

# A Sector-Selection Methodology for Living Labs Implementation

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## ABSTRACT

Creative Wallonia is a framework program that puts creativity and innovation at the heart of the redevelopment of Wallonia. In the context of Creative Wallonia, the Walloon government has decided to study the implementation of Living Lab pilot projects in Wallonia. The initiators required to identify two sectors in which the pilot phase could be addressed and conducted. This paper is dedicated to the sector selection methodology that was developed for the implementation of the Walloon Living Lab pilot projects. The paper is organized in three sections. In the first section we search for the criteria that could be used to select appropriate sectors. In the second section we present the developed methodology and the selection grid based on criteria. In the third section we discuss the grid and the results after application to the Walloon call for pilot projects. The contribution of the research consists in a methodology that allows to objectivize the choice of sectors that will be applied to the future Living Lab projects. Finally, a preliminary feedback about the living labs implementation is discussed.

## Keywords

living labs, co-creation, methodology, public policy, economic development, creative wallonia, belgium.

## 1. INTRODUCTION

Wallonia is one of the three regions in the federal state of Belgium based on a geographic division (Brussels, Flanders, Wallonia). It has evolved towards wide autonomy in the economic and educational field. The Walloon region knew a glorious industrial past that influenced the regional innovation policy (e.g. clusters and competitiveness poles policies). The launch of Creative Wallonia framework program marked a turning point in the Research, Development and Innovation policy of the region that took account of the fact that innovation is not only based on new technologies (Nelly, 2014). Creative Wallonia ([www.creativewallonia.be](http://www.creativewallonia.be)) is a framework program that puts

creativity and innovation at the heart of the redevelopment project of Wallonia. Creativity is included in a strategy to restructure, strengthen and modernize the local economy. The program posits that a more creative territory and citizens will lead to more innovative corporates and the creation of jobs. The initiative is driven by Minister Jean-Claude Marcourt, in charge of the Walloon economy. Creative Wallonia supports various projects in the areas of the support for entrepreneurs (e.g., awareness, training or funding), collaborative spaces (e.g., CoWallonia), design (e.g., Wallonie Design) or prototyping (e.g., (e.g Boost'up and Prototyping). The last major initiative from Creative Wallonia is called Creative Hubs. The latter are organizational platforms focused on the transformation of the traditional economy into creative economy through the development of the capacity of the actors by promoting the open innovation, the transdisciplinary hybridization and the collaborative intelligence ([www.creativewallonia.be](http://www.creativewallonia.be)).

In the context of Creative Wallonia, the Walloon government has decided to study the implementation of Living Lab pilot projects. The study and the coordination of those projects were entrusted to the Centre of Excellence in Information and Communication Technologies ([www.cetic.be](http://www.cetic.be)) research center. A Living Lab *"is a user-centric innovation milieu built on every-day practice and research, with an approach that facilitates user influence in open and distributed innovation processes engaging all relevant partners in real-life contexts, aiming to create sustainable values"* (Bergvall-Kåreborn *et al.*, 2009b). The Living Lab is a laboratory for open innovation. It puts the user at the heart of the innovation process. It brings new opportunities for companies to design and develop innovative products or services that meet the users needs and expectations. The Living Lab allows the creation of new sources of value by a new innovation system where users and citizens are no longer only consumers but also actors and designers. For public managers, the establishment of Living Labs should strengthen the dynamics of open innovation that has been implemented in Wallonia with the Marshall Plan, the competitiveness clusters, the clusters, the Creative Wallonia program, etc.

From a practical standpoint, the Living Lab approach will be put into practice by the establishment of the first two pilot projects. The selected sectors must be promising for Wallonia and suited to the implementation of Living Labs that stay within a reasonable budget. The development of business models in pilot stage should allow to establish and implement an innovative, practical, sustainable and efficient model of Living Lab at a later stage, when considering to broaden the initiative to a second set of key sectors or thematic on which Wallonia is able to capitalize. Hence a first study was already conducted by partners to identify

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business models allowing the Living Labs to be financially viable after the public funding period.

