Research Day
4th European Network of Living Labs Summer School
Manchester, August 27th, 2013

The European Network of Living Labs publishes a collection of Proceedings from the 4th ENoLL Living Lab Summer School Research Day on August 27th, 2013. Research day consists of three session, a i) plenary focusing on Living Lab research foundations, concepts and tools, and two parallel session on ii) Urban and territorial innovation with Living Labs and iii) Case studies in Living Lab application domains.

For more information, see here the call for abstracts/papers.

RESEARCH SESSION 1  (PLENARY): LIVING LAB RESEARCH FOUNDATIONS, CONCEPTS AND TOOLS

Living Lab research foundations, concepts and tools.

Session chaired by Prof. Pieter Ballon, Vrije Universiteit Brussels, SMIT iMinds

1. In-situ methods as innovative approaches to effective co-creation of urban public spaces
   Katerina Frankova, Andree Woodcock

2. Imagine Infinite Bandwidth and Zero Latency: an approach to engaging stakeholders in the early stage innovation
   Steve Walker, Simon Bell, Daniel Heery

3. Identifying Lead Users in a Living Lab Environment
   Lynn Coorevits, Dimitri Schuurman

4. Co-creating an open working model for Experience & Living Labs willing to provide services to external players
   Nicola Doppio, Fabio Pianesi

5. Motivational Factors Influencing User Co-creativeness in Living Labs
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Urban and territorial innovation with Living Labs
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RESEARCH SESSION 3 : CASE STUDIES IN LIVING LAB APPLICATION DOMAINS

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1. Building on a living lab in dementia care: A transnational multiple case study
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   Raymond Bond, Maurice Mulvenna (presenter), David Kane, Andrew Bolster, Dewar D Finlay, Suzanne Martin,

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4. Open innovation systems for value creation and knowledge exchange: results from the Flemish LeYLab Living Lab
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   Anne Äyväri

6. A Living Lab approach to the development of a consumer care service platform for older people
   Nikki Holiday, Gill Ward, Darren Awang, David Harson

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RESEARCH SESSION 1  (PLENARY): LIVING LAB RESEARCH FOUNDATIONS, CONCEPTS AND TOOLS

1. In-situ methods as innovative approaches to effective co-creation of urban public spaces

Katerina Frankova and Andree Woodcock; Coventry University

Abstract

In view of the growing importance of public consultation in urban regeneration, and the ongoing ambiguities in effective public involvement, this research explored the effectiveness of two in-situ public consultation methods – the photographic diary and the walking discussion. Through their application in two test-consultations, the results indicate that by immersing the participants in the space under discussion, these methods succeed at capturing valuable first-hand user knowledge. By being relevant, location specific, actionable and contextual, data derived from these methods may be used by professionals to co-create more successful urban public spaces with the assistance of the users of these spaces. Results show that both methods offer innovative approaches to involving the general public in co-creating the physical environment around them.

Key words

In-situ methods, walking discussion, photographic diary, public consultation, urban public spaces, user knowledge

Introduction

The doctoral research presented in this paper focused on evaluating the effectiveness of currently under-researched approaches to public consultation in the context of urban public space regeneration. This paper explores two of these methods – the photographic diary and the walking discussion. Being examples of experiential and in-situ methods, they are both conducted within the space that is
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earmarked for regeneration. As such, they facilitate contextual user involvement. The study responded to the fact that despite public involvement now being a key component of urban regeneration, as well as wider policy and practice in the UK and abroad, there is evidence that the public is not always effectively involved.

The paper begins with an overall introduction to public involvement in urban public space regeneration and subsequently narrows down to public consultation in particular. The need for in-situ consultation methods is explored, together with the potential of mobile and visual methods in public consultations when looking at co-creating urban public spaces. The two methods (i.e. the photographic diary and walking discussion) are outlined in more detail, together with their application in the context of this research. Before discussing the effectiveness of the chosen methods based on their application in two case study locations, the evaluation framework is introduced, together with a universal effectiveness definition. The paper concludes with some general learning points, useful for the Living Labs community.

Public involvement in urban public space regeneration

Since the 1990s, public spaces have been acknowledged for their positive contribution to the lives of urban dwellers (Gehl, 2007; Cattell et al., 2008) and social, cultural, environmental, health and other benefits (ibid.; Williams and Green, 2001; Woolley, 2003; CABE Space 2004). Consequently, the importance of public spaces has been recognised by statutory and community planning processes (CABE Space, 2009) and their regeneration often forms part of urban regeneration strategies (Holland et al., 2007; Worpole and Knox, 2007). This may involve the design, (re)development, renewal as well as maintenance of such spaces. Importantly it has been recognised that the lay knowledge of the everyday users of these spaces – the general public – can be harnessed to co-produce such spaces in accordance with the public’s needs, views and aspirations. This is because despite the growing awareness of what aesthetically, functionally and maintenance-wise constitutes successful urban public spaces (Williams and Green, 2001; CABE Space, 2004; Bell et al., 2007), these are rarely achieved (PAN 65, 2008). As the principal users of urban public spaces, the general public are believed to have ‘the greatest wealth of subjective knowledge of their own experiences’ (Watt et al., 2000: 122). Coming from a different perspective to that of the ‘experts’, citizens may consider a wider range of problems and solutions that are relevant to their everyday lives and which may be overlooked by the professionals (Titter and McCallum, 2006; Horlick-Jones et al., 2007). As such, considerable value is placed on their knowledge (Fiorino, 1990; Day, 1997; Rydin and Pennington, 2000) and its potential contribution to the regeneration and co-creation of urban public spaces (Mean and Tims, 2005; Sanders, 2006; Lee, 2007, 2008).

