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OPEN INNOVATION BUSINESS MODELS- THE CASE OF LIVING LABS IN FRANCE

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Abstract:

Open innovation business models, based on knowledge flows across firm boundaries, include pecuniary and non pecuniary mechanisms (Chesbrough and Bogers, 2014). In addition they have to take into account the interests of different stakeholders. We investigate open innovation business models through the example of living labs.

Living labs are ecosystems in which end users (customers, patients, citizens, etc.) and other stakeholders are involved over a long period in the development of an innovation, in a real life context, using an iterative approach combining different research methods (Schuurman et al., 2012). In spite of the expansion of the number of living labs worldwide since 2000, Schuurman (2015) notes a mortality rate of 40% on living labs labeled by the largest network of living labs, European Network of Living Labs (ENoLL). A large number of living labs thus have an unwanted temporary nature (Leminen et al., 2012). The question of the business model is crucial. Based on a survey answered by nine living labs in France, the main objective of this research is to find out the main dimensions of the business models of living labs and by extension the dimensions of the business models of open innovation intermediaries. It highlights three forms of value generation: knowledge creation, social impact and economic value. Revenues can be exclusively public, exclusively private or mixed. As regards the sharing of value, it is a concern for several living labs which respond by ensuring the dissemination of their innovations within their network or to a wide audience.

Only research-oriented laboratories have intellectual property protection practices. We finally propose a typology of three living labs business models archetypes. This exploratory research contributes both to living labs and to open innovation literature by analyzing examples of business models for open innovation intermediaries.

Key-words: open innovation, business models, living labs.

INTRODUCTION

Living labs are ecosystems in which end users (customers, users, patients, etc.) and other stakeholders are involved over a long period in the development of an innovation, in a real environment, using an approach of iterative research combining different methods (Schuurman et al., 2012). The creation of a living lab is the result of various initiatives. While some are supported by laboratories or research organizations, others are carried out by companies, public organizations, even not for profit organizations or individuals. Although their structures are different, they are characterized by five common dimensions (Ballon and Schuurman, 2015): (1) active user involvement, (2) real life environment, (3) participation of multiple stakeholders, (4) multi-method approach and (5) co-creation. Very focused initially on technological innovation, then on subjects such as health and smart cities, living labs are increasingly identified in relation to social innovation (Edwards-Schachter et al. 2012, Hillgren et al ., 2011).

Indeed, they encompass societal and technological dimensions simultaneously in a business-citizen-government-university partnership. These structures are developing in France and around the world. The European Network of Living Labs (ENoLL) thus claims 150 active members in 2018. Knowing that more than 400 different structures have received the label since 2006, this gives an indication of the fragility of the economic model of such structures. They

often find it difficult to translate the value created into a sustainable revenue model. Consequently, a large number of living labs are of an unwanted temporary nature (Leminen et al., 2012).

We define business models as the content, structure and governance of transactions inside an organization and between the organization and its external partners in support of the organization's creation, delivery and capture of value (Santos et al., 2009; Zott et al., 2011). They can be considered as conventions that relate to the generation of value, its remuneration and its sharing (Verstraete and Jouison-Laffitte, 2011) and they represent a broader conceptualization of value co-creation (Zott and Amit, 2008). As far as value generation is concerned, living labs do not directly develop products or services. They serve as a link between research and citizens in a real life environment (Franz, 2014) and function as intermediaries for open innovation (Katzy, 2012). They thus can be considered as open innovation intermediaries (Howells, 2006; Ollila and Elmquist, 2011). Under these conditions, the identification of the generated value is not obvious. The main problem with the sharing of the value is related to the collective nature of the innovation process, which is the product of multiple stakeholders, the main role being played by users who are often volunteers and unpaid. The fact that certain actors seek to appropriate or obtain a financial gain from part of the co-created value can potentially create tensions (Bonaccorsi et al., 2006; Chesbrough and Appleyard 2007). This research is based on the results of a questionnaire answered nine living labs in France. It aims to identify the value generated by living labs, the way in which it is remunerated and shared between the different stakeholders. A literature review (part 1) will highlight the great fragility of the economic models of living labs. The methodology that led to the development and then the analysis of the survey will be explained in part 2 then the results leading to a mapping proposal will be presented in part 3. Finally, we will discuss these results and outline the follow-up that could be given to this research.

1. Weak business models for living labs

Financial sustainability seems to be the essential condition for living labs to become sustainable (Veeckman et al., 2013). However Schuurman in 2015 noted a mortality rate of more than 40% in the living labs labelled by the European Network of Living Labs, ENoLL. Through a literature review, we highlight the nature of the value generated by living labs, their sources of income and the problems that arise in terms of sharing value, including its governance.

1.1. Open business models in tension between value proposition and value capture

Research on the business models of living labs is spread over two levels of study: the business models of the living lab structure and the business models of the projects led by the living labs (Rits et al., 2015). This research is concerned with the first level.

Business model has been a concept that has attracted the attention of researchers since the 1990s (Zott et al., 2011). The majority of studies converge to assess that business models denote the company's core logic for creating and capturing value (Saebi and Foss, 2015), the understanding of these two logics being crucial for the sustainability of the structure.

