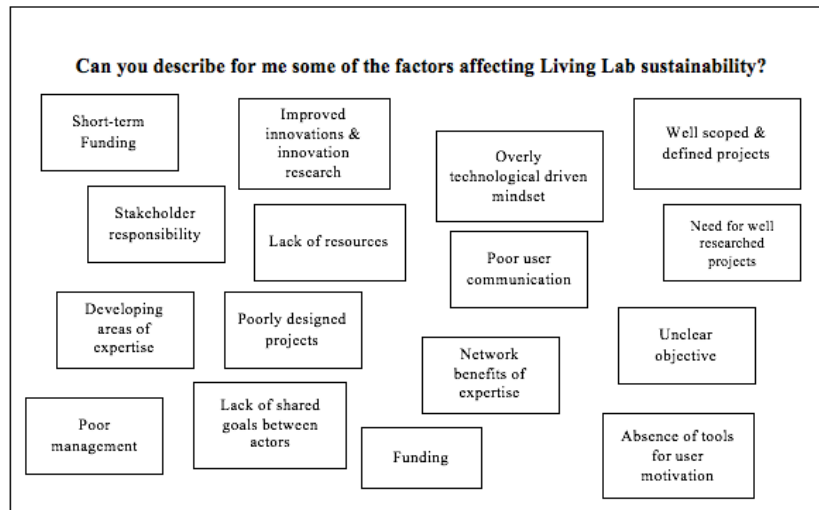
**Investigating Unique Living Lab Characteristics (Their Core differentiators)**

