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How to keep a living lab alive?

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Abstract

Purpose – *This paper aims to explore how Living Labs might be evaluated, building on the current efforts of the European Network of Living Lab (ENoLL) to encourage new members, and complementing their existing criteria with elements from business model development strategies – specifically the Business Model Canvas (BMC) (Osterwalder and Pigneur, 2010).*

Design/methodology/approach – *First, it is explored how Living Labs have emerged, at the intersection of transition management, open innovation and collaborative consumption. It is then suggested that the BMC could be a complementary tool in Living Lab evaluation.*

Findings – *This tool helped identify three important elements missing from current ENoLL evaluation criteria: identification of the cost structure, customer segments and the revenue stream. The case study of an Energy Living Lab created in Western Switzerland is used to reflect on the strengths and weaknesses of different evaluation criteria; this paper is then concluded with some ideas on how future research might contribute to further strengthening Living Lab evaluation process towards long-term “sustainability”.*

Originality/value – *This article will be of value for ENoLL to refine their evaluation criteria for the next “wave” of application. It could as well help living labs to reflect on how to keep a living lab alive.*

Keywords *Open innovation, Business models, ENoLL, Evaluation criteria, Living labs*

Paper type *Research paper*

1. Introduction

Researchers and practitioners have been preoccupied for some time with addressing complex problems at the nexus of society, economy and environment. Different forms of learning have been promoted, such as participative workshops towards visioning and backcasting, as well as different forms of production and consumption, including open innovation and collaborative consumption. In recent years, what are known as Living Labs have emerged, as spaces for innovative and participative research, development and activity deployment, using multi-disciplinary methods and approaches and bringing people together in social contexts around a range of themes. Living Labs have attracted the attention of the business sector, researchers and teachers, as well as the public sector and communities. In Europe, a platform exists for promoting such sites of applied and action research: headquartered in Brussels, the European Network of Living Labs (ENoLL) is a non-profit organization founded in 2006, with support from the Finnish European Presidency. ENoLL defines a Living Lab as: “a real-life test and experimentation environment where users and producers co-create innovations” (ENoLL, 2014). Underlining the value of Living Labs in improving the research and development phase, through public-private partners and its focus on small-to-medium enterprises, the European Commission has also lent its support to further investigating the cross-border Living Lab networks in Europe. In 2009, the European Commission issued a report on the methodologies and achievements of Living Labs, further defining Living Labs as “a user-driven open innovation ecosystem

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based on a business – citizens – government partnership which enables users to take an active part in the research, development and innovation process” (EC, 2009).

According to ENoLL, a Living Lab engages in four main activities: co-creation, exploration, experimentation and evaluation (ENoLL, 2014). One of the missions of ENoLL is to benchmark best practices among its members and to increase the number of participants in its network in a series of “waves” or annual calls for membership. The 8th Wave membership application to join ENoLL ended on the 21 May 2014; Living Labs that passed the evaluation criteria joined the existing network which grew to 370 Living Labs across the world. Numerous case studies exist on Living Lab methodologies and around a variety of thematic areas, mostly related to more “sustainable” forms of production and consumption, in areas such as mobility (Rizzoli *et al.*, 2014), smart cities (Coenen *et al.*, 2014; Schaffers *et al.*, 2011), ambient assisted living (Krieg-Brückner *et al.*, 2010) or even vending machines (Newman *et al.*, 2008). Research has also focused on the various tools to co-create products and services with users in a Living Lab (Pallot *et al.*, 2010), recognizing that a variety of methodologies and approaches are applied in Living Labs. Less attention has been paid to the evaluation criteria of a Living Lab and how such an evaluation contributes to the Living Lab performance: what defines a Living Lab and how do such criteria ensure the sustainability of such an activity over the long term? Can the system of evaluation tell us something about why some Living Labs persist over time while others do not endure, despite passing the ENoLL evaluation phase? As Wu suggests (2012), better clarity on the purpose and mechanism of Living Labs as viable business models could lead to easier access to long-term financial support. In this paper, we address the question of evaluating Living Labs and propose to draw from the Business Model Canvas (BMC), a strategic management tool originally developed by Osterwalder and Pigneur (2010) to assess whether the existing evaluation criteria proposed by ENoLL could be augmented.

