

The Living Labs at the test of user-centered innovation - Proposal of a methodological framework

Laura Draetta, Fabien Labarthe

*Institut TELECOM/Télecom Paristech, Route des Crêtes 2229, 06560 Sophia Antipolis, France,
{laura.draetta, fabien.labarthe} @telecom-paristech.fr*

Abstract

This paper builds on the experience of PACA Labs, a public program launched by the Regional Council of Provence-Alpes-Cote d'Azur (France) to foster digital innovation in territorial communities of the region. This program aims to support projects involving experiments with new uses of information and communication technologies adopting a user-centered approach. Presenting characteristics of a large Regional “meta-living lab”, the program faces methodological issues concerning the involvement of users in the innovation process and evaluation of their contribution. The purpose of the paper is to propose a methodological framework to identify issues and provide some rational answers about the identification of users, the choice of forms of assessment, the good methods in terms of data collection and the types of skills likely to implement them. We believe, in fact, that as long as the concept of Living Lab will not impose limiting conditions for its implementation, this concept is condemned to remain in the state of declaration of intent whose formulation is only rhetoric.

Keywords

Living Lab, user-centered innovation, usability, methodological framework, social science

The concept of “Living Lab” today tends to impose itself in new forms of public policies to support innovation. However the content and contours of this concept remain difficult to define, especially because institutions or structures that reclaim them, present much diversity. The only two principles that seem to unite Living Labs is the common reference to “user-centered” approaches and the willingness to involve “communities of users” in the innovation process so that it can be “user-centered” or “user-driven”. Here again the methodologies are different, while the concept of user can, in turn, cover many situations.

This paper is derived from the experience carried out by the authors as part of PACA Labs assistance. PACA Labs is a public program led by the Regional Council of Provence-Alpes-Cote d'Azur (France), with the support of the European Regional Development Fund (ERDF), to foster digital innovation in territorial communities of the region. This program aims to support projects involving experiments with new uses of information and communication technologies (ICT) adopting a user-centered approach. Presenting characteristics of a large regional « “meta-living lab”, the program faces methodological issues concerning the involvement of users in the innovation process and evaluation of their contribution.

The purpose of this paper is to propose a methodological framework for the implementation of “user-centered” approaches within the Living Labs. For this, we support the idea that this is a complex process that requires establishment of a series of mediations. Indeed, it is not enough to declare the need “put the user at the center” or “involve communities of users” so that these situations effectively occur; it is necessary to organize this inference, which means to perform a number of preliminary actions: (1) identify “good” users, (2) choose “good” ratings, (3) use the “right” methods and, if necessary, (4) rely on “good” skills.

For this reason, the methodological framework that we propose encourages close collaboration between actors in innovation and skills from the social sciences (sociology, ethnology/anthropology, communication sciences...) for **analysis of use**, but also with additional

skills (human sciences as psychology and ergonomics, engineering, design, marketing...) that can ensure the integration with this analysis in the design and validation of prototypes. In this sense, the scope is sufficiently wide to allow each stage of the innovation process, as it is in phase 1 *design* or phase 2 *validation*, an effective consideration of the views or practices of users during the development of the projects.

Before going into details about each of these different points, it's worthwhile to quickly review the way the analysis of use will be considered by project leaders, in particular for those that originate from the economy. In many cases, these types of experiments are simply treated as pre-deployments which are designed to accelerate the positioning on the market, whereas approaches "user-centered" aim more to reduce uncertainties.

There is **an issue, or even a challenge, to which each Living Lab is required to address**, this consists of convincing actors of innovation of the relevance of "user-centered approaches" to clarify the logic that govern the use of products or services they develop. This implies first to communicate the objective of reducing uncertainty, rather than on the acceleration of the position in the market. Secondly, to present the analysis supported by Living Labs that is no longer a *linear* or *de-contextualized* process, but to insist on their *iterative* size which is similar to the movement of a vortex (Akrich, Callon, Latour, 1988b).

The interest in conceptualising a nonlinear innovation model resides in the fact of anticipating the design and validation phases, penalties and judgments that can then occur when positioning on the market - even if it is decided, *in the end*, not to take this into consideration (Ibid). The first phase of the "user-centered" approach consists then on identifying users who we consider that the evaluation is important for the improvement of the prototype.

1 Identify and recruit "good" users

How to identify the "good" user, who is best placed to guide the effort to improve the product in the sense that best fits the market? A first way to address this is to funnel each of the issues, performing elimination at each step (Figure 1).