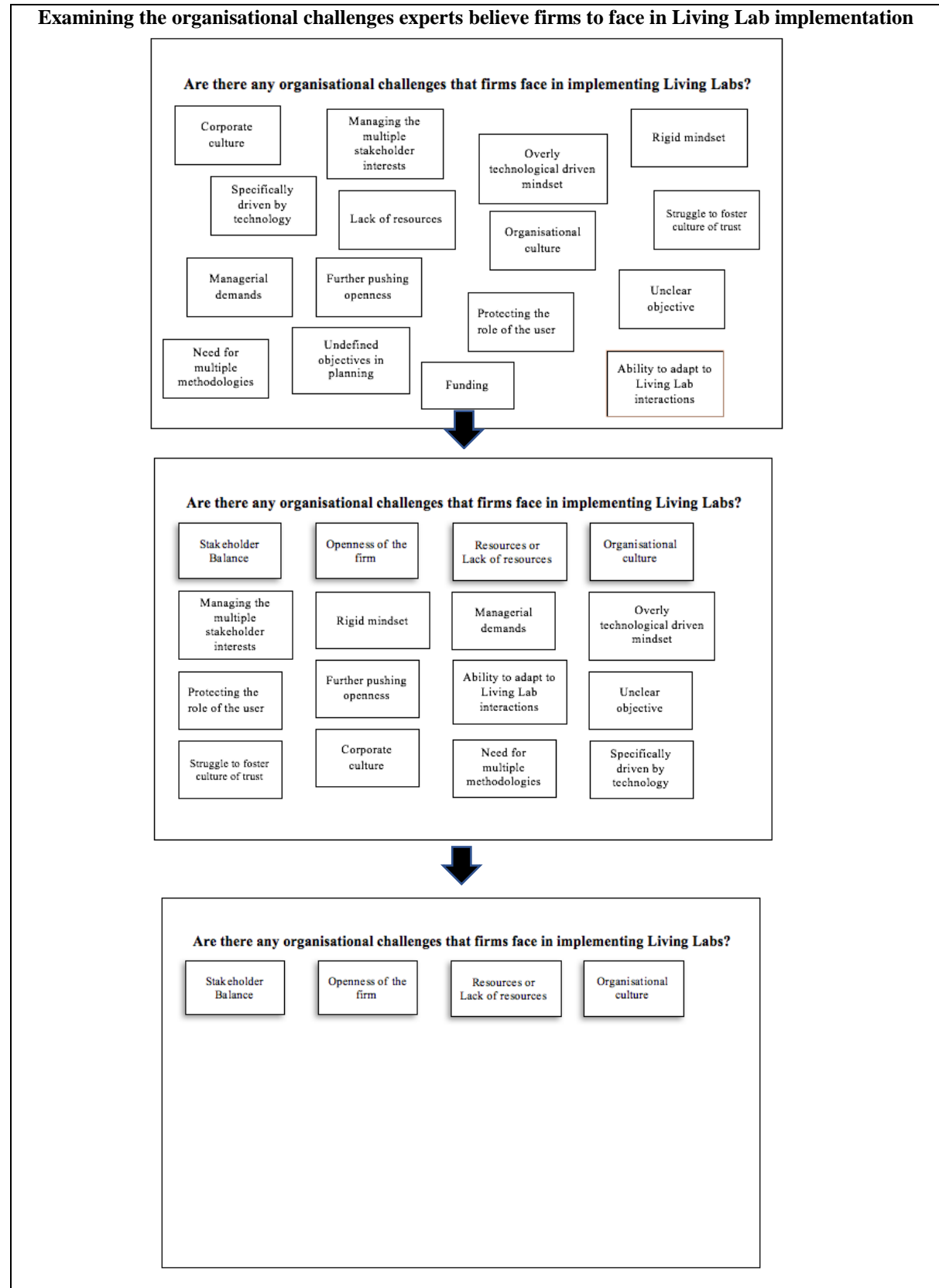


**Exploring the added value of Living Labs for firms from expert experiences**



**Exploring factors which influence the sustainability of Living Labs through expert experiences**





- 1) Which initiatives have you participated in? And in what year?
- 2) Which innovation area is your solution inserted in?
- 3) How did you find out about the initiative?
- 4) What motivated you to participate? What were you hoping to obtain from your participation?
- 5) Following your application, can you recall how the process was conducted?
- 6) What type of help/resources did EDP make available to you along the different phases of the process? Were there specific resources you found to be more helpful than others?
- 7) Was the assistance extended to you by EDP aligned with your expectations?
- 8) Are there new capabilities or expertise you feel you have acquired?
- 9) Before applying, at which stage of development was your idea? At which stage of development do you know find your idea?
- 10) Was your solution/product incorporated into EDP’s current business activity? In which way? Did you feel involved along this process?
- 11) Is there anything you wish might have been done differently? (particularly when it comes to the management of initiative(s)).

Annex 24 – Analysis of participants' interviewees (1 to 3)