The first goal of this paper is to better understand what defines a Living Lab concretely? What are the common characteristics of Living Labs? With the evaluation criteria, ENoLL defines which organization can be considered as Living Labs and which cannot. It is key for ENoLL to get an academic view on this theme as the network has grown so quickly since 2006 and is actually working on its strategic development.

The second goal is to understand if the actual evaluation criteria are strong enough not only to assess if an organization is a Living Lab or not but also to assess the sustainability of the Living Lab. In launching the Energy Living Lab, a new effective member of ENoLL in 2014, a recommendation letter from another actual ENoLL member was mandatory. Three ENoLL Living Labs were contacted, one was clearly dead but always on the Internet site from ENoLL and considered as a member, one was alive but passive, with no research activity linked to the network and one was alive, but was not really focusing its activity on co-creation. It was clear for the authors that some of the members were not alive and active, information that has been confirmed by ENoLL. Through a more strategic assessment, Living Labs could better plan their activities and evaluate their processes to continue their operations over the long term. By considering evaluations at the level of ENoLL, we hope that such strategic approaches could be shared across the landscape of Living Labs in Europe, to remain in activity over the long term.

In the section that follows, we briefly describe our methodology. We then follow with a description of how Living Labs emerged in Europe, from a historical perspective and in relation to different strands of research and practice. In the next section, we provide an overview of existing evaluation criteria aimed at selecting future members of the ENoLL network and place this in relation to the BMC. Finally, we apply the criteria to the case study of the Energy Living Lab, established in Chablais Region in Western Switzerland. We end with a discussion around our main findings, and propose future research directions

focused on evaluating Living Labs through the prism of business model development, understanding the role of LLs as innovation intermediaries.

2. Methodology

This paper includes a historical overview of how Living Labs have emerged in the case of Europe, using a literature review of existing secondary sources. We present different evaluation criteria based on existing literature. Secondary and primary data on ENoLL evaluation process and criteria have then been collected. The (BMC) Canvas has been used to allow a thematic classification of the different evaluation criteria and to highlight if there was a gap in the evaluation or if all the main components of a business model have been assessed. A lot of other models exist (Al-Debei and Avison, 2010). The BMC has been chosen because it is the most used, easily understood by non-specialists and give a visual overview to assess the key components of a business model. ENoLL has been satisfied by this pragmatic approach.

The case study on the Energy Living Lab established in Western Switzerland is based on an analysis of qualitative data collected from seven in-depth interviews with stakeholders from November 2013 to January 2014 including public authorities from the Chablais region, three SME participating in the Living Lab, two managers of other existing living labs, ihome Lab Lucern and MobiLab Geneva and the director of EPFL in Wallis Region. A workshop with the stakeholders which took place in January 2014 has also been transcribed. Qualitative data collected during the workshop have been compared to the face-to-face qualitative interviews to see the similarities and divergences. Through this process, we are able to assess the different criteria proposed for evaluating Living Labs, including their strengths and weaknesses. To classify ENoLL effective members, this paper draws on previous research on typology of innovation intermediaries proposed by Lopez-Vega and Vanhaverbeke (2009). They have based their typology on 32 case studies, partly composed of Living Labs (f.i. IBBT in Belgium). We have used the same methodology and distributed the different effective members among the four types of innovation intermediates, based on secondary data on Internet. We have analyzed the components of the business models of each effective member: value proposition, value chain, market segment, value network, competitive strategy and, revenue model. For each component, they have defined measurable variables that we have also used in this paper to categorize the different Living Labs with the same methodology.

3. Historical perspectives: the emergence of Living Labs

Pallot *et al.* (2010) have already mapped the domain landscape on Living Lab research, presented at the first ENoLL summer school. The following section complements with a historical perspective of the different theoretical frameworks preceding Living Lab methodology.

Living Labs emerged in Europe and North America at the convergence of different forms of research and practices, including social learning, collaborative consumption, open innovation and participative methods, to name but a few. In this section, we will detail select strands leading to the increasing popularity of Living Labs today. The complexity of addressing issues at the nexus of societal, economic and environmental dimensions has lead to interest in novel approaches, as achieving transitions to “sustainability” as a normative goal have proven difficult. Two main issues can be raised here: how “sustainability” is framed as a research and societal problem, and how efforts towards more “sustainable” can engage with different stakeholders in participative forms of research, action and learning, questions that are at the heart of “sustainability research” in social sciences today (Fahy and Rau, 2014).