Creative Wallonia therefore appointed CETIC to identify two sectors for the pilot stage of Living Labs implementation. That paper is dedicated to the sector selection methodology that was developed for the implementation of Living Labs pilot projects in Wallonia. The paper is organized in three sections. In the first section we search for the criteria that could be used to select appropriate sectors. In the second section we present the developed methodology and the selection grid, based on criteria. In the third section we discuss the grid and the results after application to the Walloon call for pilot projects.

## 2. BACKGROUND

That section presents the different assumptions and principles underlying the sector selection process.

### 2.1 Co-creation

Kambil *et al.* (1999) defined the co-creation as “*a new dynamic to the producer/customer relationship by engaging customers directly in the production or distribution of value*”. On a methodological point of view, co-creative projects can be implemented on the basis of several existing theoretical frameworks: lead users, users toolkits for innovation, open source, open innovation and open source innovation, action research, participatory design, operation of Fab Labs, etc. Refer to Almirall *et al.*, 2009; Chesbrough, 2006; Fitzgerald, 2006; Penin, 2012; Von Hippel, 1986; Von Hippel, 2001. Many authors discuss the relationships between those different theoretical frameworks and Living Labs. For example: open innovation and Living Labs (Chatzimichailidou *et al.*, 2011.), Fab Labs and Living Labs (Song *et al.*, 2009), lead users and Living Labs (Baltic and Gard, 2010) or Participatory Design and Living Labs (Wolkerstorfer *et al.*, 2009). Pallot *et al.* (2010) offer a domain landscape of Living Labs that articulates various existing methods for involving users.

The Living Labs implement an activity of co-creation between technology providers, product developers and users in order to make needs and solutions emerge. A Living Lab is not only a test bench technology. The user can play the role of stakeholder, co-creator, co-tester or adopter (Tang and Hamalainen, 2012). He can thus help to construct a shared vision, contribute to the development of prototypes, participate to evaluations and test innovative products or services from other collaborating Living Labs. Compared to other co-creation methods, the Living Labs are characterized by the strong engagement and the empowerment of users (Bergvall-Kareborn *et al.*, 2009a; Mulder *et al.*, 2008; Mulvenna & Martin, 2013; Niitamo *et al.*, 2006). Moreover the Living Labs implement the co-creation practices on a large scale, and often unite more than 1000 users (Mulvenna and Martin, 2013).

### 2.2 Users Selection

The selection of co-creators is highlighted as a key issue by Kambil *et al.* (1999), because “*not all customers will be good co-creators*”. The known documented cases of Living Labs show different goals. Hence, in some cases, the Living Labs are oriented towards organizations and experts / professional users. In other cases, they are more opened and also gather naive users.

The lead users can be preferred in Living Labs for the implementation of co-innovation initiatives (Schuurman *et al.*, 2009). The lead users go beyond the simple interest for novelty (Von Hippel, 1986). They face a lack of solution and innovate by

themselves. They are often the source of new concepts and prototypes. They are also able to give an informed opinion about disruptive innovations.

Whatever the users profile is, the projects management within the Living Labs must accommodate the users motivations. They seem particularly sensitive to the dimensions of fun, learning and discovery of new technologies (Stahlbrost and Bergvall-Kareborn, 2011).

### 2.3 Turbulent or Emerging Markets

The Living Labs are rather designed for emerging markets, where the technologies are available (and validated) but have not yet been successfully placed on the market (Niitamo *et al.*, 2006). The availability of state of the art technology is considered as a key issue for the success of Living Labs (Niitamo *et al.*, 2006). A particular focus is placed on Information and Communication Technologies (ICT).

The interest for Living Labs seems important when the information relative to the domain is sticky: “*the stickiness of a given unit of information in a given instance as the incremental expenditure required to transfer that unit of information to a specified locus in a form usable by a given information seeker*” (Von Hippel, 1994). We can bring the concept of “sticky information” closer to that one of “tacit knowledge”, i.e. “*valuable and highly subjective insights and intuitions that are difficult to capture and share because people carry them in their heads*” (Nonaka, 2007). The need to transfer information and crystallize knowledge can be solved by environments such as Living Labs that foster interactions between people.