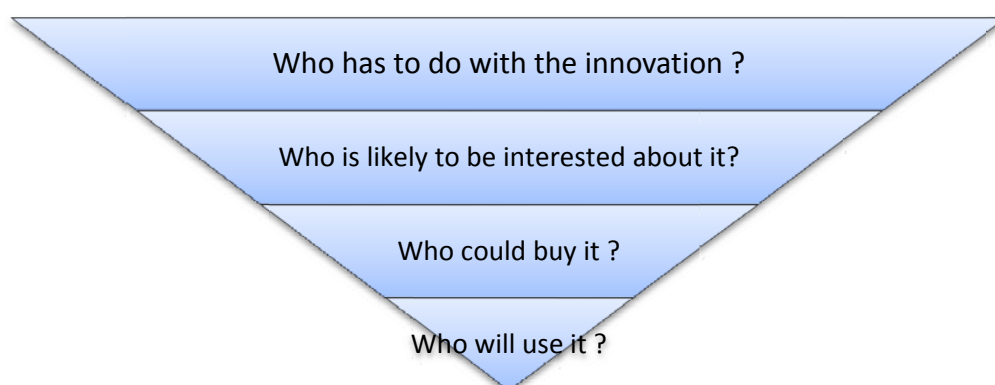


Figure 1: Define the community of users

In this approach, the first question concern all stake-holders involved in the project experimentation. The second one allows to pinpoint prescribers of the solution. The third question can target its potential buyers. Finally, the fourth question identifies the professional or public users, which will be the end users of the solution without necessarily be involved.

Thus, behind the "user", appear successively, the stake-holders, prescribers/professionals, clients/consumers and finally end-users. It is therefore possible that these entities overlap and merge, but not necessarily. It is the responsibility of the project leader to make the choice of the suitable community of users, according to what they wish to evaluate in the analysis of use. A

way to proceed towards this choice consists of identifying situations that interface between the different actors involved, and point those who present potential problems.

A second question that must be answered concerns the terms of enlistment of the community of users in the experiment. In fact, as we shall see, how it involves the user depends greatly on the type of evaluation criteria chosen and methods that we use. We can nevertheless distinguish two main modes of recruitment of users:

- A **“direct” method of recruiting**: is in general, how the actors of the “free” software world which took the position to leave “open” source code available to all users interested in tool, so that each of them can freely come, learn, exchange and/or transform characteristics. We may also collect information through a “suggestion box” left where the experimentation takes place, or enhancing this process by diffusing and animating “collaborative technologies” (cf. 3) online such as a blog, a discussion forum, a mailing list by mail or a site of social networking (*Facebook, Viadeo, Linked In or other Web 2.0 tools*). Although this recruitment can help gather valuable information on the “view” of users, the objective assessments of use (or “user-centered”), however, implies a more pro-active approach and selection of users.
- An **“indirect” method of recruiting**: unlike the previous one, this recruitment goes through a third party, either personal or institutional, as a mediator. It is possible in the first case, have recourse to informal methods of “good contacts” or “word of mouth”. These methods, defined as “networking” consist of asking to potential users to designate other users to form a chain. This method relies essentially on the mobilization of relational resources. As part of a collaborative project, it is possible to involve a partner to mobilize its employees, its users or customers. However, even if from the point of view of recruitment, the method is effective, it is not necessarily safe for the validity of assessments, in terms of neutrality of users, especially if they belong to the same community partner “recruiter”. As such, public institutions can be a good channel for recruitment of users, as they are, by their status, less engaged with the interests of project and because they have to manage the establishments who are already frequented by users (libraries, media, cultural spaces, but also have places of public access to the internet).

It should be noted that taking into account the perspective of the user cannot, however prevent the elusive nature of use. Indeed, the only certainty we have about the uses, is that people always divert the objects from their initial use. It is therefore necessary to prevent what Pascal Nicolas-Le Start called “tactical flexibility of uses” (2008), leading to iteratively “good” ratings. Doing so, the project sponsor may have to change the user community to which he originally predestined his product.

2 Choose the “good” evaluations

How to apply the “user centered” approaches to the diversity of projects likely to emerge within a Living Lab? Especially since these approaches may appear to their bearers as “misplaced” when, for example, in a B2B perspective, the users to which they are addressed are first of all organizations (companies, government) and not end-users (although these are ultimately the real users), or furthermore when the technology they develop have the characteristic of not requiring a user to allow their operation. For a certain number of these projects, in fact, we observe that the experimental procedure seeks to assess the reliability of “technical” products (sensors or terminals) to ensure they are well integrated into lifestyles or self appropriated by users.