‘The success of particular public space is not solely in the hands of the architect, urban designer or town planner; it relies also on people adopting, using and managing the space – people make places, more than places make people.’

(Worpole and Knox, 2007: 2).
In the UK, public involvement is no longer an option, but a requirement (LGID, 2011). However, although public involvement is now a key component of not only urban regeneration, but also wider policy and practice in the UK (and worldwide) (Innes and Booher, 2004; Smith, 2008), it has been argued that the public is not always involved in the most effective manner (Taylor, 2003; Robinson et al., 2005; Chess and Purcell, 1999; Weblé and Tuler, 2002; Rowe and Frewer, 2004, 2005). Despite the rhetoric and the general argument that public involvement should be conducted effectively (Burton et al., 2004; HM Government, 2008) in order to achieve ‘better decisions and better implementation’ (DETR, 2001: 20), governmental and other documents generally fail to stipulate how this should be achieved. Benefits of conducting evaluations are clearly advocated (Robson, 2000; Rowe and Frewer, 2004), however in practice these prove challenging and may be limited and not conducted in a systematic manner (Chess and Purcell, 1999; Burton et al., 2004; Abelson and Gauvin, 2006). The key reasons for this include the absence of agreed evaluation criteria against which the success or failure of different methods could be measured, a lack of evaluation instruments, the absence of clear definitions and the general uncertainty of how to conduct evaluations (Rosener, 1978, 1981; Lowndes et al., 1998; Rowe and Frewer, 2000, 2004). As such, there remains a gap in knowledge regarding the methods by which the public could be effectively involved in regenerating urban public spaces. This research aimed to address this gap by developing an effectiveness framework and using this to critically examine and iteratively refine under-researched consultation methods. Before reporting on the results of these evaluations, the concept of public involvement will be briefly discussed.

Consultation vs. public involvement

The concept of public involvement remains ambiguous in both theory and practice (White, 1996; Innes and Booher, 2004; Burton et al., 2006). Often, terms such as ‘involvement’, ‘participation’ or ‘consultation’ are used interchangeably (Rowe and Frewer, 2005; Kasim, 2011), even though they can be used to refer specifically to different levels of public involvement, ranging from information provision to citizen control (Arnstein, 1969; Robinson et al., 2005; Smith, 2008). This research focused on ‘consultation’, which McLauglin et al. (2000: 155) defined as ‘a process in which stakeholder views are sought’. However, when consulting there is no guarantee that the obtained information will be incorporated into a policy or decision making process (ibid.; Catt and Murphy, 2003). As such, the public’s involvement is limited to advising or providing information. Still, McLauglin et al. (2000) argue that it marks a step towards full participation (see Arnstein (1969), Weblé and Tuler (2002), Bishop and Davis (2002) and Rowe and Frewer (2005) for a further discussion of public involvement).

In-situ consultation methods
The photographic diary and the walking discussion used in this research were selected as being under-researched. They are both examples of in-situ methods, with the photographic diary being a visual method and the walking discussion a mobile method. They are conducted in the actual environment under discussion. Finney and Rishbeth (2006: 29) have pointed to a notable absence in the use of experiential methods, highlighting that 'research and public consultation about the use and perception of open spaces [...] has predominantly been conducted in places and situations removed from these open spaces'. The use of ex-situ methods may result in generalised accounts and rely on memory, which may not always be accurate (Hobsbawm, 1997). However, in-situ methods offer the opportunities for embodied and multi-sensory experiences of the spaces under consideration (Ross et al., 2009).

