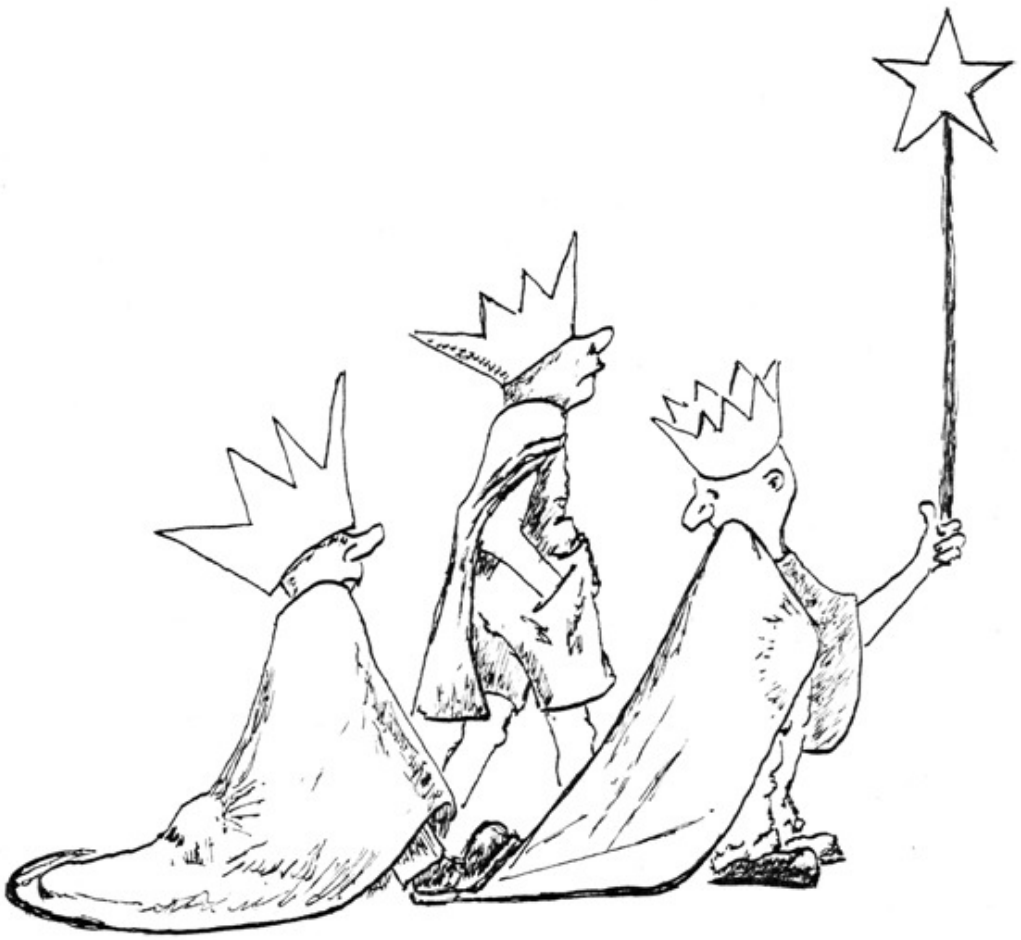
The return of the king ?

Living labs – a new case of user involvement in innovation



Master thesis

Science and innovation management
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"U mag een wens doen", zei de geest met een vriendelijk gezicht
"Ik lever wonderen op maat en ben zeer cliëntgericht"
"Dan wens ik honderd jaar te worden", zei Aladin toen maar
En meteen werd hij veranderd in een man van honderd jaar

– *Herman Finkers*

If a problem cannot be solved, enlarge it

– *attributed to Dwight D. Eisenhower*

Abstract

Although most firms have adopted a market-pull model of innovation, many incumbent companies still struggle to recognise and profit from emerging customer needs. To cope with this problem, living labs have begun to appear throughout Europe, following the example of the MIT Media lab, established in 1985, and making use of ethnographic and anthropological methods to identify (latent) consumer needs. These living labs use ethnography methods rather than surveys to identify consumer needs. The main question of this research is twofold: to analyse the assumptions, processes and methods of both independent and corporate living labs, and to subsequently evaluate the links between living labs (ethnographic) research and the traditional innovation processes that use living lab studies as input. Five living labs served as case studies in this research: the Copenhagen and Sølund living labs in Denmark, CASALA and the TRIL centre in Ireland, and the Autonom'Lab in Limoges (France). The data gathering consisted of interviews with living labs directors, ethnographers, and managers in new product development. Also, this research profited from direct observation at some of the living lab facilities.

The key factors of a good living lab project are (1) belief at the client side in the impact of users, and, following from that, equal dignity between users and firm actors and a certain level of flexibility on the product design; (2) the presence of a participant-side filter with good knowledge on the firm's needs and possibilities, and resources to enable the actors to do the creative effort on top of their daily jobs and lives; and (3) the availability of funding and the capacity of the actors involved to engage in a long-term process generating a considerable amount of data that is treated with a scientific attitude and not always leads to results that are useful to new business ventures. If the living lab movement is to persist, living lab organisations (consultancies) might want to strengthen their selection process based on the three criteria named above. It is also recommendable that living lab organisations accentuate that their unusual way of working (big amounts of data, from potential users not readily available to many firms) is likely to lead to an increased added value for the products thus conceived. For policy-makers, it is important to acknowledge that, albeit this possible competitive advantage, the fact that most living lab organisations only work for small and medium-sized enterprises, as well as the idea that interventions do not lead to successful products one-on-one, living lab organisations, for now, will still need government funding, for example in the form of innovation vouchers.

Synthèse

Bien que la plupart des entreprises aient adopté un modèle d'innovation qui part des attentes du marché, beaucoup d'organisations ont du mal à identifier et à profiter des besoins émergents. Face à ce problème, suivant l'exemple outre-Atlantique du MIT Media Lab, un réseau européen de laboratoires d'innovation ouverte (« Living labs ») a été créé. Dans ces laboratoires, des méthodes anthropologiques et ethnographiques sont utilisées afin d'identifier les besoins du consommateur. La question principale de cette recherche se pose en deux temps : (1) l'analyse des suppositions, des procédures et des méthodes des Living labs ; et (2) l'évaluation des liens entre les Living labs et les processus d'innovation. Cinq Living labs ont servi comme étude de cas dans cette recherche : les living labs de Copenhague et de Sølund au Danemark, CASALA et le TRIL Centre en Irlande, et l'Autonom'Lab à Limoges. La collecte des données consiste des entretiens avec des responsables et des chargés d'études, ainsi qu'avec des responsables de projet qui utilisent les études ethnographiques dans le développement des nouveaux produits. En plus, l'auteur a pu faire des observations aux aménagements mêmes de quelques Living labs.

Les facteurs clés d'un projet de living lab réussi sont (1) du côté de l'entreprise client, une conviction que les utilisateurs peuvent avoir un impact déterminant, et, par conséquence, le respect pour une égalité absolue de dignité et une certaine flexibilité au niveau de la conception ; (2) de la part des utilisateurs participants, la présence d'un acteur qui filtre la contribution des utilisateurs selon les besoins et les possibilités de l'entreprise, et des ressources suffisantes pour permettre l'effort de créativité en plus de leur quotidien ; et (3) le financement et la disposition des acteurs pour s'engager dans un projet de long terme qui produira une base de données considérable, qui se base sur une logique scientifique, et qui n'assure pas de résultat utile pour l'entreprise client. Si le mouvement Living lab se veut pérenne, les organisations living lab (effectivement des cabinets de conseil) devraient renforcer leur politique de sélection de projets, en s'inspirant sur les critères ci-dessus. En plus, il est recommandé de mettre en avant la plus-value générée par le travail de long terme et basé sur des données étendues issues des consommateurs pas toujours accessible pour l'entreprise. Pour les décideurs, il est important de noter que, malgré cet avantage concurrentiel, le fait que la plupart des organisations living lab ne travaillent que pour des entreprises de petite et de moyenne taille, et étant donné qu'une intervention n'aboutit pas toujours à un nouveau produit, les projets living lab auront, pour l'instant, besoin du financement, par exemple sous le forme des « bons d'innovation ».

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-Je représente une importante société européenne spécialisée dans la vente à domicile des choses que les gens n'ont pas, ce qui m'amène d'ailleurs tout naturellement à ma première question: qu'est-ce que vous n'avez pas?

A faster horse

For long, innovation scholars and policy-makers have been using a technology-push model of innovation, which was best summarised in the 1933 World Expo motto: "Science finds, industry applies, and man conforms" (Smits, 2002, p. 863). Nowadays, this model has been replaced by market-pull models, based on the assumption that an "accurate understanding of user needs [is] near-essential to the development of commercially successful new products" (Von Hippel, 1986, p. 791). There is, however, a major drawback to demand-led innovation processes: many innovations are so revolutionary, that potential users cannot imagine them; Priem et al. (2012, p. 362) refer to consumers having "bounded foreknowledge of their own needs". The most famous example comes from Steve Jobs who stated that if Henry Ford had asked his customers what they wanted, they would have asked for a faster horse (Morris, 2008).