We will therefore not focus on mature markets but go to emerging and turbulent markets in which the actors are fragmented and the knowledge is diffuse. The Living Labs help to cross the innovation chasm and reduce the risk of placing products or services on the market through an early involvement of users (Almirall and Wareham, 2009; Tang and Hamalainen, 2012).

### 2.4 Business Model

The Living Lab business models are still in construction and, in particular, the sustainable funding issue is often pending. Mulvenna and Martin (2013) conducted a study showing that funding is a problem for more than eight out of ten Living Labs. The funding of Living Labs is largely based on public structures (nearly 50%), with additional funding from universities and private organizations (less than 15% in both cases). The funding gap is also considered a major threat by Schuurman *et al.* (2009).

The private sector involvement in the development of Living Labs should be developed in Public Private Partnerships in order to ensure the sustainability of the structure. Crowdfunding also offers the possibility of additional fundings. It presents the advantage of the involvement of consumers before the launch of new products or services.

The use of tools for the protection of intellectual property is possible in a Living Lab but should not oppose the experiments of technologies or the interactions around the prototypes or new products. The openness must stay a key value in the Living Labs and is essential “*to gather a multitude of perspectives that might lead to faster and more successful development, new ideas and unexpected business openings in markets*” (Bergvall-Kareborn *et al.*, 2009b). The Intellectual Property Rights (IPR) can also be an outcome of the Living Labs, with new products/services and knowledge (Mulder *et al.*, 2008). Baltés and Gard (2010) suggest

Living Labs can be interesting intermediary environments to succeed the transition between research (that is associated to IPR) and innovation (that is associated to market).

## 2.5 Territorial Anchoring

The Living Labs primarily operate at a regional level (Mulvenna and Martin, 2013). Hence the scope of their activity is usually regional. Many Living Labs grow in a niche. However, transnational activities (and collaboration between Living Labs) are fostered by the support of the Commission and the ENoLL network ([www.openlivinglabs.eu](http://www.openlivinglabs.eu)). The study of existing living labs reveals a wide variety of activity, sometimes with a weak specialization.

Living Labs can start locally and, after an initial start-up phase, try to grow by increasing their ability to manage new projects and bringing more partners and end-users. It may also aim at stimulating entrepreneurship or, on a larger scale, the clustering effects. In Wallonia, the Living Labs installation must deal with existing collaborative infrastructures (i.e. co-working spaces, Fab Labs, competitiveness clusters or clusters) and strengthen the complementarities.

## 2.6 Innovation public policies

The living labs are part of the regional innovation system that describes and stimulates the arrangements among universities, industries and governmental agencies. Triple Helix is a common model to describe regional innovation system. It implies complex dynamics “composed of subdynamics like market forces, political power, institutional control, social movements, technological trajectories and regimes” (Etzkowitz *et al.*, 2000). The living labs policies may be viewed as an extension of Triple Helix model, involving state (e.g. Directorate General of Research and Technology DG06 and Creative Wallonia framework), academia (e.g. UMONS, UCL or ULg) and industry (e.g. competitive clusters) but also users. In the context of “creative cities”, the living labs may also be viewed as “middleground” making the link between “underground” (i.e. creative people, groups and communities) and “upperground” (i.e. creative firms, networks of firms, clusters and cultural organizations) (Simon, 2009).

## 3. DEVELOPED METHODOLOGY

The methodology works in two steps. The first step consists in identifying potential sectors. The second step consists in comparing those potential sectors with the selection grid.

### 3.1 Identification of Potential Fields

Some criteria may be used to identify niche markets and promising sectors that are convenient to develop Living Lab initiatives.

In practice, the approach is divided in two steps. The first step consists in identifying existing sources that contain useful information for the sectors identification. The second step consists in recording the potential sectors on the basis of the identified information sources. We highlighted eight items that are relevant for the sector listing:

- the trends in the ICT sector,
- the successful sectors in foreign countries,
- the pre-existing co-creation places,
- the unifying local projects,
- the key sectors identified in existing public reports,

- the key sectors in Wallonia,
- the social issues,
- the successful initiatives of crowdfunding.