In transition management studies, participative forms of back-casting emerged in recent years in relation to “sustainability” (Kerkhof and Wieczorek, 2005), which includes

stakeholder involvement and dialogue, participation in the generation of desirable futures (visioning) and learning through involvement and interaction (Quist and Vergragt, 2006). While back-casting was first proposed in the 1970s in relation to energy studies (Lovins, 1977), participatory back-casting has gained in popularity since the early 1990s, with researchers in The Netherlands leading the way (Erkman, 2004). Participative visioning and back-casting workshops have been found to stimulate an understanding of the cultural norms of consumption (Davies *et al.*, 2012), and have used various techniques such as role playing to further stimulate innovative ideas towards future sustainable lifestyles (Guillen and Nicolau, 2013). In the case of energy consumption and production, one important thematic area within “sustainability” research, these approaches are relevant when it comes to understanding how people learn new technologies, such as smart metres and energy-efficient lighting, and project themselves into future scenarios, but become all the more relevant when we consider households as having the potential to become producers of renewable energy in an increasingly liberalized energy market or “prosumers” (Darby, 2012). Household members are not only passive recipients of technologies and energies but also active participants in a changing energy provisioning landscape. Living Labs in Europe today also focus on such participative methods, drawing on socio-technical transition theories. The main assumption here is that system innovations occur at the intersection of technologies along with human agency and institutional contexts (Kemp and van Lente in Cohen *et al.*, 2013).

The notion of open innovation further expands this idea, which originated in the context of business enterprises. Open innovation is a process by which valuable ideas emerge and are confronted to the market by actors both “inside” or “outside” the company (Chesbrough, 2003). According to Chesbrough, open innovation consists in using external creative resource to integrate them into the innovation process, which goes beyond the boundaries of the firm. Similarly, Köpcke (2008) views the “external” collaboration is a process by which “customer needs” can be better understood, resulting in better public adoption and acceptance of certain “innovations” within a specific context, particularly as the average rate of innovation can be quite high. The author identifies four factors to take into consideration in an open innovation project:

1. open innovation requires a win-win situation;
2. open innovation is built on trust;
3. open innovation provides opportunities for development, cooperation and collaboration with external partners and competitors; and
4. open innovation is more specifically focused on consumers and customers.

The 1980s and 1990s were a time period, in Europe and North America, where consumers were seen neither as sole seekers of physical and psychological satisfaction nor mere dupes of producers and their marketers, but rather “empowered” personality seekers (Sahakian, 2014). It follows that more attention was given to how people come up with new trends and the possible market opportunities associated with such trendsetters. Building on the earlier work of Everett M. Rogers on the *Diffusion of Innovations* (1995, originally published in 1962), Gladwell (1997) describes the “innovator” as the small group of people who originally generate new ideas and ways of doing, while the “early adopters” are the immediate followers of this trend, followed by the “early and late majority” or the millions who buy into the trend or join once products and services are more readily available. Other authors such as von Hippel (2005) deepen the notion of users, including the concept of “lead user”, constituting a group of users who have already explored innovative ways to respond to their needs.

Since the early 2000s, there has been a shift in how the process of value creation is understood: final consumers are involving in collaborative forms of consumption, not solely an elite set of consumers, but everyday people (Botsman and Rogers, 2010). For example,

the customization of sneakers by Nike (2014) and through NikeiD web platform illustrates this phenomenon. Here, customer involvement is based on customization of a mass product at a later stage in its development.

Much of this trend towards collaborative forms of consumption and production stems from the possibility of sharing information over the Internet, including via social media tools. In 2006, for example, *Wired Magazine* coined the term “crowdsourcing” as opposed to “outsourcing”, distinguishing both the type of agents involved and the process (Howe, 2006). In the outsourcing process, as in the crowdsourcing one, the externalized object is a work usually performed by an employee; however, in a crowdsourcing process, the agents to whom the task is subcontracted are not previously identified. Crowdsourcing is a practical outcome of the Internet tools. It confers a quick and easy way to appeal to a large community to gather ideas to deal with a problem (Mendonca and Sutton, 2008). In recent years, specialized commercial platforms in providing creative resources from an “external” group have emerged, such as Atizo.com in Switzerland.