In innovation processes, i.e. the activity of "combining (...) several different types of knowledge, capabilities, skills, and resources" in order to create competitive advantage (Fagerberg, 2005, p. 5), understanding user needs is one of the very few factors that scholars repeatedly and consistently find to be a crucial determinant of success (Hyysalo, 2009). Scholars like Christensen (1997; and Bower, 1996; and Raynor, 2003) have consistently repeated the difficulties of identifying user needs, especially those in emerging markets – the only place where disruptive technologies are saleable from the outset. Companies that are too preoccupied by their current markets are likely to miss the wave of disruptive technology, because of their focus on developing incremental innovations (Danneels, 2003). This focus "prevents the firm to remain flexible in a dynamic market" (Fredberg & Piller, 2011, p. 472), where user needs are tacit, changing, or both. New markets involve emerging needs that can be highly different for different types of users, and even contradictory (Pinch & Bijker, 1984; Priem et al., 2012). This implicates that "the importance of customer input [increases] with technological newness" (Hopkins et al., 2011, p. 46).

Over the years, innovation scholars and managers alike have treated "the challenge (…) of consumer-oriented strategy (…) in contexts of disruptive innovation" (Priem et al., 2012, p. 352) in different ways. For sure, the most radical approach is not listening to customers and using a technology-push model of disruptive innovation (Martin, 1995). Empirical evidence has shown however, that this approach does not always lead to success (Murray, 2005), based on the above mentioned reasons: technology-based innovation relies on the assumption "that customers' needs are certain and that an innovation's value creation is a given" (Priem et al., 2012, p. 351), which is virtually only the case for an incremental innovation, elegantly defined by Ethiraj et al. (2012, p. 139) as "an innovation that preserves the market for the existing product". Another, more famous approach, is based on the involvement of lead users. A lead user strategy, however, is "particularly important for the development of complex products", with lead users that are "very demanding, such as the military seeking to develop stealth aircraft", and bears the difficulty of "identifying lead users ex ante when success is defined ex post" (Hopkins et al., 2011, p. 46).

Indeed, firms that operate in highly standardised, low-margin industries, looking for emerging needs, will require other ways of market exploration. Govindarajan et al. (2011) and Day (1999) suggest the use of weak ties when searching for tacit needs. Referring to Granovetter (1973), Powell and Grodal (2005, p. 61) state that "weak ties introduce novelty in the form of different ideas or tastes". In the same way, structural holes, defined as "gaps in information flows between alters linked to the same ego but not linked to each other" (Ahuja, 2000, p. 431), provide "speedy access to diverse information" (p. 451). Day (1999, p. 13) argues that managers "should be watching for the emergence of unserved segments with different requirements". Acknowledging

this necessity, Danneels (2003, p. 573) counters that firms have a tendency to tighten the links to their current customers, and that "loose coupling (…) requires deliberate effort".

Several ways of loose coupling have been suggested since then: Danneels (2003) insists on the creation of separate organisational units, to prevent alienation of existing customers. Other market research methods relate to the art of ethnography, which involves "the description and study of human cultures" but is used by firms "as a new form of consumer research that is useful in uncovering and identifying emerging and unmet customer needs" (Sanders, 2002). The best known example of this type of market research is the filming of "office workers struggling to operate their Xerox machine" in the 1970s (Suchman, 1987 in Rosenthal & Capper, 2006, p. 216). Recently, living labs have emerged as a way to use ethnography in the innovation process of small and medium-sized enterprises. These facilities find their roots in the MIT Media Lab, whose mission is to apply "unorthodox research approaches for envisioning the impact of emerging technologies on everyday life" (MIT, 2011). Dutilleul et al. (2010, p. 63) define living labs as "spaces where designers and researchers find inspiration by observing users and where they may test hypotheses through experimentation". By "[fostering] all phases of the commercialisation process" (Baltes & Gard, 2010, p. 9), living labs are thought to enable a more dynamic approach to user innovation (Leminen & Westerlund, 2009).

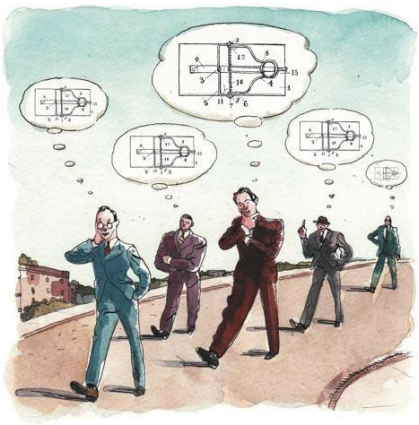
The idea of living labs as "in vivo experimental settings" (Dutilleul et al., 2010, p. 70) that "[manifest] initial demand for products and services" (Almirall & Wareham, 2011, p. 100) is central in this thesis. Following the introduction of a European living lab network in 2006, the phenomenon has received some scholarly attention. Only recently, this stream of research has been linked to the existing work on user innovation (Schuurman & De Marez, 2009) and open innovation (Bergvall-Kåreborn et al., 2009; Lopez & Vanhaverbeke, 2010) A considerable research gap still exists between the handful of conference papers on the topic, mostly authored by living lab staff, and, on the other hand, mainstream innovation research, where the concept of living labs and the use of ethnography in innovation may play an important role. This study examines the methods and processes of living labs, and investigates how these can be used as input for the traditional innovation funnel (Tidd et al., 2005). It asks *how living lab studies, given their assumptions, methods and procedures, fit onto traditional innovation processes, and which factors determine their impact (positive or negative) on technological innovation*.

This thesis seeks to explore the concept of living labs and, subsequently, to advance towards a more dynamic model of user innovation, in which technological novelty and user need co-evolve. Indeed, the static concept of user innovation has proven to be insufficient for current research puzzles. When it comes to more practical matters, this study aims at finding the factors in both living labs and innovative firms that determine the successful transfer of non-technical knowledge. To this end, an empirical study will be carried out between several living labs throughout Europe, with a special focus on Western Europe and Scandinavia – Europe's early living lab adopters (the concept has been introduced under Finnish EU presidency; ENoLL, 2012), and above EU average innovation performers (IUS, 2011). The living labs studied are specialised in healthcare and ageing innovations, for two reasons. Firstly, demographic ageing is one of the most important challenges of European society today. Secondly, in healthcare products, "correct usage and easy accessibility are (…) of primary importance" (Peine, 2007, p. 5).

The remainder of this thesis is constructed as follows: after a theoretical section about the research field of market-pull innovation, describing the context of a new case of user involvement in innovation, the methodology of this study will be outlined. In two subsequent sections, the different cases will be described and related back to a single new case of user involvement. The thesis will then conclude with a discussion of its limitations, some pertinent managerial and policy implications, and suggestions for further research.

Quid novo ?

As described in the first section, the theoretical aim of this thesis is to analyse the case of living labs in the broader framework of user innovation. In this section, the context of user involvement in innovation will be described, briefly and without being completely exhaustive, and a first definition of living labs will be given, differentiating living labs from other forms of user involvement in innovation. The remainder of this thesis will build upon several interviews with the aim of assessing the position of living labs in the broader research tradition of user involvement in innovation, finally leading to an answer on this study's main research question about the impact of living lab research on innovation processes.



Who says big ideas are rare?

In the broad landscape of innovation theory, with strands of literature ranging from evolutionary economics and large technological systems to organisational stage-gate models of innovation, user innovation has been adopted by the relatively young domain of open innovation. Indeed, notwithstanding the audacious reference to user innovation as "one of open innovation's best-researched part fields" (Gassmann et al., 2010, p. 214), it is user innovation which has the most ancient roots in the world of academics: Bogers et al. (2010) even claim the 18th century economist Adam Smith to be one of the first to acknowledge user innovation. In a more recent paper, Rothwell (1977, p. 201) identifies marketing and following user needs as "the area which is most crucial in innovative success or failure", arguing that three quarters of all successful innovations are market-driven. The evolving role of users, from peripheral up to the point of crossing the firm boundaries, fits remarkably well into the paradigm of open innovation, which Chesbrough (2006, p. 43) defines as "valuable ideas [coming] from inside or outside the company and [going] to market inside or outside the company". Like open innovation, user innovation thus starts with the idea of (deliberate) osmosis between the firm and its environment – in open innovation, this environment is, by definition, extended beyond users alone.

Before elaborating on the role of users in innovation processes, it is necessary to define users, consumers and buyers, and to highlight the differences between these concepts. In management literature, *buyers* is the most common term to denominate those actors who, by paying more for a product than just its production cost, enable industry and firm survival (Porter, 1985). All consumers are buyers, but not all buyers are consumers. *Consumers* (or customers) are buyers who buy the end product of a value chain (Priem et al., 2012) without having the intention neither to process nor to resell the product. In common language, consuming is related to using up a certain product or resource: once consumed, the product cannot be used any more. Indeed, in many product markets, consumers and users are synonym (Laursen, 2011). In some product and in most service markets, however, *users* differ from consumers: they are not always buyers. In healthcare, for instance, patients, doctors and nurses use MRI scanners rather than buying or consuming them. Because of its focus on the healthcare and ageing sector, this thesis distinguishes consumers and buyers from users. Following Von Hippel's (2005, p. 3, emphasis in original) terms, this study defines users as actors "that expect to benefit from *using* a product or service" without having to consider the product's or service's price premium.