Those items should lead to a kind of trade-off between top-down approaches that are inspired by international initiatives and more bottom-up approaches that are build on local initiatives.

### 3.2 Selection Grid

The evaluation of fields and their comparison rely on a set of criteria that are divided into three different key aspects: economic criteria, domain criteria and catalysers criteria (see Table 1). The economic criteria are used to assess the economic potential of the projects that could be developed in the Living Labs. The domain criteria are used to assess the interest to develop Living Labs (rather than other types of innovative environments) in the considered sector. The catalysers criteria are used to assess the sector potential in terms of existing communities and practices. Each criteria can be divided into sub-criteria. A weighting of the criteria ( $w_i$ ) and sub-criteria ( $w_{ij}$ ) was determined in order to conduct the assessment of sectors that are deemed of interest. The weighting can be tuned in function of the goals and the vision of the Living Labs sponsors.

**Table 1. Criteria used to compare and select sectors and themes.**

Criteria	Score	Justification
<b>1. Economy</b>	$w_1$	Score for criteria (#).
<i>1.1. Economic potential</i>	$w_{11}$	Score for the sub-criteria (#).
(a) Identified technological trend	Yes / No	The interest for the topic is strengthened by an identified technological trend.
(b) Identified societal issue	Yes / No	The topic may help solve societal challenges.
(c) Fragmented value chain	Yes / No	The actors in the sector are fragmented and may benefit on Living Labs spaces.
(d) Identified business models	Yes / No	Some sustainable business models are identified in the sector.
(e) Perennity beyond incubation	Yes / No	The projects that would be developed can move beyond the incubation phase.
(f) Potential for exportations	Yes / No	The projects that would develop open opportunities for exportations.
<i>1.2. Funding needs - Short term opportunities</i>	$w_{12}$	Score for the sub-criteria (#).
<b>2. Domain</b>	$w_2$	Score for the criteria (#).
<i>2.1. Immature and emerging sector</i>	$w_{21}$	Score for the sub-criteria (#).
(a) Existence of prototypes	Yes / No	The technologies work but do not reach commercial maturity.
(b) Need for	Yes	The usage modes (usage

Criteria	Score	Justification
technology and design validation	/ No	scenarios, ergonomics,...) of the technology must be validated in real situation.
(c) Existence of standards to discriminate	Yes / No	Several industrial standards compete and must be discriminated.
<i>2.2. Domain complexity</i>	w <sub>22</sub>	Score for the sub-criteria (#)
(a) Multidisciplinarity	Yes / No	The Living Labs can gather various competences and people.
(b) Stickiness of information	Yes / No	The Living Labs can simplify the capture of sticky information and tacit knowledge.
(c) Difficulties for commercial launch	Yes / No	The technologies were embedded in several commercial products but the latter doesn't encounter commercial success.
<i>2.3. Interest for users</i>	w <sub>23</sub>	Score for the sub-criteria (#).
<i>2.4. Opportunities for collaboration</i>	w <sub>24</sub>	Score for the sub-criteria (#).
<u>3. Catalysers</u>	w <sub>3</sub>	Score for the criteria (#).
<i>3.1. Pre-existence of thematic local ecosystem</i>	w <sub>31</sub>	Score for the sub-criteria (#).
(a) Citizens, naive users or lead users	Yes / No	Communities of users are identified.
(b) Companies	Yes / No	Companies are identified.
(c) Researchers	Yes / No	Researchers are identified (feed with new technologies, concepts and methodologies).
(d) Networks	Yes / No	Users, companies and researchers can already meet because of existing networks.
<i>3.2. Support from public and private partners</i>	w <sub>32</sub>	Score for the sub-criteria (#).
<i>3.3. Pre-existence of openness</i>	w <sub>33</sub>	Score for the sub-criteria (#).
(a) Open innovation practices	Yes / No	The sector already benefits on some open innovation practices.
(b) Structures for collaborative work	Yes / No	Structures for collaborative work are pre-existing.
(c) Use of hybrid or open source licences	Yes / No	The actors in the sector used to rely on hybrid and open source licenses.
<b>TOTAL</b>		Total Score.