For the rest of the research we rely on Verstraete and Jouison Laffitte (2011) model which proposes an analysis on three dimensions: value generation, sources of revenues and value sharing. Although this model is not well-known outside French-speaking countries, it has proved to be particularly well suited for business with a social dimension, which is the case for living labs. More especially it points out the interest of value sharing rather than value capture like this is the case in most of the business models framework (Teece, 2010).

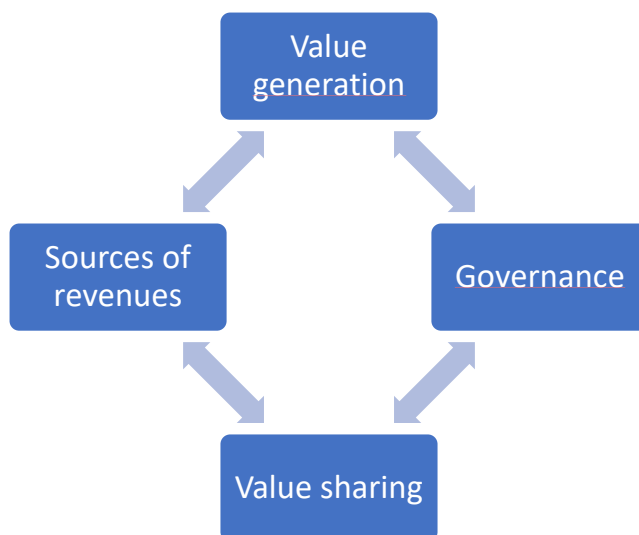
The business model is not a simple representation of how an organization creates value but it is also a cognitive device (Chesbrough, 2006) through which decisions are evaluated, adopted and find economic materialization (Leroux et al., 2014). This characteristic is particularly important

for open innovation where the innovation process relies on purposively managed knowledge flows across boundaries (Chesbrough and Bogers, 2014) with multiple and heterogeneous stakeholders who must succeed in producing compromises beyond their divergent interests (Leroux and Berro, 2010). The governance proves then to be a key dimension, which need to be taken into account by studying business models. We then propose four dimensions for studying living labs business models (see figure 1).

The open innovation model relies on pecuniary and non pecuniary mechanisms (Chesbrough and Bogers, 2014) which have to be taken into account in business models.

Open innovation induces tensions between value generation which requires openness and value capture which requires more protective processes (Chesbrough et al., 2018). The living lab, as open innovation intermediary (Almirall and Wareham, 2011), is at the center of this tension.

Figure 1: The four dimensions for studying living labs business models



1.2. Different natures of value generation for living labs

A living lab has multiple resources linked to its different stakeholders who all participate in the co-production of innovation, its multiple research methods and its ability to carry out tests in a real environment. They are able to facilitate access to external ideas, whether commercial or scientific. Through their original and often unprecedented associations of heterogeneous stakeholders, they can be qualified as “architects of the unknown” (Agogu e et al., 2013) and thus clear new ground to act in situations where technologies, markets and the involved actors are partially unknown.

But the main difference to other open innovation methodologies is the particular interest to users (Baccarne et al., 2013). All these resources allow it to create economic value by co-producing a response as close as possible to the needs of customers and users. From a market point of view, they make it possible to improve new offers and to test the market-product adequacy (Ballon et al., 2018). They thus increase the chances of success of an innovation and reduce time to market and they have the potential to improve user value (Almirall & Casadesus-Masanell, 2010).

If living labs take part in creating economic value, it does not mean that they realize this economic value by themselves. According to Leminen et al. (2012), living labs create either knowledge (utilizer-driven and provider-driven living labs), new strategies of development (enabler-driven living labs) or solutions to users specific needs (user-driven living labs). As open innovation intermediary, they produce knowledge which can then be integrated into innovative products and services marketed by one or other of the stakeholders. However, traditionally knowledge is not valued as such, but its valuation is integrated into the innovative product or service. The economic value is then made visible only by the stakeholders.

In addition to economic value, through the attention given to users specific needs, living labs produce environmental and social effects (Bergvall-Kåreborn et al., 2009; Ståhlbröst, 2012) and strengthen social cohesion (Leminen et al., 2012, Schuurman et al., 2016).

Even all living labs have common characteristics (Ballon and Shuurmann, 2015), they demonstrate a variety of different activities. They thus can be classified by their activity sector (healthcare, urbanism, education, etc.), by their form of user participation (Dell'Erra and Landoni, 2014), by their innovation tool (Leminen and Westerlund, 2017). Leminen et al. (2012) proposed a typology taken into account the dominant actor of the living lab and its purpose. It highlights four types of living labs which main properties are summarized in table 1.

Table 1: Categorization of living labs according to the driving actor (from Leminen et al., 2012; Leminen, 2013)

Type of living labs	Utilizer-driven	Enabler-driven	Provider-driven	User-driven
Purpose	Strategic R&D activity with preset objectives	Strategy-development through action	Operations development through increased knowledge	Problem-solving by collaborative accomplishments
Dominant actor	Companies who launch a living lab to promote their business	Public-sector actors, non-governmental organizations, and financiers, that pursue societal improvements.	Educational institutes, universities, or consultants.	User-communities
Outcomes	New knowledge for product and business development	Guided strategy change into a preferred direction	New knowledge supporting operations development	Solutions to users' everyday life problems
Coordination	Top-down	Bottom-up	Top-down	Bottom-up
Innovation approach¹	Inhalation-dominated	Exhalation-dominated	Exhalation-dominated	Inhalation-dominated

They point out that a specific stakeholder plays a dominant role according to its own purposes. This influences different dimensions like the purpose of the living lab, the outcomes, the coordination and the innovation approach. The expected outcome nevertheless should also cover the interests of the other stakeholders for them to accept to take part in the innovation process (Leminen et al., 2015).