The different roles of users in innovation processes have received some scholarly attention over the past few years. Fredberg and Piller (2011) distinguish three degrees of participation (design for, by and with users), which they combine with the strength of the consumer-firm ties in order to obtain a graphical presentation of consumer involvement in innovation processes. The au-

thors accommodate user innovation methods ranging from impulse purchase (design *for* users, *weak* ties) to co-creation (design *with* users, *strong* ties), but also questionnaire answering (design *for* users, *moderate* ties), and customer loyalty programs (design *for* users, *strong* ties). Living labs, then, would fit into the Fredberg and Piller model on the intersection of moderate ties and design with users. In another study, which classifies user innovation along the lines of degree of participation and knowledge focus (which can safely be translated as innovativeness), Niitamo et al. (2006) categorise living labs as 'high participation, high innovativeness' experimentation. Ballon et al. (2005) propose a broad range of maturity degrees in which living labs would fit, given an open innovation platform and a development focus that is somewhere between design and testing. Niitamo (in Galli, 2010) defines the living lab as "a research methodology for sensing, prototyping, validating and refining complex solutions in multiple and evolving real life contexts" – as a tool that can be used in all stages of product development. It is in broad applicability and in the relatively high involvement of users who are not necessarily close to the firm where living labs seem to distinguish themselves from traditional forms of user innovation.

In their analysis of European living labs, Dutilleul et al. (2010) stress the shift from in vitro (surveys, consumer panels) to in vivo (or real life, inspired by ethnography and anthropology) experimentation which the living lab framework embodies, and their goal of involving users in the product development process. Working towards a dynamic perspective on user-producer interaction, this thesis will speak of *living labs* as open-ended, in vivo experimentation settings of new product design by and with users as well as potential users, making use of ethnographic methods and applied in all stages of new product development, from ideation to launch. Open-ended, following Følstad's (2008, p. 107-108) observation that through living labs, firms "can find out how new solutions are taken up among their users, be sensitised with regard to new and unexpected uses, and find inspiration for future innovation". The involvement of both users and potential users refers to the notion of strong and weak ties: according to previous research, a firm should leverage both in order to find opportunities for radical innovation (*cf.* Danneels, 2003). The definition employs a combination of design by and with users as a reference to the innovation funnel (see Tidd et al., 2005), stressing the gradually changing role of users in the innovation process from designers to testers.

> ***Anthropology***: The science of man, or of mankind, in the widest sense
>
> ***Ethnography***: The scientific description of nations or races of men, with their customs, habits, and points of difference
>
> *– Oxford English dictionary*

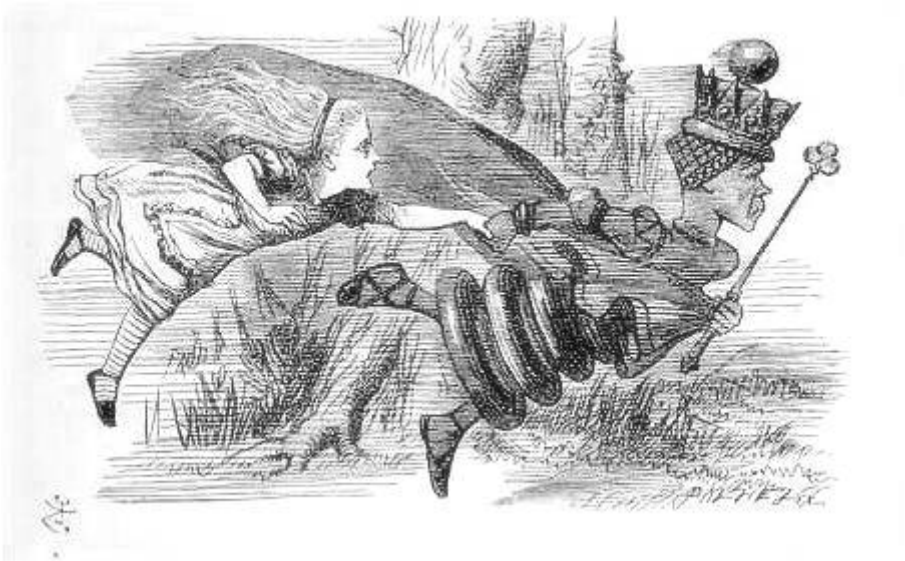
As is the case in many strategies, user involvement and the living lab methodology are, in itself, no guarantee for high innovation performance. Using a sample of chemical, electronic and industrial product manufacturers, Campbell and Cooper (1999, p. 516) find that consumer partnerships "may be more trouble than they are worth". Finding "evidence of negative returns of the involvement of customer knowledge beyond a certain point", Laursen (2011, p. 721) suggests an inverted U-shaped relationship with innovation performance, thereby implicitly referring to Nooteboom's (2000) work on cognitive distance in joint knowledge production. Recently, three very useful reviews on consumer involvement in innovation have been published, shedding a light on the prerequisites of successful user partnerships. Greer and Lei (2012) have compiled an interdisciplinary framework about the managerial level. Priem et al. (2012) review three distinct streams in literature (innovation, entrepreneurship and strategy), thereby providing a macro-economic perspective on demand-side innovation. Bogers et al. (2010, pp 871-872), finally, offer a more theoretical view on the demand side of user innovation, providing "a springboard from which [management scholars] can make deeper and further-reaching contributions to theory in the field".

Starting with the drivers of collaborative innovation with customers, Greer and Lei (2012) cite several components, including the economic and cultural conditions that were identified by Etgar (2008). For this thesis, the most important of these forces are (1) strategic forces, which lead

back to transaction cost theory, core competences, and make-or-buy decisions (Williamson, 1979; Teece, 1986), and (2) organisational forces – a factor that refers to absorptive capacity (Cohen & Levinthal, 1990), and in a lesser extend to Pavitt's (1984) taxonomy of industries. In short, Greer and Lei (2012, p. 72) argue that firms need to have "the ability (…) to absorb information necessary for innovation", and that this ability depends on the organisational culture, the presence of trust and empathy, and the availability of time and other resources. Echoing both Williamson (1979) and Teece (1986), Mehlman et al. (2010, p. 56) add that "if the firm can achieve its (…) objectives with internal resources (…) and assets purchased through normal procurement channels, [it] should not enter a collaborative effort". Priem et al. (2012, p. 353) add to these factors, stressing "the alertness of the entrepreneur in interacting with the market", thereby suggesting an entrepreneurial attitude in user-driven innovation.

On the point of managerial factors, only Rosenthal and Capper (2006) provide some guidelines for planning and conducting the ethnographically inspired research that is intimately linked to participatory design. These guidelines include (1) a well-planned access to a diverse range of respondents, (2) the use of multiple observation and enquiry techniques, adapted whenever needed, (3) the conduct of traditional market research to probe any insights, and (4) an appropriate follow-up, i.e. a go-no-go decision and the engagement in formal innovation activities, when the results of the ethnographic research have been confirmed. While these guidelines might seem simplistic, they have yet to become common practice. For example, Thiesen Winthereik et al. (2009) cite representation as a crucial issue in living labs, but one that still has not been convincingly taken into consideration. At the same time, studies like Neven (2010) and Loe (2010, p. 331) illustrate the need for flexible ideas of user groups in new product research: (elder) users "creatively utilise and adapt everyday technologies [continuously] to construct meaningful lives".

This section concludes the part of the research that is based on previous work. In the following sections, the methodology of this research will be outlined, and the organisations that have been examined will be introduced. In the results section, the theory which was presented in this section will be contrasted against the study's empirical insights.



Methodology

> It was six men of Indostan
> To learning much inclined,
> Who went to see the Elephant
> (Though all of them were blind),
> That each by observation
> Might satisfy his mind.
> *– J.G. Saxe*

Having described some of the previous research on user involvement in innovation processes, and after deriving some guidelines and factors that have been found previously to be important in establishing a fit between ethnography and innovation, this research now turns to its empirical contribution. This empirical contribution consists of evidence derived from interviews and observations at the premises of several living lab facilities throughout Europe, from managers, ethnographers, and from client firms that effectively use ethnographic insights in their innovation processes. This section is aimed (1) at explaining the means and reasons of the qualitative research method in order to analyse corporate and independent living labs in terms of processes, methods, and, ultimately, knowledge transfer to corporate R&D staff, and (2) at describing the safeguards that are used to ensure the quality of the analysis.

In his seminal account on case study research, Yin (2009) recommends the use of case study methodology, when answering how and why questions on contemporary phenomenons, without the possibility of controlling the research subjects. Hancké (2009) adds that case studies should be performed when the boundaries between the research subject and its context are vague, i.e. when the research subject cannot be studied completely disentangled from its environment. Both authors suggest that case studies are inevitable when the number of possible cases is too low and when the goal is theoretical exploration rather than theory confirmation (*cf.* Gerring, 2004). The empirical part of this research, which is aimed at exploring and describing the methods and procedures of a limited number of living labs, will be based on embedded case study methodology (Yin, 2009). In the results section of this research, the empirical data will be related back to one case – the living lab in the context of other forms of user innovation. In doing this, the theoretical framework on user innovation can be explored beyond the field of strong user ties.