## 4. RESULTS

Some tools were developed in order to objectivize the choice of two sectors in which the future Living Lab pilot projects will be implemented.

The first tool allows to structure and record information sources. It facilitates the selection of niche markets and promising sectors that are convenient to develop Living Labs initiatives (see Table 2). The criteria refer to the eight categories identified in 3.1. section.

**Table 2. Information sources used to identify niche markets and promising sectors.**

Criteria	Information Sources
Trends	Gartner Hype Cycle publications, reports from professional associations such as Syntec or Agoria,...
Co-creation places	Inventories of collaborative spaces or events such as coworking spaces, Fab Labs, hackerspaces and hackatons.
Unifying local projects	Major local projects such as Mons 2015 ( <a href="http://www.mons2015.eu">www.mons2015.eu</a> ) and Liège Together ( <a href="http://www.liegetogether.be">www.liegetogether.be</a> - following the missed candidature to International Exhibition).
Key sectors (reports)	Reports from European Union or Commission (e.g. Horizon 2020, ICT for Societal Change,...), OECD reports, Capron (expert) reports,...
Key sectors (existing)	Competitiveness clusters, clusters, places for innovative firms such as incubators; research institutes, units and groups;...
Social issues	Saving energy and raw materials, ageing population,...
Successful sectors	Feedback about Living Labs installed in Sweden, Finland, France, Canada or Spain,... Refer to ENoLL reports and scientific publications.
Crowdfunded projects	Projects documented on crowdfunding platforms such as FundedByMe in Sweden and Finland or Kickstarter in USA.

The second tool allows to structure and record the niche markets and promising sectors that would be suitable for the Living Labs emergence. Each item is accompanied by a short justification (see Table 3). In the full table, the justifications are widely described and are classified in the eight categories identified in 3.1. section.

**Table 3. Identified niche markets and promising sectors.**

Promising Sectors	Justifications (extract)
Culture	Local "Mons 2015" project (European capital of culture). Covered by several Living Lab. Linked to tourism and mobility.
Education	Key point in AWT (Agence Wallonne des Télécommunications) barometer and

Promising Sectors	Justifications (extract)
	Master Plan TIC (local development agenda). Low technology supply.
eGovernment	Key point in local technology offer. Fragmented sector. Interest for citizens. Several hackathons in the open data field.
Energy	Key point in european report “ICT for Societal Challenge (Digital Agenda for Europe)”. Covered by Liege Metropole (local development program).
Mobility	Often covered by Living Labs (mobile city, mobile TV, pedestrian GPS,...). Mobile technologies well represented in Gartner Hype Cycle. Identified as important trend by AWT. Technological and scientific backwardness in Wallonia.
Health	Often covered by Living Labs. Supported by ENoLL. Key point in European report “ICT for Societal Challenge (Digital Agenda for Europe)”. Linked to demographic change. Home health monitoring highlighted in Gartner Hype Cycle.
Open domain	Proposed by a partner. To be opened for innovative SMEs. Inspired by foreign open work environment (e.g. Open Design City Berlin). Coherent with the frequent multi-thematic nature of Living Labs.

The third tool refers to the implementation of the selection grid (see Table 1). It allows to compare the promising sectors, with a set of weighted criteria, and rank the alternatives (see Table 4).

**Table 4. Final score (evaluation) for sectors (application of selection grid, refer to Table 1).**

Promising sector	Score
Culture	18
Education	18
eGovernment	12
Energy	13
Mobility	15
Health	21
Open Domain	19

The methodology allowed to objectivize the selection of two thematics for the launch of two Living Lab pilot projects: the Health and the Open domain.