¹ Inhalation-dominated approach refers to the ability of the driving actors to enroll the network in their own innovation activities and targets (Leminen, 2013). The exhalation-dominated innovation approach meets on the contrary the needs of the other participants. The driving actor then expects indirect benefits.

1.3. Living labs revenues: a mixture of public and private funding

Funding plays a major role in the development of collaborative innovation.

Most living labs depend mainly on subsidies and public aid (Brankaert et al., 2015) while others operate through project based funding (Hossain et al., 2019).

Indeed, from 2006, the European Union identified living labs as devices allowing to increase the European innovation potential, stimulating job creation and wealth generation (Nesti, 2018). European funds were then dedicated to the priming of these structures. In general, living labs are likely to receive public subsidies for territorial economic development, research, innovation or social impact. These grants may, depending on the case, concern the structure or one or other of the projects developed by the living lab.

However, public funding has evolved in recent years. Prouteau and Tchernonog (2017) thus distinguish three trends in France:

- Growing privatization of funding, in particular by involving users in the funding of the service provided,
- Rise of local authorities in public funding in the face of State disengagement
- Decrease in subsidies in favor of the rise in power of public procurement through calls for projects or calls for expressions of interest. This trend can be compared to an instrumentalization of not for profit organizations according to the priorities defined by the public authorities (Leroy 2019, p 96). But the main risk of this funding is its temporary nature which can have the effect of launching the living labs into a headlong rush to capture funding even if it means deviating from their initial project (Fasshauer and Zadra-Veil, 2017), all the more that it induces a strong competition among commercial, not for profit and hybrid organizations (Bennett, 2008)

While these kinds of funding are acceptable short-term option, it does not guarantee long-term sustainability and growth (Guzman et al., 2013). Problems often arise after initial public funding has ended (Katzy, 2012; Grezes et al., 2013; Burbridge et al., 2017).

The sustainability of these structures therefore depends on their ability to become autonomous and generate sufficient income for the service provided (Garcia-Guzman et al., 2013; Grezes et al., 2013; Katzy, 2012; Mulvenna et al., 2010).

Living labs are therefore likely to use different types of income as shown in Table 2.

Table 2: Potential revenue sources for living labs

Public/Private	Origin of funding	Nature of revenues
Private	Customer	Payment for products or services
	Private companies	Donations and sponsoring
		Membership fees
		Invoicing of annex services (workshops...)
		Intellectual property, patents
Public	European Union/ State/ local authorities	Grant
	State/ local authorities	Public order: calls for projects or expressions of interest

1.4. Sharing the value, a question of governance?

Traditionally, value is captured by intellectual property management. Open innovation gives nevertheless new status to intellectual property rights that are seen as vectors for openness that help the firms identify partners and build secure relationships (Cohendet and Penin, 2011;

Ayerbe et al., 2020). Intellectual property can nevertheless in some cases bring restrictions to the exchange of knowledge (Ayerbe and Chanal, 2011). Some open innovations structures, inspired by the example of free software communities, turn to specific open management methods of intellectual property such as "creative commons". In case of collective creation of value, these devices make it possible to identify the contribution of each partner while framing the rights of use and preserving the generation of value for the stakeholders by allowing wide dissemination. They are therefore part of a concern to contribute to the common good, in line with the desire to create social value. However, to our knowledge, there is no study on the effective use of creative commons in living labs.

Moreover some living labs work on usage innovations based on existing technologies. In this case, patents or other intellectual property protections prove to be unsuitable. Nevertheless open innovation models, beyond the undeniable advantages in terms of acquisition of external knowledge and skills, can generate perverse effects when some stakeholders contribute little but can take ownership of ideas. In addition, living labs are based on the contribution of users, who are not always paid. There is then a risk of their instrumental use. However, living labs are often not very explicit on these problems (Berthou and Picard, 2017).

They nevertheless pay attention to bring value to each their stakeholders. The success of living labs depends on their ability of transferring knowledge between the different partners.

Based on the example of a French rural living lab, Fasshauer and Zadra-Veil (2020) highlight the value produced for the main categories of stakeholders (see Table 3).

Table 3: Value creation by category of stakeholder for a rural living lab (Fasshauer and Zadra-Veil, 2020)

Stakeholder	Type of value generation
Local authorities	Dialog with citizens Territorial attractiveness Economic and social impact
Firms/ not for profit organizations	Better risk evaluation (small scale test) Partnership Understanding of emergent needs
Users	Opportunity to contribute to products and services adapted to their own need Access to knowledge and competences Social relationship

Beyond the sharing of the value among stakeholders, some living labs ambition is to disseminate the knowledge to external actors. Then, since ideas are shared within a large network of actors, the risk of recuperation by external actors is real.