To meet these challenges and this diversity, we can offer three kinds of evaluation use, depending on the type of information that are to be collected:

- * The first type - **assessment of the contexts of use** - is interested in the socio-professional characteristics of the users, as well as the economic and social context in which it is planned to integrate the use. In this sense, this type of assessment may be complementary to a market study, the study of product positioning and competition in a market; but it is the analysis of representation of different parts involved and/or positions of various opinion leaders in the controversies and debates that raises an innovation. It may also reflect, in a more circumscribed perspective, lifestyles and practices of ordinary consumers in their private or professional environment. The technologies and services are in fact included in contexts of use that will not be without consequences on patterns of **integration** and **ownership** of tools and products offered.
- * The second type - an **assessment of the meanings of use** - deepens the analysis on how people judge, in a context of use, a technology or service, examining more specifically how they represent the tools, features and the skills necessary to the use. This involves interest in both the semiotic characteristics of products and in the cognitive capabilities that users mobilize, or are likely to mobilize to seize it. The technologies and services in question have meanings of use that provoke different interpretations among users that allow for a variety of **adoption** methods by tools and offered products.
- * Finally, the third type - **assessment of situations of use** - can also integrate its analysis of the sense that users give to their uses, however it focuses more on the situations that give or will give, rise to the use. It aims therefore less at assessing the possibility for users to acquire a tool based on the context or characteristics, but it's more specific to how the users adapt to their needs depending on the situation. The technologies and services are in effect in situations of use of circumstances and contingencies that invite users to change their **adaptation** methods. The situation of use is different from the context of use, because it takes into account a different scale of analysis.

Once the finalities of the experimentation of use are decided (in function, of the type of evaluation considered), it is now advisable to use the good means to ensure they are reached.

3 Use the “good” methods

For nearly 30 years now, the discussions held in the *Computer Supported Cooperative Work (CSCW)* have tried to put users at the center of the design of ICT tools, creating “user-centered” approaches. These approaches have drawn heavily on the disciplines and methodologies from the Human and Social Sciences (HSS) to develop so-called “collaborative technologies”. Thus, these technologies have the particularity that they integrate the users “point of view” at the start of their process of development, according to the mode of inductive and understanding reasoning in force in the HSS.

Along with their developments, collaborative technologies have helped to clarify the importance of social contexts in use analysis. The works of CSCW have since tried to develop new methods to better understand the social dimension of activities. These methods have again relied on social science, and ethnography in particular, not only to develop collaborative technologies, but also to give rise to different forms of “quick and dirty” ethnographies may account for this dimension. We propose to distinguish four kinds¹:

- * **Collaborative Ethnography, for the identification of use scenarios**: it is a collaboration between an ethnographer and designer, to undertake joint prototypes and usage scenarios. The observation of events is in parallel with the design process to allow the evaluation of returns even within this process in progress. Discussions are well planned so that the ethnographer reports their observations to the designer, but also the designer directs the

¹ The following issue is based upon our own experience of use analysis. It's also the result of a synthesis of anglosaxon researches (cf. Hugues et alii. 1994 ; 1995 ; Blomberg et alii. 1993).

ethnographer's observations in light of the difficulties encountered. These “debriefing” sessions also assume a general knowledge of contexts of use.

- * **Evaluative Ethnography, for impact analysis:** observation on how technology affects a part of life, private or professional. This involves assessing whether the decisions taken earlier by the developer or designers support or not, the downstream integration of a technology or service into the daily practices and/or ownership users. It may well highlight errors of assessment relating directly to the prototype or, more indirectly, the context in which it plans to integrate the use. Finally, it can draw attention to how users adapt the device to their use situations. This is a macro-analytical approach.
- * **“Located” Ethnography, for analysis of the interaction (HMI, SIM)²:** Observation of activities that show technology or services on a restricted and well defined context. The experiment here is to leave available objects to use, and observe how they are mobilized and used in situations in the course of action. The goal is not only to observe the handling, but also everything that happens around, especially something that had not been formalized in the scenarios of use. This allows to understand all the circumstances and situational contingencies on which users are encouraged to adapt the technology and services they use. This is a micro-analytical approach.
- * **Quantitative Ethnography** (Passeron, Pedler 1999), **for records of use or utilisation:** observation of non-verbal acts, such as duration, rates of use of technological objects. The objective is to develop enough specific indicators to enable analysis of perception and forms of reference to objects or screens with a view to improving their design or ergonomics. This is a “positive” approach, like trace analysis, that can be expressed in statistical language.