Interviewee n/ Main themes	Interviewee 1	Interviewee 2	Interviewee 3
Initiative(s)	EDP Starter	EDP Open Innovation (Prémio EDP Inovação); EDP Starter. Contestants to Prémio EDP Inovação, joined EDP Starter afterwards.	EDP Starter
Found out about initiative/ Entry into the process	Startup was invited by EDP Starter to participate. They pitched in several events where EDP was present, EDP got to know their startup and solution and ended up inviting them to integrate EDP Starter.	The startup founder previously worked in a company with connections to EDP, so he was fully aware of EDP's programs and initiatives.	(Startup contacted EDP following a recommendation.) Startup was given a recommendation by Startup Lisboa to contact EDP because they were just opening their incubator (Starter).
Motivations to participate	<b>Validation of their solution</b> on the operator side (EDP). They have a solution related to EDP Renováveis' activity and they were looking for the business know-how and expertise to validate their solution.	<b>(Validation of the solution. &amp; Feedback.)</b> (when participating in EDP Open Innovation). They had just an idea and they were looking forward to validating it and receive feedback on it from the biggest player in Portugal, so as to adjust it and develop it further. <b>(Access to technical feedback)</b> (When entering EDP Starter). <b>(Access to the infrastructure.)</b> In order to test and validate the product, they needed access to wind turbines, which was a big challenge for the startup. <b>(Get EDP as a client.)</b> Another motivation for the startup lies on a potential supplier contract with EDP, seen as a potential client for the solution.	At the time the startup was looking for investment, however, all they had was a power point. It was recommended to them to get a partner to help them: <b>develop an MVP, prototype. (Understand the market demand.) + (Looking for investment.)</b>
Help/resources received (per initiative)	<b>(Direct access to know-how and expertise)</b> ; Direct access to departments of interest (EDP Renováveis) and the people of interest for the development of the startups' solution; <b>(Faster access to specialized know-how)</b> Being inside the program allows for a faster process to get to the right people with the specialized know-how; <b>(Provide a physical space)</b> They provide a space (in the EDP Starter headquarters) for startups to use if necessary; <b>(They help startups to create a business proposal to EDP Group)</b> The end goal is for startups to sell their solutions to the right EDP business unit, EDP Starter helps them to develop their solution and create a business proposal. <b>(They help startups prototyping and pilot testing their solutions - in a fast manner).</b> <b>(They have several events/workshops to help startups improve business aspects)</b> For example, pitch workshop - they hired someone to help startups on their pitch and they worked on it for an afternoon. Other events were mentioned by the interviewee but without big detail. <b>(Access to data)</b> EDP starter promotes events where startups and other EDP member are all together, facilitating <b>networking.</b>	<b>(Support in the development of pilot tests).</b> The first time the startup saw its product working was on a wind turbine from EDP. <b>(Access to relevant infrastructure)</b> to perform the pilot tests. <b>(Access to events/talks/conferences/workshops.)</b> Inclusive o Web Summit. <b>(Brand exposure and visibility + Access to a valuable network)</b> EDP allowed them to gain visibility in the market. <b>(Technical feedback/specialized know-how).</b> EDPI drove the process of collaboration with EDP Renováveis, helped during the process and created a bridge between the startup and the business unit. <b>(EDPI creating a bridge to relevant business units.)</b> EDP Ventures provided financial resources, through programs of convertible debt, to finance the pilot tests. <b>(Access to financial resources).</b> EDP Starter by itself does not bring a lot of value to startups. The real value for startups is to be able to use the assets from the relevant business units. <b>(The big role of EDPI is to create a bridge between the startups and the business units, and manage/incentive the relationship between them.)</b>	<b>(Access to FabLab EDP)</b> , "where we were able to create prototypes". <b>(Access to technical and legal support)</b> "We had access to their engineering, we had access to their layers" <b>(They offered training to the team)</b> "EDP sponsored a mini MBA to help me on the management of the company" "We started realizing that EDP's support would be transversal" into several areas. <b>(Transversal support in all areas of the business.)</b> "Dr. Carla Pimenta accompanied all startups, if we needed something she would always help us" <b>(Day-to-day close support.)</b> <b>(Monetary/Financial support).</b> "The first units we sold of our product were ordered by EDP Comercial." <b>(Help producing molds and advancing production process)</b> "The simple fact we get to sit almost every month with someone from EDP helps us a lot to understand (...) how to manage a company." <b>(Business management know-how + internal processes)</b> (Intangible) <b>(Partnerships and business deals)</b> "they give us partnerships, deals" <b>(Networking.)</b> "through the networking opportunities provided by EDP we can reach a lot of people." <b>(Visibility)</b> [Once the investment happened: <b>Constant contact with EDP Ventures.</b>
New capabilities/expertise acquired	Acquired a lot of know-how on operations through meetings with different people in the operations area. <b>Acquired a lot of specialized know-how - knowledge from inside the business.</b>	<b>(Market and business know-how);</b> Market dynamics; understand EDP's procurement system; dynamics of contracts. <b>Not so much technical capabilities.</b>	<b>Management Skills. (Managing clients, contracts, etc.)</b> "My background was not in management (...) everything I learned about management was a result of my interaction with EDP. It has helped us a lot in understanding a lot of things, especially day-to-day issues." <b>Not so much technical.</b>
Incorporation of solution into EDP's activity	There are plans to incorporate their solution into EDP Renováveis. EDPI is helping them create a business proposal for EDP Renováveis.	<b>The product was not integrated. Lack of perfect fit.</b> Not for lack of interest, but the solution is not compatible with other incorporated technologies/needs in the maintenance of wind turbines. The startup is trying to adjust their market positioning to still be able to supply to EDP.	<b>It is a consumer product (not able to be integrated into EDP's activities) - EDP does not sell the product.</b> "EDP does not sell our product."
Aspects to improve (management of initiatives)	<b>(Process of adopting the technologies is slow and sometimes frustrating).</b> (last phase) Even though the process of pilot testing and validation of solution is fairly considered fast, once a proposal is made, the process of proposal acceptance and production is seen as <b>very slow.</b> Interviewee believes this is frustrating both to the startups and EDPI. Seen as a consequence of big corporations. <b>"Lack" of understanding regarding common challenges of startups and aggregate them.)</b> Each startup has its own challenges, and sometimes it is difficult for EDPI to see which are the common hardships for startups and gather them all.	<b>Slow and bureaucratic process</b> during contract negotiations + <b>Slow and bureaucratic process</b> to obtain internal answers - Startups are being incubated by EDPI but need assets from other business units - the <b>articulation</b> of the two parties can be a slow process.	<b>(Corporate structure unadapted to the startup environment - but improving.)</b> "I think EDP's structure is very corporate and is not adapted to the startup world" "In the beginning they demanded constant reporting (...) startups are focused on the product, are focused on growing and are not used to do reporting like a company like EDP." "I think they are improving that aspect (...)disconnecting a little bit from their corporate roles and getting close to the startups like startups" <b>(Don't tie down startups - push for international markets + don't lock them to corporate systems and organizations like EDP is used to.)</b>