All of these issues can be addressed through the establishment of governance mechanisms. This is all the more crucial that most research on the business models of living labs highlights the need to secure lasting collaborations (Garcia-Guzman et al., 2013, Grezes et al., 2013, Mulvenna et al., 2010, Niitamo and al., 2006) with numerous and heterogeneous actors. Living labs governance is challenging because they cannot directly manage or control stakeholders but rather just motivate them to engage in innovation activities (Bergvall-Kareborn and Stahlbrost, 2009). Governance is then a key for assessing sustainability. Indeed if actors perceive that a given project has resulted in unfair value realization across contributors, they are likely to exit that project or refrain from engaging in future projects (Chesbrough et al., 2018).

2. Methods: Exploratory study on 9 living labs

To study the business models of living labs, we first chose to focus on one country, France. Indeed, the importance of public funding may suggest that there are significant differences among countries.

France is, with Spain, a country with the most ENoLL members (23 according to the web site as at August 2020), which is an indicator for the vitality of living labs in this country, even if many living labs do not belong to this network. In France indeed there are two competing local living lab networks: a network for Francophone living labs, which is strongly related to ENoLL Network and a network dedicated to healthcare living labs (Forum LLSA).

We have developed a survey on the different dimensions of economic models identified by the literature.

Our survey thus presents a mixture of open and closed questions on six headings:

- Identity of the structure
- Value proposition, customers and revenues
- Infrastructure
- Partners and governance
- Role of users
- Impact and sharing of value

The questionnaire was sent by email to 50 living labs, identified on the websites of the living labs networks: European Network of Living Labs (ENoLL) and the Forum of the Health and

Autonomy living labs (LLSA). Nine structures have responded to date. Their main characteristics are summarized in Table 4.

In the absence of a global study and even a global database on living labs, it is impossible to decide on the representativeness of the sample. For example, health labs are very strongly represented (6 over 9). This may be linked to the fact that they are grouped into a specific network in France (forum LLSA) and therefore more easily identifiable.

The answers of the surveys were coded according to the different stakeholders that were addressed by the living lab activities (project's holders, local authorities, users, researchers)

The data analysis were structured in two steps:

- 1) A first level of analysis were made question by question in order to determine the similarities and the divergences.
- 2) A summary for each living lab has been written in order on the one hand to determine the nature of the generated value and on the other hand to observe if the different dimensions (value generation, revenues, value sharing and governance) were correlated. Answers to the survey have been checked with secondary data, especially the websites of the nine living labs.

This analysis served as a basis for the constitution of proposals that will have to be tested in a further step of the research.

Table 4: Short presentation of the nine living labs

Living lab	Date of creation	Legal structure	Category (Leminen, 2012)	Activity sector	ENoLL membership
A	2002	Department of University hospital	Provider	Healthcare (gerontechnologies)	No
B	2009	Groupment around a public regional structure (groupement d'intérêt public)	Enabler	Healthcare (Autonomy)	Yes
C	2010	Foundation (related to university hospital)	Provider	Healthcare (gerontechnologies)	Yes
D	2010	Department of a mutualist organization	Utilizer	Healthcare (autonomy)	No
E	2011	Cluster	Utilizer	Healthcare (gerontechnologies)	No
F	2015	Not for profit organization (mainly created by public local actors).	Enabler	Healthcare (medico-socioeconomic innovation)	Yes
G	2010	Not for profit organization (created by citizens)	User	Rural development	Yes
H	2014	Not for profit organization (created by entrepreneurs)	Utilizer	Digital innovation	No
I	2011	Cooperative (SCOP)	Provider	Design of new services using satellite data	Yes

3. French living labs business models

3.1. Value generation

Paradoxically, finding the nature of the value generation is the most difficult question to tackle. The creation of value is above all a response to customer needs. But it is very difficult to define who is the client of a living lab whose particularity is to bring together heterogeneous stakeholders. A living lab is not a commercial structure and the outcome of the innovation is commercialized by the project's holder. Thus the value provided by the living lab does not necessarily correspond to the value of the innovation for which it has sometimes only been an intermediary.

One of the living labs (A) considers that it provides research and public service work and that as such it has no customers. For the others, if the users are at the heart of the living labs project, they are not always the direct customers. Only two living labs declare having patients or individuals for clients (D and F). Otherwise their main customers are SMEs (B, C, D, E, F, G, H), large companies (B, C, E, F, G), not for profit organization (B, C, E, F, G, H) and local authorities (B, E, F, G, H), research laboratories (B, D, F, H), other public institutions (C, F, H).

Indeed a living lab is not dedicated to serve the needs of one specific category of customer but is supposed to answer to the needs of all its heterogeneous stakeholders. Understanding the generation of value therefore requires knowing the living lab network and the needs expressed by the various stakeholders, and understanding its objectives and activities.

All living labs claim to have more than three different categories of stakeholders: companies (8 living labs), not for organizations, local authorities, users (7 living labs for each of these categories), other public institutions (6), citizens (5) and hospitals (4).

The living labs also declare a great diversity in their activities, even if most of them perform activities all along the innovation process (from exploration to valorization). Two main activities emerge from the survey: the animation of the collaborative research process and the evaluation of the proposed solutions. These two activities meet the needs of almost all categories of stakeholders.

More generally, the answers to the question to which needs they answer, all living labs mentioned needs from projects'holders, some of them to users' needs or local authorities needs.