Although mobile and visual methods have received increased attention in recent years, mobile methods especially are still considered ‘novel’ due to their little systematic application (Becker, 2004). Inspired by the ‘new mobilities paradigm’ (Sheller and Urry, 2006; Büscher and Urry, 2009), a small but growing number of social scientists and other researchers have adopted mobile methods to engage with ideas of place, identity and people’s relationships and connections with space (Kusenbach, 2003; Jones et al., 2008; Carpiano, 2009; Moles, 2010). The expansion in visual methods has been driven by a renewed interest in people and places, a shift towards more discursive forms of enquiry and advances in digital technologies (Dodman, 2003; Knowles and Sweetman, 2004). Visual images comprise of video, photographs, maps, diagrams and drawings, but photographs remain the most popular with social scientists (Rose, 2007). Although visual methods are used in anthropological, ethnographic, social and psychological research (Blinn and Harrist, 1991; Dodman, 2003; Prosser and Loxley, 2008; Lombard, 2013) and in design settings (Sanoff, 1991; IDEO, 2003; Boradkar, 2011; Noble and Bestley, 2011), they have not necessarily been applied in consultation settings. They are used during public exhibitions or to create 'photo surveys' or 'elevation montages' (Wates, 2000). However there is paucity of examples where photographs have been created by participants and systematically analysed in terms of their effectiveness in providing insight for regeneration. As Myers (2010: 330) argues, ‘participatory photo-methodologies remain uncommon in geography’. Visual methods offer an opportunity for an alternative mode of expression, where photographs can act as unique sources of evidence (Knowles and Sweetman, 2004; Rose, 2007). As with mobile methods, current debates include the extent to which such methods can capture opinions different to those obtained by traditional ex-situ approaches (Ricketts Hein et al., 2008):

‘Methodologies that capture the ways in which people […] value places are becoming increasingly desirable to policymakers, planners and designers. It is thus possible to point to theoretical, political and practical forces that are driving the development of mobile methods at the current time.’ (Ricketts Hein et al., 2008: 1266).

Overall, although approaches similar to the photographic diary and the walking discussion have been applied in research contexts, there remains a gap in
knowledge regarding the two methods’ application and effectiveness when used for consultation purposes. As such, research was conducted to determine how these two in-situ methods may benefit consultations about regeneration of urban public spaces.

Both methods were applied in two test-consultations. A developmental two-phased process was utilised, where findings from the first case study – a university campus – informed the re-application of the methods in a second case study – an urban park. In both cases, the methods were used to gather the participants’ views, opinions, concerns, ideas and suggestions for the regeneration of these spaces. The effectiveness of each method was evaluated using a three-perspective evaluation framework, described in Section 6.

**Methodology**

Within the context of this research, both methods were used at a pre-design stage of a potential project. The methods were used to elicit public views on what aspects of the selected spaces were liked and disliked, ideally uncovering some underlying reasons for these views, and generating ideas how the locations could be improved.

1.1 *Photographic diary*

The photographic diary was compiled by individuals taking photographs in a particular urban public space. The photographs were accompanied by short written explanations of why and where participants took the image, what they liked or disliked about the photographed space and ideas on how it could be improved. Each case study had eight photo-diarists – sixteen in total. In the first case study, participants were given disposable cameras to take up to 24 images and a paper notepad to record their thoughts. They had three weeks to complete the task. In the second case study, disposable cameras were replaced with digital ones and the paper notepad was replaced by an electronic Word template. The duration was decreased to one week and the maximum number of images to twelve. These alterations were informed by the experience of the first study. Although photographic diaries have been used previously (Blinn and Harrist, 1991, Dodman, 2003, Young and Barrett, 2001, Latham, 2003, 2004 and others), they have not been used for consultation purposes.

1.2 *Walking discussion*

The walking discussions involved a group of participants and a facilitator walking around a particular site, discussing the space and how it could be improved. Discussions were voice recorded. In the first case study, three two-hour sessions were held, with groups ranging from three to five participants. In the second case study, four one-hour sessions were conducted, with four to six participants per group. Altogether, there were 31 walking discussion participants. While the discussion in the
first case study was structured by the facilitator, in the second phase the researcher took a step back and let the discussion naturally progress. As such, more influence was granted to the surrounding environment, as mobile methods are advocated for their ability to facilitate ‘three-way conversations’:

‘A mobile method becomes a ‘three-way conversation’ with the interviewer, interviewee and locality engaged in an exchange of ideas: place has been under discussion but, more than this, and crucially, underfoot and all around and as much more of an active, present participant in the conversation, able to prompt and interject’. (Hall et al., 2006: 3).

Other researchers have used mobile methods in research contexts to explore perceptions of problems, urban design, sense of place and the experiences of growing up in localities undergoing change (Kusenbach, 2003; Jones et al., 2008; Jones and Evans, 2012; Hall, 2009). These were based mostly on one-to-one interactions. In practice, informal walkabouts or reconnaissance trips (Wates, 2000) are utilised. The walking discussion responded to a gap in knowledge regarding group-based mobile consultation mechanisms.

**Analysis: Effectiveness evaluation**

Drawing on previous literature (Fiorino, 1990; Webler, 1995, 1999; Chess and Purcell, 1999; Rowe and Frewer, 2000, 2005; Hartley and Wood, 2005), for the purposes of this research, an effective consultation method was defined as one which achieves its intended purpose (i.e. fulfils its aims and objectives), is fair and representative, gives participants the opportunity to express their views, maximises relevant information, achieves a balance between the expectations of different stakeholders and brings participants personal benefit (Frankova, 2013).