Hancké (2009, p. 104) argues that in compiling a case study, the use of mixed sources is mandatory: "pieces of information that (…) match with other pieces of information (…) make up a convincing story". The empirical part of this study relies on three different sources of data: semi-structured interviews with (former) living labs insiders (research directors, ethnographers), and clients, observations of living labs whenever possible, as well as with archival research. The interviews will consist of three parts: after an introduction of the interviewee and his organisation, questions will be asked on the rationales living lab research, and on the processes that lead to a living lab study design. The first part of the interview includes a question on the interviewee's own definition of a living lab. Secondly, the interview turns to methods and procedures in the living lab itself, including questions on user recruitment and paradigm differences. The third part of the interview will cover the components that are thought to be crucial for the living lab study to impact innovation, and the sustainability of living labs and the use of ethnography for innovation in general. Lastly, all interviewees will be asked what their own research question in this field would be, and if they have anything to add to their answers. The data from the interviews, observations and archival research is the basis of the results section.

The second part of this section focuses on the internal and external validity of the research design, as defined by Yin (2009). Internal validity is the idea that "certain conditions (…) lead to other conditions, as distinguished from spurious relationships" (Yin, 2009, p. 40). In order to ensure internal validity, the researcher must carefully build his explanation, addressing rival explanations and seek patterns rather than particularities. Only after this intellectual exercise internal validity can be assessed. External validity, on the other hand, can and should be assured in the research design, by using a replication logic that enables grounding the similarities and the differ-

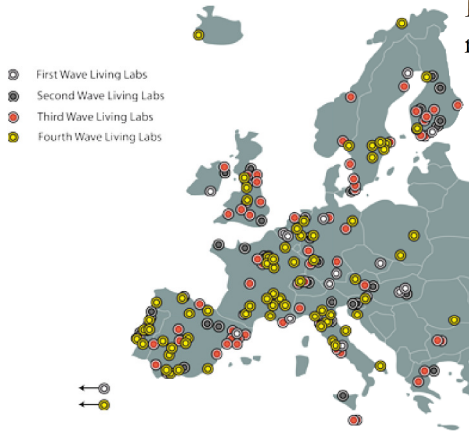
ences between the cases in theory. By using an embedded case study design as a starting point (comparing living labs in different countries and with different organisational rationales), this thesis attempts to systematically uncover the differences between the case organisations as predicted from theory. They can be differences in innovation systems and industries, corporate cultures, as well as in the cultural ideas of (elder) users: a senior citizen in Denmark will be regarded differently compared to a senior citizen in France.

As is common practice in qualitative research, interviewees will be asked to define key research concepts for themselves (as suggested by Hancké, 2009), and draft versions of the results section were sent to the research subjects before carrying on with the analysis. Finally, the reliability of this research is assured by adding interview and survey questions as appendices to this final research report, as well as by identifying the living labs studied, the projects followed and the persons interviewed. Of course, all respondents were asked whether they prefer to remain anonymous. Furthermore, every interview came with the standard introduction that no right or wrong answers existed, and that interviewees should talk in as much detail as possible; every respondent got the chance to add to the interview at the end of the protocol.

The next section will briefly introduce the European network of living labs, of which the majority of the organisations studied are part of, as well as organisations that have been studied, and the persons that have been interviewed for this research. Having described the resources of the empirical research, the interviews, observations and archival data, will then be analysed in the results section, abstracting back to the main concept of living labs, and introducing some of the general concepts that have been derived from the empirical research.

- En conclusion, je dirais que je n'ai jamais cru à l'internet et que les événements ont clairement prouvé une chose : j'avais tort.

A tale of five living labs



Having described the research puzzle to be solved, and the methodology that was used, this section will elaborate on the case selection process, and on the cases that have been selected. Prior to presenting the selected cases, this section first gives an overview of the European network of independent (i.e. not corporate) living labs. This network consists of 274 living labs (as of March 2012) that have adhered to the network in five distinct waves, the initial one after its foundation (under Finnish auspices), late 2006. The map shows the first four of those waves. When looking at the twenty-two so-called effective members (selected by their peers and paying an annual fee), five of them are based in Finland, four in Spain, and three in the UK.

Organisation	Interviewee	Date	Duration	Other sources
Autonom'Lab Limoges, France	Stéphane Soyez, *managing director*	April 10	2h	Web
TRIL centre Dublin, Ireland	Flip van den Berg, *interaction designer*	April 26	1h30	Web, brochures
	Chiara Garattini, *researcher*		30min	
	Seamus Small, *centre manager*		15min	
CASALA Dundalk, Ireland	Julie Doyle, *GNH project manager*	April 30	50mins	Web, observation
	Andrew Macfarlane, *centre manager*		35mins	
	Brian O'Mullane, *software researcher*		25mins	
Irish centre for social gerontology Galway, Ireland	Aoife Callan, *researcher, formerly at TRIL*	May 1	45mins (together)	Papers
	Keiran Walsh, *research fellow, formerly at TRIL*		45mins (together)	
Copenhagen living lab Copenhagen, Denmark	Jacob Appel, *innovation consultant*	May 3	1h15	Web
Alexandra instituttet Aarhus, Denmark	Peter Nielsen, *research and innovation specialist*	May 8	1h20	Papers
Landsbyen Sølund Skanderborg, Denmark	Maurits Eijgendaal, *former managing director*	May 8	45mins	Web, brochures

Table 1 Interview chronology

A majority of the independent living labs focus on regional development (digital inclusion), and on product development for an ageing society. For instance, the Autonom'Lab in the French Limousin region (autonom-lab.com), the Copenhagen living lab (copenhagenlivinglab.com) and CASALA (Centre for affective solutions for ambient living awareness; casala.ie) in rural Ireland all have projects on new product development for elderly people. Moreover, the Alexandra Instituttet (alexandra.dk) is a research institute running living lab studies, such as the Sølund living lab (2008) in rural Denmark. In addition, corporate living labs for ageing problems exist: the Dutch healthcare company Philips is known for its CareLab (De Ruyter & Pilgrim, 2007; research.philips.com), and Intel and GE Healthcare collaborate in the US-based company CareInnovations (careinnovations.com) and have set up the TRIL Centre (Dishman, 2009; trilcentre.org). In total, five living labs (TRIL Centre, CASALA, Copenhagen LL, Alexandra Instituttet/Sølund LL, Autonom'Lab) agreed to participate in the project. Table 1 outlines the details of the organisations and persons interviewed. In the following subsections, more qualitative details are given.

One: Autonom'Lab

Based in the capital of the Limousin region, a particularly ageing region of France (in 2010, 12.9% of all Limousins were aged 75 or over, against 8.9% in mainland France – INSEE, 2010), the Autonom'Lab aims at enhancing the security and well-being of elderly people, with projects involving co-design, project consulting and project collaboration. In 2008, the Autonom'Lab became a member of the European living lab network. The organisation was officially established in 2011 after two years of informal activities regarding its mission statement, member acquisition (the organisation is a semi-public non-profit association), and staff recruitment. The organisation was set up after the image of the French *pôles de compétitivité*, or industry clusters, partially for lack of a better example. Indeed, the team of Autonom'Lab and its advisory board (responsible for choosing and defining projects) have spent over a year defining living labs and the criteria for a sound living lab study.

Two: TRIL centre

The Dublin-based Technology Research for Independent Living (TRIL centre) is a collaboration of two academic partners (University college and Trinity college Dublin), two business partners (Intel and GE Healthcare), and a hospital (Saint James'). Because of its strong links with academics, the centre has published a number of articles, of which, some are on conducting ethnography-inspired research (e.g., Bailey & Buckley, 2011; Bailey & Sheehan, 2009). The TRIL centre combines visits to users' homes – "a critical site for developing new technologies", according to Bailey and Sheehan (2009, p. 99) – for ethnographic insights with clinical studies for medical data collection at Saint James' hospital, with a special focus on "falls prevention, cognitive health and social connection as these are crucial to independent living" (Bailey & Sheehan, 2009, p. 98). As the rules and regulations on clinical research are too strict to allow interviewing and observing the activities at Saint James' hospital, the interviews were held at the centre's premises at University College Dublin. The centre does not consider itself to be a living lab in the strict sense, as its does not lie in the commercialisation of its projects, but rather in basic ethnographic and medical research. In addition to the interviews in Dublin, an interview was held with two former TRIL researchers at the National University of Ireland in Galway.

Three: CASALA

The Centre for affective solutions for ambient living awareness (CASALA) is located in Dundalk, Ireland, and is an applied research centre based at the Dundalk institute of technology. In 2010, with a diversity of industry and government collaborators, CASALA opened its living lab, which primarily consists of sixteen sensor-packed apartments at a site called Great northern haven

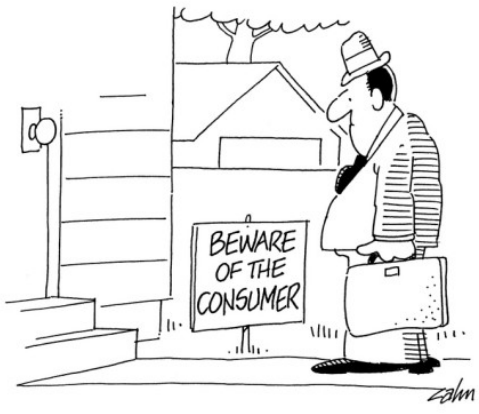
(GNH). CASALA has been part of the European network of living labs since May 2011 and provides consultancy services and facilitates collaborative research in the field of technology and ageing, and is still closely linked to the Netwell centre at the Dundalk institute of technology – it is its commercial arm, aiming "to work with industry to achieve product innovation, business competitiveness, and market leadership in (…) ambient assisted living" (Netwell centre, 2010).