The means of production are often sketchy. Seven living labs have their own premises (D as owner, B, C, H and I are tenants for a fee while A and G are tenants for free). E and F operate without their own premises. Three living labs (A, D) have no employees but can rely on permanent staff from the supporting structure, G only works with volunteers, E, F, H and I declare between one and two salaried while B and C each declares ten. When there are employees, they perform commercial functions (search for partnerships), lobbying. They manage projects, contribute to research activities or to the provision of services. They are also in charge of the animation of the living lab.

Technical equipment is not widespread. Only four living labs (A, C, D and H) are equipped with technical platforms, either on its own or with their partners.

To characterize the value generation, it is also interesting to identify the main objectives declared by each structure. To this question, three living labs (A, C and I) put forward research objectives, E declares exclusively economic objectives (turnover) while the other five have a mixture of social objectives (improvement of the conditions of life) and economic (allow local small and medium enterprises and artisans to develop their offer towards the target audience).

In spite of having only 9 living labs in our sample, our survey proves that living labs can have very different structures and practices. The most significant findings relates to the main objectives of the living labs with three main categories of value generation: new knowledge, social value and economic value. Social and economic value appear on all living labs but the focus is put on one of these two dimensions (social for B, D and G; economic for E, F, H) or even a third one, i.e research for A, C and I.

3.2. Value remuneration

The question of remuneration for value arises all the more since no living lab sells the innovative product itself. Selling the innovation is generally the responsibility of the project owner (client companies).

The remuneration therefore relates either to the service offered for a particular project, or to the structure itself. In both cases, it is likely to mix public and private income as shown in Table 5.

Table 5: Sources of revenues declared by living labs

(number of concerned living labs)	Revenues related to the structure	Revenues related to individual projects
Public funding	European grants (5) Other public grants (8)	Public tenders (6)
Private funding	Partnership with not for profit organizations, foundations (2)	Invoicing of services (7)

Long term funding is necessary to ensure the sustainability of living labs (Guzman et al., 2013). Indeed long term funding often proves to be insufficient and living labs tend to compensate by a set of solutions, which are mostly short-term fundings like the answer to public tenders or the

development of an offer of service. This is time consuming, all the more that living labs have only limited staff. Moreover public tenders are not always in adequation with the initial goals of the living labs. In conclusion, sources of revenues partially take into account the hybrid nature of the value generation but are not always sufficient for ensuring sustainability.

3.3. Value sharing

None of the living labs remunerates users. The sharing of value therefore has no monetary character for this audience.

If D declares that it did not start any particular reflection on the sharing of value, the others consider that it is a problem without having found a satisfactory solution. They tend to adopt a pragmatic approach, with case by case decisions depending on the project.

One living lab protects certain innovations by patents or copyrights which in this case are carried by its affiliated entities. A second one uses Creative Commons licenses where possible and a third one systematically promotes open source. The others have no protection processes but have a specific concern for facilitating a large dissemination of the projects or the sharing of knowledge, skills or good practices. Globally, the focus is more on value sharing than on value capture. The value sharing is often claimed as one of the main targets of the living labs, either restricted to the members of the living lab or fully open.

3.4. Governance and inclusion of users

Seven living labs have a board of directors and only two do not have any specific governance structure. When there is a board of directors, it contributes to the definition of the strategy in connection with the management of the living lab and the parent structures. Four living labs (A, G, H and I) claim to include all members to participate into the definition of the strategy.

If only two living labs have set up a formal selection committee, six living labs have a project selection procedure based on defined criteria such as:

- Their suitability for the purpose of the living lab
- Their scientific interest
- The expected benefits for users
- Feasibility (in financial or skills terms).

Users participate at all levels of the innovation process: ideation (A, B, E, F, G, H, I), prototyping (A, B, C, E, F, G, I) and test (A, B, C, D, E, F, G, H, I).

User involvement in projects seems logically to be a common practice but only some living labs include them in the governance of the structure. A kind of democratic governance (openness to all members) appears on four living labs out of nine.

3.5. Categorization proposal

Although the sample is quite small, this exploratory research allows us to propose a first categorization of living labs according to the main characteristics of their business model. This proposal is shown in Table 6.

Table 6 : Categorization proposal

Type of living lab	Research oriented	Social innovation oriented	Local network oriented
Number of living labs	3	3	3
Common dimensions	<ul style="list-style-type: none"> - A vast network of heterogeneous partners (companies of all sizes, public institutions, not for profit organizations, individuals, etc.) - Attention to the needs of projects' holders - Mixed private / public income - Low workforce (between 0 and 10 employees) - Collegial governance - Values that guide the choice of partners and projects - An importance given to the user who participates in the different phases of the innovation - A desire to recognize the importance of the collective nature of the value created 		
Nature of the generated value	New knowledge (not excluding economic and social value)	Social value first, economic value second	Economic value first, social value second
Value sharing	Dissemination + intellectual property protection	Dissemination/transferability	Sharing knowledge within the network

The first category includes living labs which are linked to university hospitals or research organizations and have objectives in terms of scientific publications. Their objectives are expressed in terms of innovation and / or publications. Nevertheless, they pay close attention to the needs of users and work in collaboration with projects'holders to produce innovation. They are the only ones to have formalized intellectual property practices, sometimes inspired by open source. They affirm a desire to disseminate the innovations to which they contribute on a large scale.