Following Rowe and Frewer’s (2005) agenda for evaluation, an evaluation framework was developed to assess the methods’ effectiveness. The evaluation framework consisted of three perspectives – data quality, participant perspective and researcher perspective (Figure 1). In this case, the sponsor perspective was not included, as the ‘test’ consultations did not have sponsors per se. In order to achieve a holistic evaluation, the perspectives of a variety of stakeholders should be explored (Chess, 2000).

Data quality was analysed against the following criteria: relevance, location specification, clarity and actionability (i.e. the level of detail and degree of specific suggestions for improvement in a comment) (Table 1). These criteria were established through literature and the review of several local authorities’ online reporting forms. They were also validated in interviews with urban regeneration professionals (Frankova, 2013).
The data yielded by photographic diaries came mostly in the form of relatively short written comments. It was coded against the individual criteria, as detailed in Table 1 by three independent raters. The images themselves served as evidence to the comments but were not subjected to critical visual analysis (Rose, 2007). The walking discussion transcripts were subject to general textual analysis, which discussed the same data quality criteria in a narrative format. All data was also explored in terms of sentiment (compliment, complaint, general comment) and theme.

| Table 1: Data quality criteria and codes utilised to analyse photographic diary data |
|---------------------------------------|-----------------|----------------|
| **Criterion**                        | **Code**        | **Details**    |
| **Relevance**                        | Relevant (1)    |                |
|  - Is the comment relevant to the purpose of the study, i.e. regeneration of urban public spaces, physical environment, | Irrelevant (2)  |                |

Figure 1: The three perspectives of the evaluation framework
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<tr>
<th>redevelopment?</th>
<th>Yes (1)</th>
<th>Location specified</th>
</tr>
</thead>
<tbody>
<tr>
<td>No (2)</td>
<td>Location not specified</td>
<td></td>
</tr>
</tbody>
</table>

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<tr>
<th>Location vs. image (PD only)</th>
<th>Yes (1)</th>
<th>Location can be determined from the image itself</th>
</tr>
</thead>
<tbody>
<tr>
<td>No (1)</td>
<td>Location cannot be determined from the image itself</td>
<td></td>
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<tr>
<th>Clarity</th>
<th>Clear (1)</th>
<th>Partly clear (2)</th>
<th>Part of the comment is not really clear, we may not know what the person meant even based on the context</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unclear (3)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<th>Actionability</th>
<th>Not actionable (1)</th>
<th>No suggestion for improvement, irrelevant comments or statements</th>
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<tr>
<td>Partly actionable (2)</td>
<td>Points (vaguely) to a problem or identifies a lack of something and gives some sort of suggestions, however this is not particularly specific</td>
<td></td>
</tr>
<tr>
<td>Actionable (3)</td>
<td>Points to a problem or identifies a lack of something and provides a specific suggestion how to remedy it</td>
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<tr>
<th>Additional considerations:</th>
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<tr>
<th>Sentiment</th>
<th>Compliment (1)</th>
<th>Positive comment, compliment</th>
</tr>
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<tbody>
<tr>
<td>Complaint (2)</td>
<td>Negative comments; but also not necessarily a negative comment, but one that identifies a lack of something – something missing, something that could be improved</td>
<td></td>
</tr>
<tr>
<td>General comment (3)</td>
<td>Neutral, general comments and statements</td>
<td></td>
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<tr>
<th>Theme</th>
<th>A variety of themes was used, appropriate for each case study</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the main topic of the comment/discussion?</td>
<td></td>
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</table>

The participant perspective on the effectiveness of the method was obtained via a questionnaire which considered perceived effectiveness, advantages, disadvantages and barriers, the opportunities to express opinions, contact time, likelihood of paying more attention to the surrounding environment after taking part and other topics.

The researcher’s perspective combined all the perspectives and supplemented the findings with personal reflections (Kolb, 1984; Schön, 1983, 1987), methodological
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observations and more theoretical discussions. By triangulating the data, a more rigorous evaluation of the consultation methods was achieved.