What can be noted in this brief historical introduction to the growing popularity of Living Labs today is that the concept of a Living Lab stems from different interest areas, including researchers focused on “sustainability” issues, as well as the private sector, that sees such platforms as an opportunity for new forms of business development, and finally a public sector that also sees the value in such participative methods. It is interesting to note, however, that best practices from the world of business development may not have yet been applied to understanding how Living Labs can be created and persist over time, as a viable enterprise – whether funded through private, public or mixed sources. One attempt towards this goal has been the “harmonization cube” (Mulder *et al.*, 2008; Genoud *et al.*, 2009). As Mulder *et al.* (2008) discuss, there is a need to continue sharing information on the process of creating and maintaining Living Labs, which would ensure a sustainable network on open innovation. While the mapping towards performance criteria used by the ENoLL community to evaluate the Living Lab applicants is a good starting place, current versions of this criterion, used in the 8th wave, have evolved since those earlier papers. What follows is an evaluation of current criteria used in the ENoLL process for approving new members.

4. Analysis of Living Lab evaluation criteria

In this section, we will briefly describe the different memberships proposed by the ENoLL and introduce the current evaluation process including the criteria used in the evaluation of the 8th wave of Living Lab applications.

We then present the BMC to assess what aspects of the ENoLL evaluation criteria might be further enhanced through business model development tools.

ENoLL opens each year with a new “wave” or call for participation in their network, which gives the opportunity for Living Labs who pass their qualification to be granted the use of the ENoLL Label as proof of certification. Such entities are then given a membership certificate and are officially recognized as being an adherent member of ENoLL during the annual conference and it is as well published on the OpenLivingLabs website. Adherent members do not pay any annual fee but only administrative costs of €500. They do have access to a part of ENoLL service but not to the full portfolio of services. If an adherent member wants to become an effective member, a written application needs to be sent to ENoLL and after the approval of the general assembly, an annual fee of €5000 is due. Effective members get access to the full range of ENoLL services and are allowed to vote during the general assembly. They can even submit candidatures for the ENoLL elected bodies. A third membership category is associate member, an organization which is not a Living Lab but that support the Living Lab association in its activities and orientation. The annual membership fee is due, but they do not have voting rights at the general assembly.

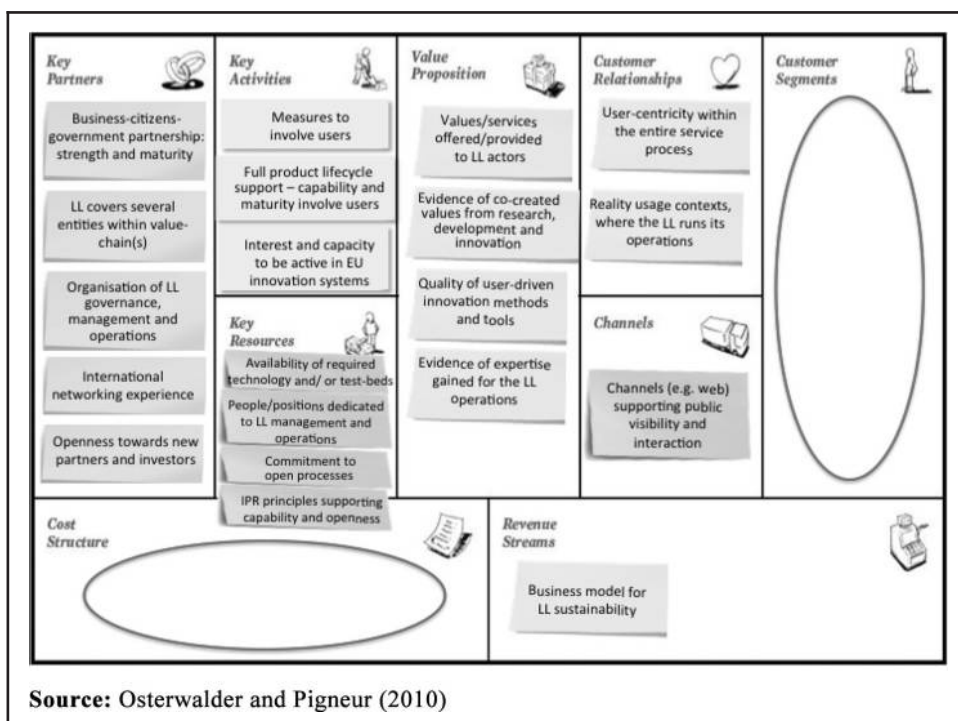
They are allowed to submit candidatures for the ENoLL elected bodies and get voting rights if elected (ENoLL, 2014).