## 5. DISCUSSION AND FUTURE WORK

*Exploitation of the methodology* - The research contribute to the Living Labs community by making available a methodology that allows the identification and the selection of sectors that are locally suitable for the emergence of Living Labs. The approach is divided in four steps: (1) the identification of information sources

that help the search for promising sectors, (2) the identification of promising sectors, (3) the evaluation of the identified promising sectors, and (4) the final selection. The evaluation tool allows to objectivize the choice of a specific sector. It allows the discussion between experts and public decision-makers. The final selection represents a trade-off between intermediate scores and political goals (e.g. history, strategic objectives, agenda, trades off between regions and interrelations between projects).

On the basis of the sectors identified with this methodology, the call for Living Lab pilot projects was launched in April 2014. The selected projects, i.e the SGL (Smart Gastronomy Lab) and the WELL (Wallonia eHealth Living Lab), were started in 2015. After a year of operation, a first evaluation of the projects established on the basis of the sector-selection methodology can be presented. It is based on various internal documents (e.g. SGL reporting, WELL reporting and Creative Wallonia strategic note).

*Confusion between concepts* - In the context of Creative Wallonia framework program, a set of collaborative environments were settled down. They are generically known as “creative hotspots”; they covered several innovation tool, i.e. co-working spaces, fablabs, living labs and creative hubs. The latter plays an integrative role. Though the tools and their complementarities are well understood by their stakeholders, it appears that the role of each tool is not well understood by the public and businesses. The missions, the audiences, the governance, the methodologies and the business models of each type of creative hotspot must be clarified in order to match the tools with their targets.

*Issues with current legislations* - Among the objectives fixed by Walloon government, the living labs pilots must develop a profitable business model or, at least, lead to a significant self-financing rate. However they are subject to the legislation on state aids, which frame very closely the conditions to receive income (the goal is to avoid unfair competitions). The use of external service providers (e.g. for methodological support to pilot projects) must deal with public procurement procedures, which significantly weighs down the contractual relationships with providers and harms the agility necessary for this type of project. Beyond legislations, the contractual aspects (e.g. agreements between institutional players) appear as an important factor of time due to procedural or financial details (e.g. fees levied on any income in some universities, specific arrangements for the application of VAT, amortization periods of assets compared to the duration of subsidization or ineligibility of certain legal structures to some public subsidies) conducting to extended negotiations. Finally, the regional vocation of living labs sometimes opposes the sub-regional or local mission historically imposed on some of their partners.

*Issues with business models implementations* - Several income sources have been identified, e.g. privatization of collaborative workshops for remuneration, social innovation funding by crowdfunding, production and resale of intellectual property, public funding (e.g., FEDER, FIRST or H2020) by project or equity interests in spin-offs. However, it appears that it is difficult to charge for collaborative workshops, particularly with SMEs. The offers for innovation support services tend to be more oriented towards large industrial groups with more resources. Moreover the identified issues with current legislations and institutional practices result in practices inherited from public sector and constraints to entrepreneurial dynamic.

*Relevance of selected sectors* - The SGL living lab benefit on co-creative ecosystem provided by TRAKK creative hub and KIKK

teams (international festival devoted to creativity in digital culture). Moreover, the gastronomy is attractive for the public and allows to bring the users to other creative activities (open domain). The food industry appears as a more traditional sector but interested in opportunities for innovation offered by the SGL living lab. Belgium also hosts industry recognized in that field (e.g. chocolate), which facilitates the creation of business partnerships. For his part, the WELL has a large network of institutional partners facilitating the link with end users (close to 500 people have participated in the living lab activities).

*Perspectives* - Several issues are being processed and must lead to additional publications (e.g. Viseur, 2016). First, the intellectual property appears as a recurring concern of living labs, caught between traditional practices that do not encourage collaboration (e.g. restrictive agreements or patenting) and more open practices asking questions in terms of revenue capture (e.g. domain public or open source). Second, the business models are not yet validated and require the establishment of an attractive offer of services for institutional and private organizations. Third, the community management and, more particularly, the composition of creative workshops requires the implementation of specific tools complementary to existing tools (e.g. CRM or mailing lists). Finally, a comprehensive inventory of barriers (and efficient workarounds) to the establishment of living labs would be of interest for future managers of this type of space.

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