The second category includes living labs that seek above all to have an impact on users (inhabitants of a rural area, elderly or disabled people). They cover needs that are poorly covered by both the public and private spheres while working in collaboration with public and

private actors. The sharing of the value takes place through a desire for dissemination to a wider audience and transferability.

The third category includes living labs that seek above all to create a local economic ecosystem. Their objectives are essentially economic and the sharing of value takes place mainly through the exchange of good practices within the network.

There seems to be a strong relationship between the nature of the generated value and the value capture or sharing. The other dimensions (revenues, governance) seem on the contrary to be independent and not related to the type of living lab. Although the sample is relatively small, it shows a variety of practices.

4. DISCUSSION AND CONCLUSION

This exploratory research contributes both to living labs and to open innovation literature.

As regards living labs literature, it proposes a description and a categorization of living labs business models.

We set up common dimensions of living labs' business models and we highlight three different forms of living labs depending on the nature of the generation of value: knowledge creation, social innovation and local network oriented.

These three categories rely on two interrelated dimensions: value generation and value sharing.

We identify three categories of value generation: knowledge creation, social value creation and business value. In fact the three different natures of value generation are almost always present in the different living labs but the main goals of the living lab is more focused on one or the other component. At this stage of the research there seems to be a relation between value generation and value sharing. Research oriented living labs have the most elaborated processes to

protect value. For the other ones, there is a concern for taking into account the collective nature of the created value but they hardly find ways to formalize it. They nevertheless try to ensure a large dissemination of the innovation when it brings social value. At least they share the generated knowledge within the living lab network.

With few exceptions, the revenues are a mixture of public and private funding independently of the type of living lab. They seem to respond to opportunities rather than to deliberate strategies as we did not find any correlation between funding and type of living lab. The main reason is probably that living labs suffer insufficient criteria for assessing their performance (Schaffers and Turkama, 2012). More especially, identifying or measuring the social value of living labs remains a problem, even if some researchers (Gualandi and Leonardi, 2018) or institutes (Institut Godin in France) are starting to develop methodologies to assess the social value which is created. It is an avenue for future research which could then focus on the measurement of externalities.

Due to the numerous stakeholders, governance is always collective but in some cases there is in addition a concern for creating the conditions of a democratic governance, also independently of the nature of the living lab. Governance is in fact what the living lab will use to make choices on the creation and on the sharing of value by taking into account the variety of its stakeholders, including the user.

The proposed categorization differs from the one proposed by Leminen et al. (2012) and Leminen (2013). Even if the dominant actor is important for understanding the business model of living labs, other factors have to be taken into account. Indeed only their “provider” category is fully in line with our category “research oriented”. Utilizer and Enabler categories may be either social innovation oriented or local network oriented.

It confirms that not only the outcomes of innovation are linked with the characteristics of the living lab (Leminen et al., 2017) but also the value sharing of the innovation.

Moreover neither activities and structures nor governance of living labs seem to be related to the dominant actor.

Our research neither does not confirm the results of Leminen 2013 regarding the dominant coordination (bottom-up or top-down). The governance of living labs also includes lateral coordinations that are not taken into account by Leminen (2013). A trend to more open and democratic governance is outlined by Habib et al. (2015) in their definition of third-generation living labs defined as “platforms with shared resources, which organize their stakeholders into a collaboration network, that relies on representative governance, participation, open standards and diverse activities and methods to gather, create, communicate and deliver new knowledge, validated solutions, professional development and social impact in real-life contexts”. This is not the case for most of the living labs in our survey.

This research also contributes to open innovation literature which is dominantly focused on business models developed by industrial firms. The open innovation literature clearly calls for more research involving an organizational level of analysis, explicitly referring to the organizational designs and practices that underlie openness (Ayerbe et al., 2020). Chesbrough and Bogers (2014) already extended the concept to public and not for profit organizations. We here focus on open business models for open innovation intermediaries, which allow to exit the “firm centric approach” of dominant open innovation researches (Saebi and Foss, 2015). Living labs present a new form of structure being able to “organize for open innovation” (West and Bogers, 2014) and remain largely beyond the well-acknowledged Open Innovation literature (Hossain et al., 2019).

The success of open business models is defined by aligning value creation and capture activities to an innovation (Chesbrough, 2003; Zott et al., 2011). This research shows that in living labs there is no mandatory alignment between value creation and capture mechanisms, even sometimes no real research of value capture. They mainly focus on value sharing, either restricted to the members of the living lab or fully open with an intention to widely disseminate the innovation. Sharing the value is thus one strategy to manage the openness paradox. This strategy is nevertheless not formalized, which may be due to the emergent property of living labs. This is thus made possible only as long as there is trust between the stakeholders and fairness and transparency in the decision process which allows the emergence of case by case solutions but raise the problem of sustainability.

This research is mainly limited due to the small sample and the fact that it is concentrated on only one country. It is also limited due to the use of the survey methodology which does not allow to understand the detail of the governance, the motivations of the diverse stakeholders and the value sharing mechanisms. This would be important to add deeper interviews with a variety of stakeholder for each living lab. An international comparison could also be useful to highlight the country specificities, especially as regards the sources of revenues.