In 2014, only 19 Living Labs were effective members and 3 were associate members out of 370 total members. The ENoLL network has grown really quickly since 2006 and the number of adherent members has grown, but the number of effective members has not followed the same trend. It would be interesting to understand these 19 effective members that participate actively in the network, not only from an academic point of view but also to help ENoLL expend the network qualitatively.

As described on their web pages and after an interview with Ana Garcia, Project and Network Manager at ENoLL (December the 18th 2014), the process for selecting new members is as follows: each Living Lab that wants to be an adherent member of the European Network of Living Labs must complete an application form. This application form is then transmitted to three experts from different European Union (EU) nations that conduct the evaluation. They are charged with reviewing applications that pass the eligibility test. Evaluators cannot consider projects from their own country, to remove certain biases, and each proposal is scored according to selection criteria. The evaluation criteria are grouped into thematics and have the same rating, there is no weighting applied. When the three experts have finished their evaluation, they discuss together about the discrepancies. An average of the three evaluations is then applied. Each of the thematic must be rated above the average (minimum rating of 2.5 over 4). The experts' evaluation is then transmitted to a committee that does a cross-evaluation to see if group of experts have rated above or under the other and to ensure the consistency of scoring. The criteria currently being proposed in the 8th wave are presented in Figure 1.

In this paper, we propose to use the BMC to group the different evaluation criteria into categories and to understand if the whole business model of the Living Lab is assessed in the evaluation phase. Developed by Osterwalder and Pigneur (2010), the BMC is a model used for strategic business development, for both new and existing businesses. Based on

Figure 1 ENoLL criteria applied to the business model canvas



the ontology of various business models (Osterwalder, 2004), the BMC is useful for describing, analyzing and designing business models. BMC offers a visual diagram that includes the following nine elements: key partners, key activities, key resources, value proposition, customer relationships, channels, customer segments, cost structure and revenue streams.

As can be seen in Figure 1, the 20 ENoLL evaluation criteria presented have been distributed in each section of the business model canvas:

- Evidence of co-created values from research, development and innovation.
- Values/services offered/provided to Living Lab actors.
- Measures to involve users.
- Reality usage contexts, where the Living Lab runs its operations.
- User-centricity within the entire service process.
- Full product life-cycle support – capability and maturity.
- Living Lab covers several entities within value chain(s).
- Quality of user-driven innovation methods and tools.
- Availability of required technology and/or test-beds.
- Evidence of expertise gained for the Living Lab operations.
- Commitment to open processes.
- Intellectual property rights (IPR) principles supporting capability and openness.
- Openness towards new partners and investors.
- Business–citizens–government partnership: strength and maturity.
- Organization of Living Lab governance, management and operations.
- Business model for Living Lab sustainability.
- Interest and capacity to be active in EU innovation systems.
- International networking experience.
- Channels (e.g. web) supporting public visibility and interaction.
- People/positions dedicated to Living Lab management and operations (Source: ENoLL 8th wave, adapted from application brochure).

What can be seen at a glance is that there is no evaluation criterion covering cost structure or customers segments. The criterion dedicated to revenue stream is also quite vague, represented solely by the request for a “Business model for Living Lab sustainability”.

What follows is an analysis of how these three sections could be further augmented for ENoLL evaluation processes, based on the case study example of the Energy Living Lab based at the University of Applied Sciences Western Switzerland.