Four: Copenhagen living lab

Founded in the summer of 2006 by employees of the Danish broadcasting corporation and the Symbion science park, the Copenhagen living lab brings together "ethnographers, experienced executives and creative entrepreneurs" (CLL, 2011) in order to conduct innovation projects for both public and private organisations, in fields ranging from construction and architecture to health and elder age groups. The Copenhagen living lab implements an innovation model that starts with market needs, and through opportunity recognition, partnerships and project championing leads to organisational alignment around the new business. Its website features a video of *Soldier things: a notion of growing old*, a theatre play on living and ageing in a nursing home. An interview was held with Jacob Appel, a carpenter and entrepreneur who joined the Copenhagen living lab in February 2012, and who provides important insights on the philosophy of his organisation. The case of the Copenhagen living lab is especially important because it is the only living lab in the sample that does not directly depend on government funding, and because it has an application field that is much broader than (elder) care.

Five: Alexandra Instituttet / Sølund

Based in Aarhus (Denmark), the Alexandra institute (founded in 1999) defines itself as "a bridge-builder between research, private corporations, public institutions and citizens" that develops "innovative ICT-based products and services" (Alexandra Instituttet, 2012). From 2008 to 2010, the Alexandra institute managed the HandiVision project, using the village of Sølund (in Skanderborg, half an hour driving from Aarhus) as a living lab environment and involving cognitive impaired people, their caretakers and relatives in product development. Besides, the Alexandra institute participated in a project for physically disabled high school students (Egmont). Apart from a handful of papers, the Sølund project resulted in a high-tech *snoezelen* facility, a "multi-sensory environment [that] creates experiences for the residents" (Nielsen & Nielsen, 2011, p. 5). The Alexandra institute was involved in these living lab projects to learn about this new methodology. The second interview was with Maurits Eijgendaal, the former managing director of the Sølund village, who was deeply involved in the living lab project. Although somewhat disappointed about the results, he does not regret participating in the study, as it gave him the opportunity to rethink his way of creating facilities for cognitive impaired persons.



Ceci n'est pas un laboratoire

> Wist u dat? Misschien vindt u dit alles heel gewoon. Ik kan slechts vertellen, wat ik merkwaardig vind. (…) Maar misschien lig ik een ronde achter.
>
> – *Godfried Bomans*

Having described the interviews and other data which were used in the empirical part of this research, this section relates back from the individual organisations to living labs as a single case – a case of user innovation. The insights gathered in the interviews will be rearranged into three dimensions: (1) the added value of living labs in innovation management and in user innovation in particular; (2) the assumptions, methods and procedures of living labs; and (3) the critical success factors for a living lab intervention. A fourth subsection will relate all these insights back to theory, and to the definition elaborated above in particular. Although the aim of this section is to draw a general picture, particularities of the observed living labs will be used to gain insight in the concepts that are described in this section. Also, several interviewees will be quoted along the way[1].

One: Added value, and a different role for business actors

> "The business must forget they want to sell something, and we should forget that we're a customer. Rather, we go into some room and leave out our buying and selling logic, and develop something. (...) We bring in our own practical knowledge, they have knowledge about what's possible, or they find possibilities, after which you can start talking about buying and selling." (Maurits Eijgendaal, Sølund; translated from Dutch by the author)

Generally speaking, a living lab project can consist of consultancy services, data gathering and analysis, or both. As any consultancy, a living lab project yields knowledge that none of the partners could have gained on its own. Indeed, the added value of any living lab organisation is its closeness to real users in real environments – not necessarily to a firm's current users, but notably to people who have no links to the client firm, either because the users have never had any need to (most people only start thinking about fall prevention once they have become fragile), or because the client firm is entering a whole new market (the firm that is currently showcasing in the Sølund *snoezelen* facility had never worked with cognitive impaired people before). The data which is gathered in living lab projects (*projects*, because not all living lab organisations have a tangible and permanent facility that can be called a laboratory) is always qualitative, but may have some quantitative elements as well. For instance, the residents of the Great northern haven site (CASALA) live in sensor-packed houses (fifteen permanently occupied one-storey apartments with eighty sensors each); this data is systematically complemented with daily surveys on physical and emotional well-being, and weekly visits of a CASALA staff member, who brings engineers and designers along on a regular basis. All this ethnographic effort holds the entrepreneurial horses, but on the long term works as a catalyst on business aspirations, as the information gathered is much more reliable. As Copenhagen living lab's Jacob Appel puts it:

> ***Laboratory*** (1) a room or building for carrying out scientific experiments or procedures, especially for the purposes of research, teaching, or analysis; (2) a site or centre of development, production, or experimentation
>
> – *Oxford English dictionary*

> "[The anthropologist's role] is to understand... What do [people] do? Not what do they say they do, not what do we think they do... As an entrepreneur, we are very quick: 'Well, there's a problem, let's fix it'. And that's counterproductive, because we don't understand it, we don't understand the problem. But when our anthropologists are out, in an elder home, or in a local area, looking: what is actually happening? How are people moving around? How are simple things done every day? (...) Then there's all different kinds of

[1] Within the limits of recording quality, all interviewees are quoted literally, and their discourse, including fillers, hesitations and bad usage, has been transcribed as authentically as possible.

possibilities, ways to organise... Then our entrepreneurial approach gives ten times as [much] value, as it would be, like, (...) when we would do quick."

Keiran Walsh (former TRIL researcher) uses similar wordings to defend the extended time line that characterises the social sciences in general and ethnography in particular:

"If you were to look at a problem, like, trying to create some piece of technology, (...) the time lines there are different. I mean, if we do a research project here, we're understanding probably something like 'people's experiences of deprivation' or something like that, it always takes us one year, two years. (...) That might not be connected onto the time lines of technology and innovation (...). It can, I suppose, lengthen the process, but certainly (...) you'll have a better technology."

And indeed, some projects go through multiple phases to get crucial response early on in the product development process. For instance, CASALA uses its virtual 'cave' environment and mock apartment to get very early feedback on product ideas. At TRIL, clinical research and home visits by the design team are the central part of each project, as, in the organisation's philosophy, only the two elements together can lead to useful and meaningful products. It was during a home visit that TRIL designers realised how they could take a skin resistance sensor away from the laptop:

"TRIL had a project, Engineering alertness, where we developed a device for self-monitoring alertness, and we had done a clinical test, and it all worked fine. Then we turned to home deployment, (...) and the quickest way was to put the device's software on a laptop and connect the sensors [measuring electrodermal activity]. (...) We found out that people's anxiety to use a laptop altered the measurements. (...) I was asked to think about this, together with an anthropologist, and we decided to make a stand-alone device, just an on/off-button and a little screen, using two pieces of Velcro for the sensors. (...) And one of the participants, at home, sat in her comfy chair, we sat next to her talking about how the device should be, and she fetched a little cushion (...). So now we have this device integrated in a little cushion, with only two wires coming out of it. You know, sitting at a desk you never think of a cushion, you never get that kind of inspiration; you have to get to people's homes and find out." (translated from Dutch by the author)

Another particularity of living labs compared to traditional user innovation is the diversity of staff members (engineers, designers, ethnographers, …) that come into contact with the users. An extreme example comes from the French Autonom'Lab, involving *equal dignity*, a rudimentary form of *belief* – the concept that is central to this section:

"You know, we have these focus groups, where we tell users (...) that they are the afternoon's experts, that they now have the power to tell the marketing guy of organisation X what they think about his firm – if it's doing good or bad. (...) And we have had this case where the marketing guy came out of the focus group as if they had smashed him to pieces – he had never done this before, in front of fourteen end users. He arrived, you see, all dressed-up, (...) and he just got the wrong vocabulary. So when one of the users said that they had understood nothing from the first two minutes, he tried to change his wordings, and he started trembling as he found out that his audience not only didn't understand him, but also made this clear to him, made it clear that he had to come down from his own little cloud. Afterwards he came to me and said: 'Well, I didn't like it, but I think it has been very useful'." (translated from French by the author)

Also in this sense, living lab projects do have some remarkable parallels with traditional consultancy, in a way that the client firm has to be assisted in switching technological and business paradigms. Living labs are primarily special because of their data sources.

CASALA's centre manager also emphasises the uniqueness of his organisation's approach:

> "We've done things differently, I think; we've built a good reputation of ourselves, locally, nationally, and, you know, it's come back for a big European project, last week in Birmingham. Internationally, particularly in Europe, we've built a good reputation for ourselves. (...) Very few things in here, you know, are normal; we like to challenge received thoughts or processes (...): that's our way of doing things, to the good of older people (...) [I]t's a mix, (...) bringing things together in a pot, and see what comes out."