Type of evaluation and objectives	Methods	Techniques of data collection
Evaluation of meaning of use <i>Adoption</i>	Collaborative Ethnography Quantitative Ethnography	Brain storming / paper board / paper prototype Eyes tracking / capteurs divers / trace analysis
Evaluation of situations of use <i>Adaptation</i>	Directed Interviews / Focus Group Evaluative Ethnography Located Ethnography	Audio recording Video of users in activity Observation in natural situation
Evaluation of usage contextes <i>Integration/Appropriation</i>	Archive research Statistic analysis Speeches analysis Semi-directed interviews Quick and dirt ethnography	State of the art of the documents and the studies Questionnaire/Survey/Infometry Audio recording Field diary/ Notes Taking / Photography

Table 1: Comparison in between use assessment tools with techniques and methods of data collection

² HMI : Human-Machine Interaction ; SIM : Social Interaction Mediated.

As we can now realize, each of these methods is intended to be mobilized in the evaluations of use we have identified above, according to information that we wish to obtain. In doing so, they also require technical data collection that match the methods used.

So if, the evaluations of use need methods and techniques of data collection, we will see now that they inevitably require skills not only to implement them but also to interpret data and translate them into useful information for the project leader.

4 To be based on the “good” competences

Refereeing to the laboratory HSS mobilizing methods and interpretive frameworks from its disciplines may be relevant to implement the types of evaluation use we have distinguished and all operations that underlie. Indeed, the techniques described above are generally part of the background of any sociologist, ethnologist, anthropologist..., even if they do not necessarily have the same purpose.

Indeed, there are a multitude of disciplines within the HSS, which are more or less appropriate depending on the type of assessment that is being considered, and it is therefore important that the innovation actors wishing to leverage skills in HSS in user analysis can make in a full knowledge of the facts an informed decision. It is therefore important in our perspective that the Living Labs could be able to raise these types of skills, to the extent – as we said – that “user centered” approaches are dependent on their methods.

It should be noted that it is the responsibility of the person in charge of the use analysis to implement the methods and techniques of data collection that would capture, in the most relevant manner for the project, the “point of view” of users involved and their logic of use. But it's also their job to know how to present the results of the analysis in a form that is easily assimilated by the project leader, or any other person (designer, developer) that will ultimately have the task of incorporate **evaluation feedback** into the design of prototypes.

Figure 2 shows all the steps and operations described above. Thus, depending on whether the project is in phase 1 Design or phase 2 Validation, different options in terms of use analysis are available. From Phase 1, which is to direct a design of a prototype, the project leader can rely, on one hand, on evaluations of significances of use (in order to test the adoption of future prototype by users), on the other, evaluate of context of use (in order to envisage a better integration of the future prototype in the range of the social activities for which it is intended *a priori*).

From phase 2, which is the time to experiment with a prototype already developed, the project leader can rely on one hand, on the use of situational assessments (to better adapt the prototype usage by the user scenarios) and, on the other, evaluate the context of use (in order to promote ownership of the prototype by users as part of their everyday lives).

The methodological framework has a double function: it allows to experience the mode of operation of the prototype at the start and the end of its design process (adoption, adaptation), while specifying the framework and places of practice before and after of its deployment (integration, ownership). It is the complementarity of these assessment phases that could formulate the dynamics of “user-centered” innovation as envisaged by a Living Lab.