5. Applying the evaluation criteria: the case of Western Switzerland Energy Living Lab

As presented below, three main elements are missing from the current ENoLL evaluation process for Living Labs in Europe: cost structure, customers’ segment and revenue stream. We first introduce the Energy Living Lab created in 2014 in Western Switzerland. Then each missing element will be discussed and illustrated with the case study of the Energy Living Lab. We also introduce some other ideas for evaluation criteria that could be further researched and discussed.

The Energy Living Lab, an effective member of ENoLL as of September 2014, is an open innovation ecosystem dedicated to energy efficiency and the development of renewable energy in Western Switzerland. It is composed of the University of Applied Sciences Western Switzerland, host of the Living Lab, Chablais Agglo representing the public authorities of this French-speaking region, private companies in the field of energy, together with an association of users.

The goal of the Living Lab is to empower the users of energy (citizen of the region, employees of private companies, members of the association of users [. . .]) and integrate them into the innovation process, motivating them to participate, putting the right tools in place to enable a bottom-up dialogue and translating ideas into sustainable products or services. A toolbox has been developed, adapted to the needs of different companies and public authorities (crowd-innovation, lead users, service design, ethnography [. . .]).

In terms of cost structure, an evaluation criterion already suggested in the work of [Mulder et al. \(2008\)](#) and their “Harmonization Cube” could be the “use of private versus public infrastructure.” Indeed, being clear about the type of dedicated infrastructure for a Living Lab is key.

In the case of the Energy Living Lab pilot, the best location for its activities was determined to be in Chablais region *in situ*. However, the offices of the people leading this Living Lab at the University of Applied Sciences Western Switzerland were distant from the pilot region and did not suffice: different spaces were needed for stakeholders to meet, as well as to organize conferences or training sessions. To keep the costs down, the organizers had the idea to launch a co-working office in the region, in partnership with public authorities, partners of the Energy Living Lab. The funding would be based on a public and private partnership. Both of the workplaces embrace the same values, such as sharing ideas, tools and infrastructure with the goal of developing social innovation projects in the region. The public authorities of the region proposed to host the Energy Living Lab and to share an existing office to diminish the costs at the beginning and to be immediately operational. A next step would be to launch a dedicated co-working space at a larger scale. Openness is also key to share resources developed by other living labs and diminish the operational costs.

In terms of the customers segment, the current ENoLL evaluation has no criteria linked to this thematic. Why is customer segmentation important? One can argue that in a Public Private People Partnership (PPPP) model, the focus on such a process is precisely on the relationship between stakeholders to come to a shared vision and to develop new products and services that contribute to sustainable lifestyles in a collaborative manner. What is less clear is how to identify a “customer” for a Living Lab. In a collaborative process, this remains to be clarified. One type of “customer” might be the group that will pay for the new product or service under development, but a “customer” could also be a community that might benefit from a new type of product and service in terms of quality of life, for example, or even an entire region. Perhaps one way of understanding the customer segment is to identify the revenue stream of the Living Lab, as will be discussed in the following section. One tool proposed by the Digital Lifestyle Centre, a Living Lab based in the UK ([Wu, 2012](#)) is the stakeholders’ map, which gives the opportunity to evaluate the segmentation of the different stakeholders between primary stakeholders – i.e. those at the core of the Living Lab, participating in its management and sharing the same values, as well as the secondary stakeholders, which benefit from the services proposed by the Living Lab. More research needs to be done to understand the ambivalent roles of the private and public partners.

In the Energy Living Lab pilot, the “customers” that would benefit from the co-creation in the region were planned to be three selected small and medium enterprises (SMEs) in the Chablais region. What has been imposed was an innovation challenge with an underlying

sustainable development goal in the selected region in the energy field. During the workshop in January 2014, the SME's had the chance to present their needs. At the end of the workshop, mayors of the cities in the region were not completely satisfied by the proposed "challenges" in the pilot phase of the Living Lab. They communicated their own needs. They also wanted to be considered as "customers" benefiting from services provided by the Living Lab. In the applied research project, the public funding did not permit to do so. The research team decided to launch a new project submitted to the Swiss Federal Office for Energy to answer this need. Defining who is the "customer" of the Living Lab is not a trivial question and needs further researches.