Two: Methods, and a different role for users

As suggested above, these data sources are mined in different ways. Definitely, the question should be asked which of these methods can be labelled as living lab methods – where the boundaries of this new case of user innovation must be drawn. The question was explicitly brought about by Jacob Appel from the Copenhagen living lab – from the research sample, the living lab that remains closest to ethnographic tradition by doing participant observation in natural environments (not specifically equipped houses), sometimes without the participants' prior consent, as explaining them the hows and whys of a living lab study might just not be worth the effort. This, indeed, may well be or become a point of debate within the living lab movement, as researcher Peter Nielsen of the Alexandra Insituttet repeatedly insisted on the importance of taking users along in the business part of a living lab project:

> "What they did at Egmont [high school for disabled students] (...) is to make an innovation course, trying to educate the users to participate in innovation processes. (...) And again you have to build op the experience of working with companies (...). A typical thing would be that they would come up [during a brainstorm session] with some completely crazy idea, about a flying wheelchair. And then the company attending to the brainstorm would say 'Hm, we specialised in communication...'."

At the end of his interview, Mr Nielsen quotes business knowledge on the user side as the most important success factor of any living lab project:

> "To have an impact on innovation, demands from the users, from the living lab, an organisation attuned for innovation processes. That would be understanding the needs and the working processes of a company trying to develop new products, or services. And you really have to work hard on that one with people. I mean, teachers, they're not dealing with businesses in their daily life, they're not creative people. (...) They have all kinds of ideas about how technology is, but they do not necessarily have any idea of how to get there. But then, of course, they are inspired by all kinds of things."

In Mr Nielsen's definition, a living lab is "any form of user involvement taken to the organisational level", not excluding one-to-one interaction (especially with cognitive impaired users), and most notably implying the involvement of actors from several disciplines in each step of the project, instead of separate, mono-disciplinary (focus) groups for users, designers, engineers and businessmen. Mr Nielsen himself quotes some of the methods used at Egmont:

> "[As an Egmunt student,] you have to go out and take some photos of different kinds of new inventions and home-made solutions for problems. They did that a lot – photographing, video, prototyping different ideas to deliver to the companies. They were testing a new wheelchair (...). I mean, that's the idea of exploring the living lab: how many ways can we open up a facility like Egmont for companies? What's the value? How do living labs produce values (*sic*) for companies?"

The Alexandra institute, then, would include focus groups and other more traditional marketing techniques, as would the Autonom'Lab (if only because that organisation uses traditional ethnographic methods only slightly).

Besides the fundamental debate there are of course the practical considerations of involving users to a certain degree, or not at all. And in some projects, the boundaries of the user group just might not be clear from the outset: at Sølund, the ethnographic research unit was the interaction between (cognitively impaired) residents and the shell of family and staff around them. So, in the end, a large majority of living lab projects (including those at the Copenhagen living lab) work with users who are fully aware of their involvement and of the project's goals. Prior consent can be inevitable because of the methods chosen (e.g., CASALA). As far as including focus groups and other traditional marketing techniques in the range of living lab methods is concerned: a divide would be purely analytical; in practice, the procedures belong to the same project, are executed by the same team, and often there will be a difference in firm-side participants and their role in the focus group. The question whether multiple research techniques can be fully deployed within a single project is a pertinent one – and will be discussed in the next section.

So, living lab organisations pair in-depth knowledge and data on (potential) users to marketing methods that may be inspired by the more qualitative branches of science, and in which the client firm inevitably plays a radically different role. Moreover, the scientific approach of living lab organisations, partly caused by their close linkages to university research, cater for a tendency to enlarge the consultancy problems, rather than slice them into pieces. Former TRIL researcher Keiran Walsh talks about this research logic and the necessity for business to know how to interpret ethnographic research accounts:

> "In a research environment, you're looking for the precise answer, a specific answer, and it doesn't really matter how long it takes you. Whereas maybe in a commercial or business environment it's more about having a proximate answer and it needs to be done by tomorrow, or something like that. (...) [T]he questions of what are the trade-offs being made, in terms of knowledge, and data collection, and in terms of time, I would say that would be the biggest challenge [for living labs to be durable]."

Jacob Appel talks about the 'creative organisation' that has a natural tendency to leadership (and creativity) over management (or business thinking) – a requirement for the Copenhagen living lab to safely pull out of a project:

> "The normal behaviour [of a firm] is (...) to fix [a problem], to freeze it: managing. So we have to start up and create a process where you don't freeze, where you keep leadership. And then (...) you transform your identity from having fixed goals to being an entity who is searching, developing: you're curious and brave."

> "[One of my projects] is a company who's producing burgers (...) and this woman she is producing 60 000 takeaway burgers per year – high quality burgers. And she has a restaurant (...) and she doesn't want to earn more money, she doesn't want to be bigger, but she wants to have a more funny... a funnier job (*sic*). (...) She wants [her company] to be a place in society where young people who have weight problems can learn how to eat right. She wants [her restaurant] to be a place where elderly people can have a meeting place and a cooking school... You see, she wants all kinds of things. (...) So we try to organise, how do you develop from a burger bar... to a meeting place?"

Three: Belief, and other criteria for impact

Firms must adapt to this new way of product development and to their new role. Part of the interview questions were aimed at finding out on the selection criteria of living lab organisations. One of the more interesting findings in this regard is the independently repeated reference of all interviewees to *belief* as one of the most important criteria. Innovation researcher Peter Nielsen from the Danish Alexandra Instituttet explains the very basics of the concept:

> "If they do not believe in user involvement in innovation processes, that would be a no-go. If they do not wish to... If I have the feeling that they do not wish to go to any kind of meeting where users are attending, then it's a no-go. I mean, it would be ridiculous, in order to create value for this company they do have to engage in some of these processes, in order to abstract what they need – only *they* [the users] know."

Belief can also be a reason for the client organisation to turn down a project proposal, according to innovation consultant Jacob Appel from the Copenhagen living lab:

> "Well, [if] they don't believe it. We try to minimise the insecurity by saying 'You will definitely learn something'. (...) So you have to come up with very good evidence, and very good plans (...). [Some companies] are not seeing opportunities because they don't believe. And there's a lot of examples of non-believers who lose opportunities. And belief doesn't have to be anything with God; just you don't believe evidence... (...) It has something to do with identity and culture, it has something to do with how close you are to development (...). Companies [must] understand they have to do better all the time."

Based on the insights provided by each of the interviewees, this thesis will further define belief as *the ability of an organisation to abandon its knowledge and assumptions about users in favour of a time-consuming living lab project, and the capacity to repeatedly translate the insights of this project, if any, into its business model.* (Repeatedly, since a living lab project runs parallel to the innovation process; the two ideally co-evolve.) As such, belief is one of the most important criteria to the impact of living lab projects on innovation processes. In the remainder of this section, the concept of belief will be explored and unravelled along the lines of several other, secondary, criteria. These criteria include *firm characteristics*, *product maturity*, and *institution-side collaboration*.

Firm characteristics

Criteria that relate to firm size and staff competences appear to be a part of the key to the concept of belief that a social investigator's intervention, and diverse and early user input, even in limited form, will be worth spending the resources (e.g., an engineer's enterprise has a tendency to be too focused on its own brilliant idea to incorporate ethnographic insights). Several interviewees have invoked those (secondary) criteria.

CASALA's centre manager, on the disadvantages of very small firms, and on demanding ones:

> "It's particularly smaller operations [that muddle through], you know, it's a small one-man company, or two-men company, and other challenges and other, you know, elements of their business will overtake focus on this part of business (...)."

> "Sometimes we have a bit of a reset to reality for people who come in and think we can do all these things (...). Some people think we could deliver a product for 5K; if we could do that, I don't think we would be here."

Former Sølund managing director Maurits Eijgendaal was not too happy with the firm that was assigned to his living lab project by the government of Midtjylland:

> "[I'd rather cooperate with] a bigger firm, with more heads, with more thoughts, with more people, with more possibilities. The man we worked with was too fixed on his own little idea [of motion sensors]. And what actually happened was that he was taken over by reality, with the emergence of the Wii game console. (...) And, you know, that can happen when you do innovation (...). But there was no firm that had the same advanced ideas as we did then, apart from the firm that works with us now, and that learned everything about running a living lab from us." (translated from Dutch by the author)

Alexandra's innovation researcher Peter Nielsen, who cooperated in the Sølund project, is also very clear about his criteria:

> "I would be screening... Well, I would certainly try to map out the innovation process of the company: how do they do innovation? Do they have *any* kind of tradition for user involvement? If they have, the process will be much more easy. (...) The important thing is to know their innovation process. Then the size of the company, obviously. What product do they have? Are there any natural extensions from existing products into new products, or would the innovation be about something completely new? Have they been into the market before? Does the company know this user? (...) Then I would take a careful look on the competences... Do they have a designer?, for instance."

Product maturity

There appears to be a fine balance when it comes down to the maturity of the product (or service) that is developed when it enters a living lab project, but all interviewees agree that the product should not be too mature, and that the client firm must think of its business as continuous development. Copenhagen living lab's Jacob Appel, just as Maurits Eijgendaal (Sølund), starts from the assumption that living lab projects are tools for gaining knowledge which none of the partners would have gained on its own. Starting from there, it is a necessity that client firms abandon a large part of their assumptions on what is important to users, and are comfortable with the idea of not exactly knowing where the project may end. This is the 'consultancy' part of belief, which Copenhagen living lab's Jacob Appel defines as a prime go-no-go criterion:

> "Well, if the goals are fixed, too fixed to do anything about it... If it's only a question of bringing a product to market. If it's not a question to question the product. If it's not a question to question the approach to market. If it doesn't involve the company itself in reconsidering its identity. (...) You see, we operate with large scopes. When the scope is too small, well, the company would have all the answers."