Annex 25 - Analysis of participants' interviewees (4 to 6)

Interviewee n/ Main themes	Interviewee 4	Interviewee 5	Interviewee 6
Initiative(s)	EDP Open Innovation (Prémio EDP Inovação)	EDP Ventures	"We participated in <b>Prémio EDP Inovação (EDP Open Innovation)</b> ." "We didn't end up entering Starter yet. We entered the contest and we created a relationship with EDP and sometimes they invite us to some events they promote."
Found out about initiative/ Entry into the process	<b>(Recommendation from EDP Starter Brasil.)</b> "We were already participating in EDP Starter Brasil and they encouraged us to participate in EDP Open Innovation."	<b>(EDP contacted the company.)</b> "EDP Ventures was interested in betting on companies that were doing something different in the energy sector. And at the time they decided to invest in the company."	"At the time we were in college, I think, and an e-mail announcing the contest got around. At the time we were developing the project and decided to participate since it was related with energy, so a match could exist."
Motivations to participate	"We always have something new to learn" <b>Meeting the other contestants (Networking), (Extend the relationship with EDP: Get to know executives from EDP) + (Attract investment) + (Attract interest and the possibility of partnerships.)</b>	N/A	<b>Access to a company present in the market + More experienced people with valuable inputs</b> "Have access to a company present in the market for a long time, that has people that understand the market better than us (...) "access and opportunity to get in touch with people that contact with the market for longer than us, and that could give us inputs for the future."
Help/resources received (per initiative)	"It was basically the usual process used in acceleration." <b>(Worked on our elevator pitch + Started working in-depth on the business model canvas (each day/period dedicated to a component of the BMC)</b> "There was also the startup talks where other startups shared their experience (...) that was nice because we end up learning from the experiences of others." <b>(Learn from the experience of other startups + Good opportunity for networking + Opening doors in European market + Knowing other startups.)</b>	<b>(They are not involved in the day-to-day activity of the company.)</b> "Our relationship with EDP is an investment relationship" <b>(They give some advice but no other support.)</b>	<b>Workshops at EDP in Lisbon &gt; feedback from EDP's executives on startup business plan &gt; made them look at different perspectives/ some issues not considered by the startup before.</b> "From that point onwards it was very important too, we got to know people at EDP, EDP's processes (...) and from that point on we have <b>open access to EDP.</b> " "We have the opportunity to talk to people, share our ideas and <b>search for common opportunities to be explored with EDP.</b> " + <b>Access to the FabLab + Access to a physical space</b> they could use. "Have the opportunity to talk with guests, and some people from EDP that were at the event, it was interesting." <b>Access to networking opportunities.</b>
New capabilities/expertise acquired	<b>Critical and strategic thinking.</b>	N/A	"During this process, you always end up learning something with the people you interact with, or the organizations you interact with." <b>Opportunity to contact with EDP's experts and receive their help/feedback</b> "In EDP's case it was great because on one side it gave us the opportunity to speak with people that already had a view of the business different from ours. Our background was more technical so it's easy to forget about the business side of the product. So it was great from that point-of-view." <b>Understand how a big corporation works and its organizational structure</b> "At the same time, because it is a big corporation, it allowed us to understand how an organization works, how it is divided, structured, with all the different departments we have to talk to." <b>Learn to approach big companies (from experience with EDP)</b> "It also helped us prepare to approach other big companies."
Incorporation of solution into EDP's activity	N/A	We participate in [concursos públicos] alongside other competitors. We already got one some from EDP Distribution and EDP Comercial, but they treat us like a normal client.	<b>Not directly incorporated into EDP's activity.</b> "Not not yet, but there is a possibility that it can be incorporated." "We know that there are some technical characteristics and functionalities of the system that permits an interaction with the electric grid."
Aspects to improve (management of initiatives)	"I think EDP's executives of each area should have a closer relationship and more direct interaction [with the startups]. They were available to schedule some meetings but they were not there during the program." <b>(EDP's executives of each area were not in the program - it would be better if they were. E.g.: An executive mentors a specific startup and helps them in everything they need.)</b>	N/A	"The biggest enemy of a startup is time. (...) If we are too slow to test [our solution], later will we realize if it is wrong or right, and the later the worse for the entrepreneurs, and for the companies that are supporting the initiative, because they will only know the reality later and we can all be very deceived" "Create a test zone (...) where startups could test their solutions faster." "EDP could have a controlled space where it could test technologies still in development."