Results

Photographic diary

The sixteen individual photographic diaries generated a considerable amount of data, which could be considered of ‘high’ quality. At the university campus 112 comments\(^1\) were generated, from which 105 were rated as ‘relevant’. All 90 comments relating to the urban park were ‘relevant’. Over 90% of all relevant comments were also ‘clear’, implying that the participants’ annotations, however brief or comprehensive, were easily understandable. In terms of ‘actionability’, comments relating to the university campus were almost equally split between non actionable, partly actionable and actionable comments. While non actionable comments were mostly compliments, over two thirds of the comments included some constructive input for the improvement of the space (partly actionable and actionable comments). At the urban park, there was a decrease in the percentage of actionable and partly actionable comments. Still, together these comprised more than half of all comments (56.7%). Furthermore, for both phases, the data featured an almost equal amount of compliments, complaints and general comments, representing an input which was not skewed towards only negative comments. Interviews with professionals confirmed that data that is balanced in terms of sentiment and provides a range of detail and constructive input is considered as ‘useful’ for regenerating urban public spaces. As such, the method succeeded in capturing public views not only in terms of what could be improved and how, but what was already done well and was thus ‘well received’. Comments related to a variety of themes including ‘public realm’, ‘street furniture/public art’, ‘trees/hedges’, ‘sense of identity’ and others, but also ‘miscellaneous’ implying that participants photographed unexpected aspects and almost ‘hidden gems’, which can generally remain overlooked (Table 2) (Latham, 2004). Most importantly, the content was fully generated by the participants themselves, reflecting what was of importance to them. Participants claimed they rarely went out of their way to take photographs – instead, they recorded aspects along their regular routes, capturing their ‘everyday’ use of the spaces. They were not asked to create artistic images – instead, the images captured the places’ ‘texture’:

‘Photos can convey a ‘feel’ of specific locations very effectively; they can show us details in a moment that it would take pages of writing to describe.’
(Rose, 2007: 247)

Table 2: Example of ‘miscellaneous’/public realm’ comment (complaint, partly actionable)

\(^1\) The term ‘comment’ is used, as the analysis was based on the textual annotations provided
Location specification, however, proved problematic. While almost all university campus comments had their location specified, identifying exact locations in the park proved considerably more difficult. At the campus participants could refer to specific buildings, shops, streets and other features, but the park offered limited reference points that could be clearly described - only half of comments had their location specified. In this case the photographs proved particularly valuable and they helped in pinpointing exact locations for 90% of the images. This challenge might be overcome by providing participants with a simple map on which location where images were taken could be recorded.

Participant evaluations revealed that the photographic diaries offered an enjoyable consultation methodology. Participants enjoyed the process of taking photographs, reflecting on them and experiencing the locations in a slightly different and more direct manner. Through the diaries, some participants noticed trivial features or those previously overlooked (Latham, 2004) while others claimed to have become more attentive and appreciative of their surrounding environment. The main benefit of the method was identified as increasing focus, forcing participants ‘to keep an open eye’, encouraging creative thinking and enabling participants to express their views in their
own time and with little restriction. As such, it allowed a degree of autonomous self-expression without an outside agenda or influence. At the same time, the images served as evidence to the opinions raised, increasing their reliability. Time and effort were mentioned as the main disadvantages of the method, however participants were still positive and confirmed they would have kept a photographic diary again.

As mentioned in Section 5, while at the university campus participants used disposable cameras and paper notepads, photographs around the park were taken digitally and annotations completed electronically. It was assumed that a digital version of the diary would increase convenience and encourage greater reflection. Instead of competing annotations ‘on site’ (which some participants found inconvenient due to weather and other reasons), participants could complete these later while viewing the actual images. However, this did not prove to be the case. Instead of the time between taking a photo and annotating it encouraging reflection, it turned out to be time in which details were forgotten, with several participants revealing that they could sometimes not recall the reasons for taking some photos. They admitted that they should have made notes while ‘on site’ to serve as a reminder. As such it is argued that the main value of the method lies in the unique way in which the participants engage and think about the environment – through the viewfinder of the camera – rather than reflecting on actual images.

‘Keeping a photo diary makes you look at life around you differently. It is often remarked that we tend to take in the visual scene before us quickly – indeed, in a flash. We only look again, more carefully, if we sense that we need to. […] Knowing that you will be photographing something during the day forces you to step more often out of that ‘in a flash’ mode, and to take a longer look, because you are thinking: Shall I photograph that?’ (Chaplin, 2004: 43)

Several key learning points were identified by the researcher. To increase the convenience of the method, a more hybrid (digital and non-digital) version may be more suitable, responding to the abilities and preferences of individual participants. Instead of giving a time limit, specifying a maximum number of images may be more suitable, as participants tended to take their photos in two or three ‘sessions’ rather than throughout the whole ‘photo period’. A simple diary structure proved beneficial. When participants decided to follow it, they tended to provide a more comprehensive, insightful and constructive input in a structured format, sometimes even revealing personal connections to the spaces. However, in order to achieve this, the method and instructions need to be as simple as possible, ideally conveyed face-to-face to ensure participants’ full understanding of the task.

Overall, through direct immersion in a space, the photographic diary became a medium capturing the participants’ everyday use of specific sites, together with their knowledge of these areas (Murray, 2009). Through the camera viewfinder, participants appeared to perceive and engage with the surrounding environment in a different, more reflective manner. Instead of just pointing to what participants liked or disliked, they contemplated how things could be improved. The photographs provided visual evidence for the issues brought up in the diaries, representing what
mattered to the participants, thus generating data which may be more effective for regenerating urban public spaces than that obtained through other, non-visual and ex-situ methods.