The project does not necessarily end with a new product, even though an organisation such as the TRIL centre considers commercialisation vital to a living lab project. Indeed, if firms fail to abandon their assumptions and prior knowledge, they are more in a managerial logic of problem solving, and not in a leadership logic of finding new ways, in the terms of Copenhagen living lab's Jacob Appel. Needless to say, firms have to have some knowledge of their target markets. As with any research or consultancy question, a funnelling process is needed to come to a definitive and well-defined problem statement. CASALA's Andrew Macfarlane provides some insight:

> "Clients have a specific idea for a project or product and we are able to direct them, saying 'There's a potential market for that' or 'No, you really need to consider these people are doing something in this space'... You're funnelling their ideas (...) You just get quite direct: 'I think you need to look at this before you go spending your hard-earned money – take another look, and look in this direction'."

"We try to teach [technicians and businessmen] in [thinking of customers] – subtly, or not so subtly. Sometimes we just say 'Look, if you brought that to an older person now, he would tell you no – it is sugar-honey-ice-tea, it doesn't work'."

Institution-side collaboration

Interviewees also mention other, institution-side, criteria, necessary to conduct a successful living lab project. For instance, it must be taken into account that the creative effort of the client organisation staff, or participating users, will be an extra task on top of their daily jobs and activities: for instance, Sølund staff keeps working during the living lab project, and the residents of Great northern haven (CASALA) also have their daily lives to live. This double engagement is core to the living lab philosophy, where the closeness to reality is a unique selling point repeated often by all interviewees, but most clearly by Alexandra's Peter Nielsen:

"What we are actually doing when we come with this living lab project, is to say 'Well, we know you are working, you have your ordinary job, but we would like to invite you into a more creative thing built on top of your working – on top of your ordinary work. Let's do some innovation, where you put your professional skills into the process of developing something.' And this demands a kind of new mindset."

Through remaining and participating in both day-to-day life and creative effort, users would become reflective practitioners, a notion mentioned by Peter Nielsen from the Alexandra institute, meaning that users would develop imaginative skills on how to improve their lives, work, and, ultimately, the technology that surrounds them. In the meantime, there has to be awareness on the technology and business constraints that prevent a giant leap forward in the user's comfort. To this end, an organisation-side project leader, or champion, could be appointed, whose role it is, above all, to filter the ideas of the often very eager and already creative users – who might not always know about the stakes of the participating client firm. Peter Nielsen somewhat contradicts his own quotes about the Egmont project when talking about the need for an institutional filter:

"I don't think that participating in this kind of process takes, or demands, from everybody to know about businesses. But the organisational setting around the living lab does have to know about the businesses' needs. (...) [The teacher], in this case, would have the contact with the company, they would agree on what should happen, what do we expect? – expectations are really important to get a firm grip on. (...) Now she becomes the organisational part in this sense. (...) [The intermediary at Sølund] was also the one writing material about 'What does the Sølund living lab look like, what can they offer?'."

The only way to solve this possible paradox is by distinguishing two different layers: Egmont students and other 'normal' users should have some basic knowledge about the company they are talking to (in order to guide a brainstorm session, for instance), but the organisational shell around those users should know much more about a firm's interest, not only to guide the process, but to establish the contact and elaborate the project in the first place.

A last element of successful living lab projects, as far as the interviewees are concerned, is endless communication between all actors. In the several stories on not-so-successful living lab projects, the common ground of deception was to be found – with no exception – in a lack of communication between project partners. For instance, Julie Doyle repeatedly insists on the importance of communicating with the GNH residents on the projects that are going on. Yet, this communication needs to be dosed, in a way, because users are living a normal life:

"I don't want to let the residents in there think that they're guinea-pigs – they are already doing a lot of research for us. You know, we get requests constantly from people saying 'Can we meet with the residents, can we talk to them?', but we just can't, because it's not

fair for them, you know, to ask them to do so much. (...) It's generally not necessary for the companies, I think, to meet with them."

Lead engineer Brian O'Mullane also insists on the importance of minimum intervention:

> "We work with sensors that wouldn't interfere with people living their everyday lives, and also wouldn't give them a feeling of being watched (...). [I]f you could put more invasive, for lack of a better word, sensors into people's lives, something that could see their body warmth, or a camera, you'd get much better data, but you'll get a lower level of acceptance. (...) We go with light-touch sensors, and try harder in the signal processing."

> "Part of our consensual agreement with the residents says we might come in as often as every three months. (...) The project went live in June 2009, people started moving in, we've only had to go in and change sensors at two occasions since. (...) We're very protective of the people in there; they've been great supporters of our research and we try not to burden them. Part of our powerful data is that they're actual people living their lives – they're not artificially put into this environment."

Indeed, CASALA takes the Living lab concept somewhat away from ethnography, and relates the concept to the behavioural sciences. Andrew Macfarlane, the centre's manager, insists more broadly on the importance of

> "...collaboration and engagement of the stakeholders. Stakeholders – whatever your living lab is – if you have the collaboration and engagement of those stakeholders, be they older people, be they municipalities, be they health services, be they whoever... research bodies, different elements... if you get those people working together, that's the basis (...) and that's successful. *[MK: How do you do that?]* A lot of talking, and a lot of communication. And a lot of shared vision. (...) It starts there."

The same principle of collaboration and mutual understanding is repeated by Autonom'Lab:

> "A key capacity of living lab is to push people with different goals and values to share the same ambition. (...) We had this one project involving doctors and firms – so only two types of actors with really different goals and values –, and they shared the ambition to do some experiment with social, medical and economic indicators. Yet we've had the worst of troubles because the values of those two actors, the hospital and the businessmen, had not been expressed. (...) So they were always having arguments and conflicts, (...) on how to present, how to manage the project, (...). The project continued avoiding all those conflicts, and it wasn't a great success, just because we hadn't insisted on equal dignity, on making those actors listen to each other and understand each other's interests. Not even sharing, just listening." (translated from French by the author)

Communication within the living lab organisation, between staff members with different educational backgrounds, is as important as external communication. For instance, the TRIL centre has a policy of encouraging their staff to attend and participate in meetings.

Besides questions on how living lab projects are conducted and on the vital factors for those projects to impact innovation, a few conclusive questions were asked to each interviewee on the concept's viability and on the possibility of a more mainstream position for living labs. Within the sample, only the Copenhagen living lab is not dependent of government funding – if it ever deals with government, it is only with business purposes. All other living lab organisations have had government funding in their start-up phase, or a majority of their projects get paid through innovation vouchers, which implies a possible sharp decline in the number of project proposals

when the programme is stopped. CASALA is especially anxious about a new round of funding, as they still largely depend on Enterprise Ireland, the government agency for innovation policies. On the other hand, there is the Autonom'Lab, whose director sees it as his biggest challenge to find non-monetary criteria for assessing possible projects: he thinks it is not fair to calculate every project in terms of hospital days avoided and economic gain. A possible answer to his question could be found in the idea that buyers are willing to pay a higher price for products that are conceived in close collaboration with users, as Jacob Appel from the Copenhagen living lab indicated. This added value might could also turn out to be the key to a self-funding living lab.

Four: Definition, and feedback to theory

Linking back to the definition given in the theory section, which referred to living labs as open-ended projects of *in vivo* experimentation by and with users, using ethnographic methods to the benefit of new product development in all of its phases, several things can be said about the preciseness of this definition. First of all, the open ending appears to be the core of the concept of living labs: client organisations that do not acknowledge the approach of enlarging problems and known unknowns are better kept out of living lab projects, at the risk of wasting costly project time. The selection of client organisations on this criterion, in turn, is key to the viability and profitability of the living lab itself. The elements of *in vivo* and ethnography-inspired experimentation pose several minor problems, especially in the area of ambient assisted living. The reasons for this are obvious (ethical constraints, the fragility and cognitive deficit of some participants), but many of the living labs still manage to get uniquely rich data from people normally not accessible to business actors. Moreover, the time scales used in living labs are quite long compared to business time horizons, and relatively short compared to 'real' ethnographic research.

The last regard in reference to time scales, is the assumption that living labs interfere in all phases of the development process, and that the design process involves users in two different basic ways. Indeed, living labs intervene in both the ideation phase (Autnom'Lab, and, less notably, TRIL and the Copenhagen living lab) and the more mature stages of product development, but seldom in both during the same project. The reason for this is largely financial, as living lab projects are paid by technology transfer vouchers, that are generally available in €5000 or similar amounts. This sum covers up several weeks of research, but not the whole process of imagining, designing and testing a wholly new product. This is not necessarily a bad thing, as the popularity of living labs and their rapid diffusion through Europe has proven, but this disparity between the theory of long-term intervention and the practice of budget constraints is worth remarking.