The revenue stream is also particularly important for the longevity of the business model, and is a criterion not precisely assessed in the ENoLL evaluation process. One suggested evaluation criterion for the revenue streams comes from the work on the "Harmonization Cube" and under services, where the others suggest to: "Organize the living lab as profit center" and also "links to business value" (Mulder *et al.*, 2008). This point also illustrates the question related to the customer segment: who are the customers of the Living Lab and for whom is the value created? If indeed value is created for a region, then the public sector might be considered as an important source of revenue; if value might be created for private companies, they could also be seen as an important revenue source. Funding a Living Lab is considered as essential by practitioners as illustrated by Wu (2012, p. 17) and in her analysis of 15 Living Labs in the UK: "an agreed set of mutual benefits and goals among actors, as well as continuously available financial sources from public and private sectors is essential".

Here, the question of "sustainability" is paramount, particularly in regards to the longevity of a Living Lab. To launch a Living Lab under the leadership of a University, for example, with research funding, runs the risk that such an enterprise might need to stop at the end of the research project term, due to lack of continued funding. This was the case of the Food Living Lab in Switzerland, member of ENoLL. The same could be said for projects that benefit solely from private or public funding, and that are too dependent on a sole source of funds. As new politicians enter their mandates and do not support Living Lab anymore with public fundings, for instance, which was the case for MobiLab in Geneva, a Living Lab which, without a diversified funding stream, could be at risk.

In the Energy Living Lab, the revenue stream is a combination between public and private funding. The region itself contributes to the Living Lab in proposing office for the co-working area. The University of Applied Sciences is providing the seed money for the launch of the Living Lab and the test of the different methodologies and tools. Companies during the pilot phase in 2014 do not contribute financially but they are asked for a different contribution such as access to a community of users, organization of events in partnership with the Living Lab, communication plan to disseminate the co-creation project [. . .].

As of 2015, the companies wanting to collaborate will be asked to pay part of the innovation services, provided a co-funding if the challenge is related to an applied research project or the total amount if it is only a development project not linked to applied research. We believe that a Living Lab should identify the best revenue models for its operations, while also constantly assessing cost structure.

Finally, having gone through the process of creating a pilot Living Lab in 2014 through consultations with seven people interviews and by responding to the ENoLL 8th wave criteria, we can state the following strengths and weaknesses of the current process: we have noted that some of the Living Labs listed as ENoLL members were not running anymore and propose to further develop evaluation criteria linked to cost structure and revenue stream to assess the sustainability of future ENoLL members. Other sections of the BMC concentrated the greatest numbers of evaluation criteria such as key partners, value proposition, key activities which were already fully evaluated.

6. Living labs as innovation intermediaries

The Energy Living Lab case study illustrates the importance of the three missing elements, cost structure, revenue stream and customer segments and proposed potential evaluation criteria based on empirical data. But it does not answer completely the question of what type of criteria to choose from, when evaluating a Living Lab's operations towards long-term longevity. From the European Network of Living Labs viewpoint, their "customers segment" are the three different memberships: 348 adherent members, 19 effective Members and 3 associate members. Only the effective members are paying an annual fee and benefit from the extended services of the network, and are participating actively to the strategic development of the network. We make here the assumption that the objective of ENoLL would be to increase this "customers segment". But who are the effective members? How could ENoLL recruit more effective members during the next "wave" that are "sustainable" and that make the network "sustainable" as well? It would help to further define what type of additional evaluation criteria to select, when assessing the landscape of Living Labs.

This paper draws on a previous research on typology of innovation intermediaries proposed by [Lopez-Vega and Vanhaverbeke \(2009\)](#). They have defined four types of innovation intermediaries:

1. Innovation consultants provide innovation services, relying on internal sources of knowledge, to solve specific innovation problems or requests.
2. Innovation traders screen and provide access to a large amount of external ideas and innovations, relying on a platform of innovation solvers, to facilitate the identification of potential scientific and business oriented solutions.
3. Innovation incubators provide infrastructures to facilitate the internal exchange of ideas and knowledge among firms searching to conduct science, technology or business activities.
4. Innovation mediators provide infrastructures to facilitate the use of external ideas and knowledge coming from users, entrepreneurs, R&D institutes to established firms searching to conduct science, technology and business opportunities.