**Walking discussion**

While the photographic diaries were flexible in terms of time and completed individually, the walking discussion was a group-based method. Like other group-based mechanisms, it emerged from a ‘collaborative performance’ (Goss and Leinbach, 1996) and deliberation among the different group members, resulting in aggregated information, rather than separate input from individuals (Conradson, 2005; Rowe and Frewer, 2005). However, although influenced by the group composition and the personal characteristics of participants, the traditional power dynamics were reduced in the in-situ environment and a more ‘equal’ atmosphere was created than was noted in a comparison ex-situ focus group (Frankova, 2013). As such, more free-flowing conversations among the participants were achieved, especially in the park case study, when the facilitator took a more passive role in the session. This ‘passive facilitation’ granted more influence to the surrounding environment, be it natural or built. It became an active walking probe (De Leon and Cohen, 2005), triggering most of the discussion points, where a facilitator needed only to ensure that all participants could have their say. Unlike in ex-situ situations, where some stimulus materials are needed to keep the participants focused (Frankova, 2013), the actual movement and first-hand experience of space ensured a dynamic progression of the session. As such, no stimulus materials proved necessary for the walking discussions. On the contrary, the discussion not only focussed on what was of importance to the participants, but remained relevant to the consultation and covered a variety of different themes.

The first-hand and multi-sensory experience and interaction between the participants and the surrounding environment, and the dialogue among the participants, resulted in contextualised, informed and actionable public input, which could be constructively used in the process of co-creating urban public space. Necessary clarifications could be made then and there. Being in-situ, participants rarely went off-topic, discussed relevant themes and often came up with realistic propositions for improvement, which were attentive to the wider context (Frankova et al., 2013). Rather than relying on memory, they could view the space as it was at that moment. Therefore, instead of being dismissive, participants could appreciate what was already good about a space and in their suggestions for improvements demonstrated awareness of existing constraints in a location. Although opinions may have not been changed, participants were more open to different perspectives. Apart from exploring the present, the multi-sensory experience also created paths into the participants’ memories as well as imagined futures (Anderson and Moles, 2008; Ross et al., 2009). Overall, the method succeeded at capturing relevant, clear, location specific and actionable local knowledge, which was balanced in terms of sentiment and theme and was more comprehensive, also capturing the ‘sense of place’ and ‘identity’.
As with the photographic diaries, participants enjoyed the walking discussions. They recognised and highlighted the benefit of being taken out of a ‘neutral’ environment and exploring a space in-situ. They also valued the opportunity to discuss their views with others and learning about the particular locations. Time, effort and mobility problems were viewed as potential barriers, but these would generally apply to other consultation methods, too, and did not appear too restrictive in practice.

Interviews with professionals confirmed interest in learning more about the use of in-situ methods in consultation practice, but also revealed the belief that such methods are more difficult to organise. Apart from the challenges of direct recruitment (Holbrook and Jackson, 1996; Kong, 1998) – which would generally apply for any method – the operationalisation of the walking discussions was considered smoother than conducting a focus group (Frankova, 2013). The need for arranging a venue was avoided. Although the facilitator needs to remember the key points that should be discussed, in the dynamic setting of the walking discussion a rigid discussion schedule is not necessary. The surrounding environment is likely to act as a walking probe and inspire most of the discussion themes. As already mentioned, stimulus materials are not needed either, as the method works the best when kept as simple as possible, relying only on verbal communication. However, the information should be voice recorded. One hour should prove sufficient for a walking discussion. More time may be necessary for larger areas, but should not exceed two hours. The ideal group size was identified at between four and five participants, plus a facilitator. A smaller group limits the opportunities for deliberation, while larger groups (six and more) have the tendency to split up and can cause obstruction (Figure 2). A fixed-route approach was adopted in both case studies, obtaining a cross-section of responses to the same locations (Jones et al., 2008). Participants appeared reluctant to initiate diversions or group stops and thus participant-led routes may be more suitable in one-to-one scenarios (ibid.; Kusenbach, 2003; Carpiano, 2009).

Figure 2: Walking discussion at an urban park
The value of in-situ methods: main lessons for the Living Labs community

The photographic diary, completed individually, encouraged participants to engage with the surrounding environment in a unique way – experiencing it through the viewfinder of the camera stimulated reflection and more creative thinking. During the walking discussions the surrounding environment acted as a walking probe and initiated majority of the discussion topics, which remained focused and relevant to the consultation. As such, the immersion in the space contributed to generating data more constructive than that obtained through ex-situ methods (Frankova, 2013). Both methods succeeded at obtaining the participants’ first-hand knowledge of the case study areas and captured what was of particular importance to the participants. They also provided information about the public’s spatial use of areas – all data which can be creatively used by professionals to regenerate spaces in view of the requirements, wants and needs of the users.

Participants’ evaluation was mostly positive and consistent across both case studies, pointing to a level of reliability in their perceptions of the methods’ effectiveness. Participants also demonstrated increased appreciation of their surrounding environment after having taken part in the photographic diary or the walking discussion.