References

Agogu , M., Comtet, G., Menudet, J. F., Picard, R., & Le Masson, P. (2013). Managing innovative design within the health ecosystem: the living lab as an architect of the unknown. *Management et Avenir Sante*, (1), 17-32.

Almirall, E., & Casadesus-Masanell, R. (2010). Open versus closed innovation: A model of discovery and divergence. *Academy of management review*, 35(1), 27-47.

- Almirall, E., & Wareham, J. (2011). Living Labs: arbiters of mid-and ground-level innovation. *Technology Analysis & Strategic Management*, 23(1), 87-102.
- Ayerbe, C., & Chanal, V. (2011). Quel management des DPI dans les business models ouverts?. *Revue française de gestion*, (1), 99-115.
- Ayerbe, C., Dubouloz, S., Mignon, S., & Robert, M. (2020). Management Innovation and Open Innovation: For and Towards Dialogue. *Journal of Innovation Economics Management*, (2), 13-41.
- Baccarne, B., Logghe, S., Veeckman, C., & Schuurman, D. (2013). Why collaborate in long-term innovation research? An exploration of user motivations in Living Labs. In 4th ENoLL Living Lab Summer School 2013. European Network of Living Labs.
- Ballon, P., & Schuurman, D. (2015). Living labs: concepts, tools and cases. *info*, 17(4).
- Ballon, P., Van Hoed, M., & Schuurman, D. (2018). The effectiveness of involving users in digital innovation: Measuring the impact of living labs. *Telematics and Informatics*, 35(5), 1201-1214.
- Bennett, W. L. (2008). Changing citizenship in the digital age.
- Bergvall-Kåreborn, B., & Ståhlbröst, A. (2009). Living Lab: an open and citizen-centric approach for innovation. *International Journal of Innovation and Regional Development*, 1(4), 356-370.
- Berthou, V., & Picard, R. (2017). Les Living Labs, ces leviers d'innovation en santé publique. In *Annales des Mines-Realites industrielles* (No. 2, pp. 68-72).
- Bonaccorsi, A., Giannangeli, S., & Rossi, C. (2006). Entry strategies under competing standards: Hybrid business models in the open source software industry. *Management science*, 52(7), 1085-1098.

Burbridge, M., Morrison, G. M., van Rijn, M., Silvester, S., Keyson, D. V., Virdee, L., ... & Liedtke, C. (2017). Business models for sustainability in living labs. In *Living labs* (pp. 391-403). Springer, Cham.

Buxton, B. (2010). *Sketching user experiences: getting the design right and the right design*. Morgan kaufmann.

Brankaert, R., Ouden, E. D., & Brombacher, A. (2015). Innovate dementia: the development of a living lab protocol to evaluate interventions in context. *info*, 17(4), 40-52.

Chesbrough, H. (2003). The logic of open innovation: managing intellectual property. *California management review*, 45(3), 33-58.

Chesbrough, H. (2006). Open innovation: a new paradigm for understanding industrial innovation. *Open innovation: Researching a new paradigm*, 400, 0-19.

Chesbrough, H. W., & Appleyard, M. M. (2007). Open innovation and strategy. *California management review*, 50(1), 57-76.

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

Chesbrough, H., Lettl, C., & Ritter, T. (2018). Value creation and value capture in open innovation. *Journal of Product Innovation Management*, 35(6), 930-938.

Cohendet, P., & Pénin, J. (2011). Patents to exclude vs. include: Rethinking the management of intellectual property rights in a knowledge-based economy. *Technology Innovation Management Review*, 1(3).

Dell'Era, C., & Landoni, P. (2014). Living Lab: A methodology between user-centred design and participatory design. *Creativity and Innovation Management*, 23(2), 137-154.

Edwards-Schachter, M. E., Matti, C. E., & Alcántara, E. (2012). Fostering quality of life through social innovation: A living lab methodology study case. *Review of Policy Research*, 29(6), 672-692.

Fasshauer, I., & Zadra-Veil, C. (2017). Crowdsourcing public et innovation territoriale: le cas d'un living lab rural. *Politique et Management Public*, 34 (1-2) : 61-82.

Fasshauer, I., & Zadra-Veil, C. (2020). Le living lab, un intermédiaire d'innovation ouverte pour les territoires ruraux ou péri-urbains?. *Innovations*, 61 (1): 15-40

Franz, Y. (2014, September). Chances and Challenges for Social Urban Living Labs in Urban Research. In *Conference Proceedings of Open Living Lab Days* (pp. 105-114).

García-Guzmán, J., del Carpio, A. F., De Amescua, A., & Velasco, M. (2013). A process reference model for managing living labs for ICT innovation: A proposal based on ISO/IEC 15504. *Computer Standards & Interfaces*, 36(1), 33-41.

Grezes V., Fulgencio H., Perruchoud A. (2013), Embedding Business Model for Sustainable Collaborative Innovation in African Living Labs, IST-Africa Conference & Exhibition, IEEE

Gualandi, E., & Leonardi, L. (2018). Models for Living Lab's Sustainability. Evidences from Italy and the Netherlands. Paper presented at the OLLD18 – Open Living Labs Days Research and Innovation Conference, August 22–24, 2018, Geneva, Switzerland.