Annex 26 – Analysis of participants' interviewees (7 to 9)

Interviewee n/ Main themes	Interviewee 7	Interviewee 8	Interviewee 9
Initiative(s)	<b>EDP Open Innovation</b> (Prémio EDP Inovação) and integrated <b>EDP Starter</b> .	"We are currently participating in EDP Starter, the first edition here in Brasil." "We participated in <b>EDP Open Innovation</b> ."	<b>EDP Open Innovation</b> (Prémio EDP Inovação)
Found out about initiative/ Entry into the process	"I don't recall, it was a long time ago."	Recommendation from EDP's people at EDP Starter Brasil.	EDP was on the start-up's radar because it was an interesting client.
Motivations to participate	"We were looking for 2 things. On one side, our product was very close to the energy market, and so EDP was an obvious partner, or client, from the start. We wanted [to participate] <b>so we could demonstrate the value of the product</b> . [On the other side] the <b>monetary prize</b> was of 50 thousand euros, that at the time would be pretty convenient to develop our product."	Talk with people from technical areas at EDPI, the ones relevant to the startup. ( <b>Expertise/know-how from EDP's collaborators</b> .) "The second objective was <b>probing the international market + Gain insights on European market</b> ."	<b>Gain credibility and trust from clients; understand if the product fits in a company with a big dimension</b> . EDP has a context and size that interested the start-up.
Help/resources received (per initiative)	<b>(Direct feedback about the startup's solution from several people, including EDPI's board.)</b> "We had <b>mentoring</b> , we had a person (...) that accompanied us during 6 months, and which help allowed us to unblock a process that at the time was very bureaucratic." "Helped us solve several impediments to test our solution (...) made it easier for us to validate our product." ( <b>Networking</b> .) "They introduced us to a lot of different people relevant to our products."	<b>Hotel; Physical space to work in</b> during the initiative; <b>Bootcamps</b> from Fábrica de Startups; "They opened their doors so we could talk with people from EDP." ( <b>Access to people inside EDP</b> .)	When the bootcamps were focused on more generic topics (not only applied to energy sector) it was better for the start-up; <b>A good aspect of commercial guidance</b> .
New capabilities/expertise acquired	"On one side, it is more about the <b>management skills</b> " ( <b>Understand the energy market</b> .) "On the other side, being a part of EDP's ecosystem is very useful to understand the energy domain. It is pretty complex, there are a lot of stakeholders, with different roles in the value chain, and that is the type of information that we have been learning."	<b>Vision/mindset of international market; Business skills</b> .	Helped improve some processes, namely <b>communication</b> with clients/investors and how they sell their product.
Incorporation of solution into EDP's activity	<b>(Directly connected with EDP's activity.)</b> Clients from 3 business units: Comercial, Distribuição e Inovação.	N/A	N/A
Aspects to improve (management of initiatives)	"If there is something I think It could be better (...) is the <b>facilitation</b> (make it easier) of <b>access to testing conditions</b> [for solutions]." "Some things are not about the money, it is about bureaucracy, regulation, etc. With us, things went pretty smoothly."	Different stages of development among startups can create a <b>mismatch in terms of bootcamp's content</b> . Too basic for more developed companies. "I think they chose companies at very different stages of development, some didn't even exist, were mere conceptions, and others were relatively big." ( <b>Deeper approach to the organisational structure of companies, and creation of culture</b> .) Final pitch: a <b>watch would be preferable to keep track of time</b> , instead of having someone saying "only 30 seconds left", easy to lose focus.	<b>(Lack of relevant legal counseling)</b> . It was too focused on IP protection and left out other issues like data privacy, security, rights, and duties of companies. <b>Too concentrated (only 3 weeks) some important things were left out</b> .