Overall, the two methods succeeded at capturing data otherwise unattainable by other methods. The data was insightful, constructive, highly relevant, clear, location specific and balanced in terms of sentiment as well as actionability. As such, it captured considerably richer and more useful data than ex-situ methods. Such information, often capturing the ‘sense of place’ of particular areas, could be used more constructively by professionals in the process of co-creation. Furthermore, both methods facilitated a unique experience for the participants, possibly resulting in some personal empowerment.

The results demonstrated that when involving the public in co-creating physical areas, immersing the participants in the space under discussion facilitates contextual user involvement. It results in the creation and capturing of the users’ knowledge, together with multiple layers of meaning, which may be difficult to obtain using other, ex-situ, approaches. The use of methods such as the walking discussion and the photographic diary can aid a creative process, which is attentive to the users’ needs. As such, these methods can be considered as more effective and innovative at consulting the public about the regeneration of urban public spaces than ex-situ and less-experiential methods.

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2. Imagine Infinite Bandwidth and Zero Latency: an approach to engaging stakeholders in the early stage innovation

Steve Walker, Simon Bell, Daniel Heery

Abstract

Physical telecommunications infrastructures raise particular issues in the engagement of communities and stakeholders. While detailed debates about the configuration of such networks can be rather arcane their significance is widespread, with consequences for people variously as citizens, customers, innovators, entrepreneurs, educators and social activists. This paper reports and reflects on the ‘Infinite Bandwidth, Zero Latency’ (IBZL) initiative under the Manchester Living Lab umbrella, which aimed to move consideration of the potential of new broadband infrastructure to the level of innovative applications rather than architectural detail.

IBZL was a collaboration between researchers from The Open University's Faculty of Mathematics, Computing and Technology, and Manchester Digital, a trade
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...association of mostly micro- and small- enterprises operating in the digital and creative industries in and around the city. Partly as a result of Manchester City Council’s long track record of promoting digital and networked technologies since the late 1980s, and which underpins the Living Lab, there is a flourishing digital community in the city and a widespread commitment to engaging local community organisations in digital work. A recent and important aspect of these developments has been a digital strategy with a high speed broadband infrastructure at its centre.

IBZL is essentially a thought experiment, exploring ideas through a participatory engagement approach adapting the ‘Imagine/Triple Task Method’ (Imagine/TTM) method. Imagine/TTM was originally developed in the context of sustainable development, and draws on Soft Systems Methodology. The approach takes participants through four ‘events’: reviewing the current situation; prioritising issues; envisaging future options; and developing a forward plan. The output of each event is captured and fed in to subsequent stages. As used in IBZL, the outputs ‘Phase 1’ workshops which employed an Imagine/TTM cycle were clustered and used as ‘seeds’ for ‘Phase 2’ workshops which used the same approach, to refine the ideas and identify potential projects and clusters of interested people.

A proposal for a feasibility study ‘Real Rural Avatars’ investigating the use of remote tourism and livestock management in the North Pennines was one such potential project, led by a social entrepreneur from Alston Cybermoor, a technology-based social enterprise. A proposal to the UK technology Strategy board for a feasibility study/proof of concept was successful, and a demonstrator was implemented to gather feedback from local stakeholders.

We report on the use and outcomes of Imagine/TTM as adapted in IBZL, through to the point of a proof of concept demonstrator. We reflect on the strengths and weaknesses of the approach, and propose Imagine and IBZL, refined and developed over the course of the project, as outcomes and techniques which can contribute to widening participation in Living Labs in the very early stages of framing how emerging technologies are viewed.

Keywords

Next Generation Broadband, infrastructure, Participatory workshop, Imagine/Triple Task method.

Research Questions

Can we envisage genuinely innovative applications of infrastructures such as ‘next generation’ or ‘superfast’ broadband networks?
Can we use methods from the participatory development movement, specifically Imagine/Triple Task method, to generate novel ideas for the application of emerging technologies before specific user groups can be identified?

Main results
The TTM/Imagine approach, as implemented in IBZL, led to the engagement of a diverse set of actors in the generation of a range of novel ideas for the exploitation of next generation broadband networks. This was developed through to proof of concept in the case of the 'Flying Shepherd' and 'Real Avatar' demonstrators. This may provide the basis of a generalizable methodology for early-stage stakeholder engagement in envisioning alternative sociotechnical futures.

Main lesson/take-away for LLs

The Imagine method provides an effective way of engaging a wide range of stakeholders in a) generating ideas for novel applications at very early stages before clearly identifiable groups of users can be identified, and b) refining and developing ideas to the stage at which they can be presented as project proposals/proofs of concept, as demonstrated by the 'Flying Shepherd' and 'Real Avatar' examples.