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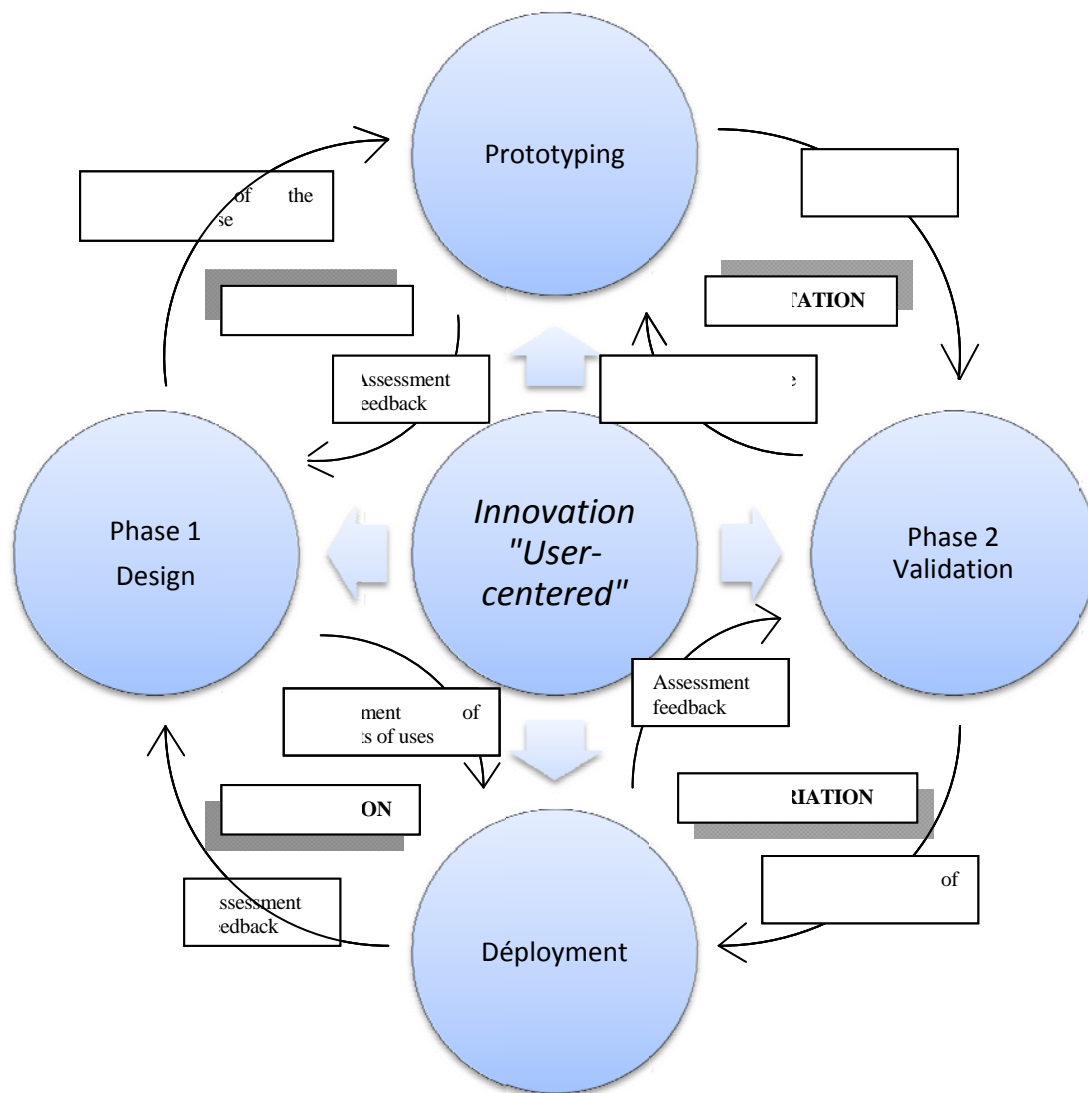


Figure 2: Representation of the innovation model “user-centered”

References

- Akrich M., Callon M., Latour B., (1988b), “A quoi tient le succès des innovations ? 2 : Le choix des porte-parole”, in *Gérer et comprendre, Annales des mines*, n°12, pp. 14-29.
- Blomberg J., Giacomo J., Mosher A., Swenton-Wall P., (1993), “Ethnographic field methods and their relation to design”, in Schuler D., Namioka A., *Participatory design : principles and practices*, London, Routledge, pp. 123-155.
- Gibson JJ. (1986), *The Ecological Approach to Visual Perception*, Lawrence Erlbaum, New Jersey.
- Hughes J., King V., Rodden T., Anderson H. (1994), “Moving Out from the Control Room: Ethnography in System Design”, Proceedings of the 1994 ACM conference on Computer supported cooperative work, pp. 429-439.
- Hughes J., Brien J., Rodden T., Rouncefed M., Sommerville I. (1995), “Presenting Ethnography in the requirements process”, Proceedings of the 2nd IEEE International Symposium on Requirements Engineering (RE’95), pp. 27-34
[<http://www.cs.st-andrews.ac.uk/~ifs/Research/Publications/Papers-PDF/1995-99/PresentingEthnoinREProcessRE95.pdf>].
- Nicolas-Le Strat P. (2008), “Micropolitique des usages”[<http://www.le-commun.fr/index.php?page=micropolitiques-des-usages>].
- Norman D. (1989), *The Design of Everyday Things*, Doubleday, New York.
- Passeron J-C., Pedler E. (1999), “Le temps donné au regard. Enquête sur la réception de la peinture“, in *Protée*, volume 17, n°2, pp. 93-116.