This section has identified a concept, belief, that appears to be key to the impact of living labs on innovation processes, and has distinguished three dimensions of that concept. Furthermore, these insights were linked back to established theory. In the next section, these results will be related back to the main research question, managerial and policy implications will be drawn, and the limitations of this research will be outlined.

More than just a tool

> Life is what happens to us while we are making other plans.
>
> – *Allen Saunders*

For most part, living labs are a new and very specific form of consultancy, making use of other sources of information, but still aiming at creating knowledge neither the client firm nor the living lab organisation could have created on its own. However, there are some differences between living labs and more traditional consultancy organisations, as there are some remarkable parallels and differences between living labs and traditional market research techniques. This concluding section analyses the position of living labs versus traditional consulting and marketing organisations, and formulate a set of management and policy implications.

First and foremost, living labs in particular, and ethnography in new product development in general, seem to work. Inside actors talk about it in terms of catalysing and canalising entrepreneurial zeal, and emphasise the effectiveness of living lab interventions in finding new opportunities for innovation, either indirectly through the use of more robust and reliable data, or directly through the new lenses on product development that are provided during a project. Moreover, it is a strong sign that large companies such as SEB (Tefal), Philips and Siemens make use of anthropology in product ideation and development, and that Siemens and Philips apply the same strict confidentiality rules to their living lab facilities as to their technology-inspired research: both firms were approached to conduct interviews, but rejected. This suggests that companies value living labs and ethnography-inspired projects. However, there are some constraints that relate directly to the reasons for which living labs are successful and valuable.

Firstly, although not as extensive as traditional ethnography, living lab projects work on much longer time scales than traditional market research, and are therefore more costly. Luckily, the Irish government and other funding agencies in Europe acknowledge the potential value of a living lab project, and many of the living labs' clients make use of innovation vouchers to fund the involvement of living lab organisations in their product development process. As long as living lab projects are carried out by (semi)public research institutes, the innovation voucher funding is likely to persist – "activities such as market research and market surveys that may be readily provided by the private sector" are ineligible for this form of government funding (Enterprise Ireland, 2012). It is highly questionable if living lab organisations will persist and remain viable when innovation vouchers and other forms of government funding are abolished. So far, the Copenhagen living lab seems to be able to survive as a fully private and independent organisation. However, even this somewhat older and more developed living lab seems to profit from generous Danish innovation policies and funding schemes. In itself, this is by no means a bad thing, but the dependency on funding agencies might become a problem when funding schemes are abolished and doing living lab research is no longer within the reach of SMEs.

Secondly, living lab projects are highly multidisciplinary. This is partly in contradiction with their focus on small and medium-sized enterprises, and indeed, sometimes this ambiguity can lead to flaws and failures in the project execution: a client firm might be preoccupied by day-to-day activities, or too much focused on the technological genius of the product they aim to market. Even firms with staff from other disciplinary backgrounds, such as marketing, can have problems in understanding and complying with the assumptions of a living lab: that nothing is to be taken for granted, and that the answer to the deliberately broad research question is fundamentally unknown at the project's outset. Many of the living lab organisations studied were once part of the academic world and still have an academic approach to their projects, implying that any answer is a useful one, even though it might not help businesses. On the other hand, living lab organisations emphasise the importance of iterative prototyping; the entrepreneurial horses are held back, but they are present, and quick action is what distinguishes living lab projects from traditional consultancy interventions.

Many of the interviewees that were consulted for this research argue that a living lab is a tool that can be used throughout the innovation process, either to gather data that a client firm cannot access, or to focus on user-inspired product development. This thesis suggests that, at least as long as living labs stay close to the academic usage, the use of this tool requires a firm to adopt a wholly different philosophy of broad questions and fundamentally unknown answers, and of users as experts – leading instead of managing, as one of the interviewees put it. Because of the difficulties in mining much of the living lab's data, it can easily be assumed that academia will be catering for this service for at least until the abolishment of innovation voucher policies, and that living labs will remain focused on small and medium-sized enterprises. If living labs want to be viable and profitable without government funding, a lot can be won, it seems, on the selection of client firms that can easily adapt to the living lab philosophy, or already have incorporated that way of thinking. As suggested above, criteria should be sought in staff diversity, innovation traditions, and the type of product that is developed.

From the policy-making side, it must be observed that living lab projects share the traits of both fundamental research (although in the social sciences) and applied research. It depends on the living lab organisation and in what mix these two are offered: there is a whole range of possibilities going from the TRIL centre (fundamental enquiry) to the Copenhagen living lab, and projects such as the Sølund living lab (user-inspired product development). This makes it more difficult to design policies on living labs specifically – so far, luckily, generic policies such as innovation vouchers seem to be sufficient. In the ex-ante evaluation of a living lab project, however, a shift might be needed in terms of criteria, especially when the project is about well-being and not about monetary added value in the first place. Indeed, the products created in living labs can come with financial advantages, but only because they might avoid technology-oriented and thus fail-prone innovation projects. As soon as a living lab organisation has proved itself capable of being more efficient in opportunity selection, this ought to be rewarded by government policy.

Certainly, this research has its limitations. The low number of interviewees and other sources is the main reason that the conclusions cannot be generalised to a broad range of similar organisations. On the other hand, strong links with existing theory have been drawn, and further research can put these links to the test. Furthermore, it was not possible to draw a comparison with in-house living labs at companies like Philips and Siemens – access was denied for confidentiality reasons. This means the insights of the current research might not be generalisable beyond living lab projects for small and medium-sized enterprises. Nonetheless, as this part of the living lab field is largely dependent of government funding, the questions to be answered seem to be more interesting here than in corporate living labs. Further research is needed to assess this statement. Lastly, most of the information in this research comes from the living lab organisations themselves. Getting insights from client organisations and project participants fell beyond the time scope of this research, but might lead to surprising conclusions.

This thesis was a first introduction to a relatively new phenomenon in user innovation: ethnographic approaches and living labs. The research shows that although heavily dependent of government funding, the phenomenon is promising in terms of more effective and efficient innovation processes. In order to be of even more use to corporate innovation processes, living lab organisations have to perfection their hybrid form of academic rigour and entrepreneurial eagerness and flexibility, which may become their one relative advantage. At the same time, the lenses need not be changed entirely, and the selection of client firms, incorporating some prior education on living lab assumptions and processes, might even become stricter.

In the end, a living lab project is a communication and explanation effort.

Interview questions

Introductory questions – Who am I interviewing?

- Can you introduce yourself; give an overview of your educational and professional background?
    - How come you work in a living lab facility?
- Could you introduce the organisation you work for, and describe its main stakeholders?
- How would you describe your role within the organisation?
- What is your relation to ethnographic studies and living labs processes?
- To kick off the interview, could you think of one living lab project that went particularly well, and one that went particularly bad?

On the reasons and rationales of doing living lab studies – Why?

- To you, what is the definition of a living lab? Does your organisation use an explicit definition?
- To you, what is the place and purpose of living labs in innovation processes?
- Could you describe the process of prospecting a living lab study?
    - Annually, how many organisations are interested in your services?
        - What expectations do prospect clients have of living lab studies?
        - What actor within the prospect's organisation typically contacts the living lab?
    - How (and by whom) are research questions, methods etc. defined?
    - At what point (in time, in advancements) a decision is made on conducting the study or not?
        - Who takes this decision, or is responsible for it?
        - What reasons are decisive in this decision?
        - What are the typical arguments of not continuing with a living lab project?
    - How many of your prospects end up by having a living lab study?
    - If a request is turned down, by whom and for what reasons?
- What is the typical time and money investment a client organisation has to make?

On the methods and techniques of living lab studies – How?

- Could you give an overview of a typical living lab procedure?
    - How are users for the living lab study recruited?
        - What are the criteria for being a living lab user?
        - Does your facility have a user pool? If so, what are the (dis)advantages?

        - What reward do living lab users get in return for their participation?
    - What enquiry techniques do you use in a living lab study?
        - Could you name some criteria for picking a certain method or set of methods?
        - Does the client firm have any say in what methods are used?
        - What is the typical professional and educational background of the people conducting a living lab study? Do they receive extra training? For what skills?
        - Does your living lab facility have any specialities or preferred methods?
- According to you, what are the key factors in conducting a successful living lab research?
    - How and by whom is the fulfilment of these factors evaluated?

On the results, impact and future of living lab studies

- What is the typical deliverable (presentation, report, workshop, …) concluding a project?
    - What is the typical professional and educational background of the people having to apply the results of your living lab study? What is the biggest difference with an ethnographer?
    - Could you describe the challenges (if any) of communicating ethnography to innovators?
    - What, in your opinion, is the most important source of these communication difficulties?
    - What is done to counter these difficulties?
- What is a client's typical follow-up to a living lab project?
    - To what extend the living lab is involved in this follow-up?
    - Could you estimate to what extend this follow-up follows the living lab's conclusions?
    - What would be a client's rationale for deviate from your recommendations?
- What are critical factors in the impact of living labs on innovation?
    - Could you rank these factors in terms of importance?
- According to you, will living labs become a mainstream part of innovation processes?
    - What are the criteria for ethnography and living labs to remain essential for innovation?

Concluding questions

- What would be your own research question on living labs?
- Do you want to add anything to your answers; is there anything I have forgotten to ask?
- Do you have any recommendations on who to interview next?

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