Using this typology of innovation intermediaries, ENoLL effective members have segmented into the four categories based on secondary data analysis available online:

1. four members are considered as innovation consultants;
2. six members considered as innovation traders;
3. four members considered as innovation incubators; and
4. five members as innovation mediator.

We recognize the limits of this approach: this segmentation among the different types of innovation intermediaries would have been more precise with primary data. It is a first attempt to categorize them; further research would be necessary to ensure the categorization of each Living Lab, based on interviews with the members of these Living Labs to collect first-hand data and complete the typology.

Based on this exercise, one can understand easily why it is so difficult for ENoLL to propose evaluation criteria for new Living Labs based on customers segments or revenue stream. The effective members belong to different types of innovation intermediaries. They have different types of customers segments and revenue streams. There is no unique model to replicate from. The proposed typology helps to understand the diversity of the network and the difficulty to set new evaluation criteria, across the board. The definition of what is a Living Lab is large enough to encourage this diversity, thus complicating the task of evaluating new postulations – but, at the same time, promoting the openness of the network, with 370 different members, encouraging diversity and not uniformity. It could

favour the regional and thematic roots of each Living Lab, increasing the adaptation capabilities. Living Labs have a dynamic nature and will evolve over the time from one category of innovation intermediate to another.

7. Conclusion

In this paper, we explore how Living Labs might be evaluated based on criteria that build on the current efforts of the ENoLL to encourage new members in Europe, complementing their criteria with elements from business model development strategies – specifically the BMC (Osterwalder and Pigneur, 2010). Our main findings suggest that the BMC could be a complementary tool in evaluating Living Labs, particularly in considering Living Lab through the business model perspective. In light of this, three elements are currently missing or under-represented in the ENoLL evaluation system. These include the cost structure, customer segments and the revenue stream. We place this in relation to the creation of an Energy Living Lab in Western Switzerland. During this launch, standardization tools such as the Harmonization Cube are valued to build upon existing best practices. Most of the evaluation criteria give direction to practitioners in order to launch or consolidate a Living Lab in the network.

We then tried to better understand, with the help of the typology of innovation intermediates, who are the actual effective members to better understand what type of evaluation criteria could lead to an increase in effective members that are active and alive. This model revealed the large diversity among the effective members, thus complicating the task of setting new evaluation criteria. It suggests a progression over the time from one category to another, an evolution that is not taken into account with the actual evaluation criteria. Different practical outputs could be raised: the necessity to evaluate the members over the time, not only when new LLs enter the network. If a member does not comply with the evaluation criteria, ENoLL should have the possibility to help the Living Lab be compliant or to dismiss the member. New evaluation criteria should also be set for the missing components, cost structure, customers segments and revenue stream, following a strategic reflection on how the network wants to grow, quantitatively or qualitatively? What are the common characteristics of the effective members? What type of new members are they looking for?

As Mulder *et al.* (2008) put it, our goal has been to understanding how to “keep the living lab alive”. To encourage further research in this area, we would like to propose in the conclusion a few additional dimensions that might be considered in the creation and evolution of Living Lab. First, the time dimension: we could like to suggest that a progressive approach be used in the evaluation of Living Lab that considers not only how a Living Lab is created but also how it is operationalized over time. Second, we would like to consider the space dimension or how such Living Labs are scalable (or not) and replicable (or not) to other spaces and geographic reaches. For example, Living Labs that work on a range of topics at the regional level might be evaluated differently from those that focus on a specific topic in and at the community level. For this, the cultural and institutional contexts should also be taken into consideration, including different institutional and legal frameworks. This leads us to a third dimension, the diversity and dynamic nature of Living Labs. Organizations are evolving and could change from one type of innovation intermediate to another over time, not necessarily following a linear process. It is complicated to decide on fixed evaluation criteria with evolving organizations. Too narrow evaluation criteria could be a constraint for the development of the organization.

Finally, we hope that our research offers insights for others interested in creating a Living Lab and insuring its existence over time. For the “sustainability” of a Living Lab, we argue that a strong model is needed, based on a long-term strategy that considers funding structures, target audiences and revenue streams, among other important factors – all of which must be assessed not only at one moment in time, but over time,

across a diverse range of Living Labs, in a continuous and dynamic process involving different stakeholders.

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