Guzmán, J. G., del Carpio, A. F., Colomo-Palacios, R., & de Diego, M. V. (2013). Living labs for user-driven innovation: a process reference model. *Research-Technology Management*, 56(3), 29-39.

Habib, C., Westerlund, M., & Leminen, S. 2015. Living Labs as Innovation Platforms. Paper presented at the 6th ENoLL Living Labs Summer School, August 25–28, 2015, Istanbul, Turkey.

Hillgren, P. A., Seravalli, A., & Emilson, A. (2011). Prototyping and infrastructuring in design for social innovation. *CoDesign*, 7(3-4), 169-183.

Hossain, M., Leminen, S., & Westerlund, M. (2019). A systematic review of living lab literature. *Journal of cleaner production*, 213, 976-988.

Howells, J. (2006). Intermediation and the role of intermediaries in innovation. *Research policy*, 35(5), 715-728.

Katzy, B. (2012). Designing viable business models for living labs. *Technology innovation management review*, 2(9).

Leminen, S., Westerlund, M., & Nyström, A. G. (2012). Living Labs as open-innovation networks.

Leminen, S. (2013). Coordination and participation in living lab networks. *Technology Innovation Management Review*, 3(11).

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

Leminen, S., & Westerlund, M. (2016). A framework for understanding the different research avenues of living labs. *International Journal of Technology Marketing*, 11(4), 399-420.

Leminen, S., & Westerlund, M. (2017). Categorization of innovation tools in living labs.

Leroux, I., & Berro, A. (2010). Négociation public/privé et coévolution stratégique dans un biocluster. *M@ n@ gement*, 13(1), 38-69.

Leroux, I., Muller, P., Plottu, B., & Widehem, C. (2014). Innovation ouverte et évolution des business models dans les pôles de compétitivité: le rôle des intermédiaires dans la création variétale végétale. *Revue d'économie industrielle*, (146), 115-151.

Leroy, A. (2019). *Economie politique des associations*, de Boeck Supérieur

Mulvenna, M., Bergvall-Kåreborn, B., Wallace, J., Galbraith, B., & Martin, S. (2010, October). Living labs as engagement models for innovation. In *eChallenges e-2010 Conference* (pp. 1-11). IEEE.

Nesti, G. (2018). Co-production for innovation: the urban living lab experience. *Policy and Society*, 37(3), 310-325.

Niitamo, V. P., Kulkki, S., Eriksson, M., & Hribernik, K. A. (2006, June). State-of-the-art and good practice in the field of living labs. In *2006 IEEE international technology management conference (ICE)* (pp. 1-8). IEEE.

Ollila, S., & Elmquist, M. (2011). Managing open innovation: Exploring challenges at the interfaces of an open innovation arena. *Creativity and Innovation Management*, 20(4), 273-283.

Prouteau, L., & Tchernonog, V. (2017). Evolutions et transformations des financements publics des associations. *Revue française d'administration publique*, (3), 531-542.

Rits, O., Schuurman, D., & Ballon, P. (2015). Exploring the benefits of integrating business model research within living lab projects. *Technology Innovation Management Review*, 5(12), 19-27.

Saebi, T., & Foss, N. J. (2015). Business models for open innovation: Matching heterogeneous open innovation strategies with business model dimensions. *European Management Journal*, 33(3), 201-213.

Santos, J., Spector, B., & Van der Heyden, L. (2009). Toward a theory of business model innovation within incumbent firms. INSEAD, Fontainebleau, France.

Schaffers, H., & Turkama, P. (2012). Living Labs for cross-border systemic innovation. *Technology Innovation Management Review*, 2(9).

Schuurman, D. (2015). Bridging the gap between Open and User Innovation?: exploring the value of Living Labs as a means to structure user contribution and manage distributed innovation (Doctoral dissertation, Ghent University).

Schuurman, D., Baccarne, B., De Marez, L., & Mechant, P. (2012). Smart ideas for smart cities: investigating crowdsourcing for generating and selecting ideas for ICT innovation in a city context. *Journal of theoretical and applied electronic commerce research*, 7(3), 49-62.

Schuurman, D., De Marez, L., & Ballon, P. (2016). The impact of living lab methodology on open innovation contributions and outcomes. *Technology Innovation Management Review*, 6(1).

Ståhlbröst, A. (2012). A set of key-principles to assess the impact of living labs. *International Journal of Product Development*, 17(1-2), 60-75.

Teece, D. J. (2010). Business models, business strategy and innovation. *Long range planning*, 43(2-3), 172-194.

Veeckman, C., Schuurman, D., Leminen, S., & Westerlund, M. (2013). Linking living lab characteristics and their outcomes: Towards a conceptual framework. *Technology Innovation Management Review*, 3(12).

Verstraete, T., & Jouison-Laffitte, E. (2011). A conventionalist theory of the business model in the context of business creation for understanding organizational impetus. *Management international/International Management/Gestión Internacional*, 15(2), 109-124.

West, J., & Bogers, M. (2014). Leveraging external sources of innovation: a review of research on open innovation. *Journal of product innovation management*, 31(4), 814-831.

Zott, C., & Amit, R. (2008). The fit between product market strategy and business model: Implications for firm performance. *Strategic management journal*, 29(1), 1-26.

Zott, C., Amit, R., & Massa, L. (2011). The business model: recent developments and future research. *Journal of management*, 37(4), 1019-1042.