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3. Identifying Lead Users in a Living Lab Environment

Lynn Coorevits, Dimitri Schuurman, Aron-Levi Herregodts

Abstract

This paper emphasizes the identification process of lead users within a living lab environment. Lead users are seen as important contributors to the living lab methodology since they express needs before the general market does. Additionally they generate ideas with a high level of novelty. Living Lab researchers have focused on the added value of involving these users in their research, but research on how to identify these lead users is still lacking. Therefore this paper will focus on the identification process of lead users by means of a Living Lab case study in the world of movie theaters.

Keywords: Living Labs, Lead Users, User-Centric Innovation

Introduction

Innovation is widespread in society, entailing the search for new products and services delivering an added value to the customers. Companies are continuously seeking for possible ways to innovate, trying to keep up with the changing trends in
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The market. Nevertheless, there is a high risk associated with new product and/or service development (Luthje & Herstatt, 2004), making the possibility of risk reduction an important determining factor in the decision to innovate. In the past, companies mainly focused on their internal processes to innovate, frequently resulting in higher failure rates. The end-users were not taken into consideration until researchers and practitioners recommended their involvement to reduce risk and failure. They suggested the alignment of key activities with the needs of actual and potential customers. This customer focus would then translate in quality, reliability and uniqueness of a product and as such a better market performance (Luthje & Herstatt, 2004). The Living Lab movement emerged from those closed innovations contexts, including end-users in the process. Real life environments and involvement of end-users are central to the living lab methodology. They contain different stakeholders such as research organizations, companies and public industry to collaborate and develop new products and services (Ståhlbröst, 2008). The concept of lead user involvement can be traced back to Von Hippel in the late seventies. He suggested the importance of involving lead users in innovation, initially in a B-to-B context, later on also in a B-to-C environment. According to Von Hippel, lead users face specific needs months or years before they appear in the general marketplace and expect to benefit significantly from obtaining a solution for their needs (Von Hippel, 1976, 1986). These lead users can be found in the market that is under investigation or in other markets facing similar problems. A major problem related to these lead users, is the fact that they are relatively rare and sometimes hard to trace. A significant amount of research has been conducted on the importance of using lead users in the innovation process for various sectors, but there is a lack of research showing how to identify them. This paper will tackle the process of identifying lead users in a living lab environment by means of a case study in the movie theater industry, the iCinema-project.

Living Lab

Living Lab-research is a state-of-the-art methodology aiming at the involvement of end-users in the innovation process. Living Labs are experimental platforms where end-users can be studied in their everyday context (Eriksson, Niitamo, Oyj, & Kulkki, 2005). Living Labs confront (potential) users with (prototypes or demonstrators of) products and/or services in the innovation process (Schuurman & Marez, 2012). This approach has three main advantages. First it assists in developing more context-specific insights on development and acceptance processes and especially the interaction between both. Second these experiments inform us about possible conditions for stimulating the societal and economic embedding of technology. Third embedding it in real life situations generates images of potential societal impacts of innovation (Frissen & van Lieshout, 2004). They function as an ecosystem with different stakeholders, where end-users are subjected to a variety of research methods, quantitative as well as qualitative. They illustrate that users not only initiate the process of innovation, but can dominate the subsequent phases of product development as well. Within those end-users, lead users have been suggested as the users to incorporate in the living lab methodology (Schuurman & Marez, 2012), especially because their innovations are commercially attractive (Luthje & Herstatt, 2004).
Pierson & Lievens (2005) identified five stages in the process configuration of living lab research. The case ‘iCinema’ follows those stages to develop a new product.

1. **Contextualization** is an exploratory phase. Different research methods are applied to provide the required background and insights. The research is done on two levels, technological and social, resulting in a technological scan and state-of-the-art study. The contextualization allows us to define the selection criteria and profiles of end-users.

2. **Selection** is the identification and selection of end-users that will be involved in the living lab research. In the selection phase non-probability sampling is used, such as maximum variation based on socio demographic variables or criterion sampling trying to understand the different factors and their configuration.

3. **Concretization** is the initial measurement of the selected users before the technology or service is introduced. Specific characteristics of the users are measured such as their behavior and perception on the technology. This is often done via a (semi) structured questionnaire, measuring user specific and case specific components.

4. **Implementation** is the operationally running test phase of the Living Lab. There are two major research methods being used: direct analysis by registering user actions remotely (e.g. logging) or indirect analysis by researching the motivations via focus groups, interviews and self-reporting techniques.

5. **Feedback** happens at the end of the living lab. It exists out of an ex-post-measurement detecting evolutions in the perception and attitudes towards the introduced technology or service. Additionally technological recommendations are deduced from the implementation phase.

We will only discuss the contextualization and selection phase of the living lab, because these two phases focus on user identification. Within iCinema one of the objectives was to identify lead users in the domain of cinema and interactivity for future participation. Researchers have reached consensus on the importance of involving lead users in the innovation process, but do not agree yet on how to identify them (Bilgram, Brem, & Voigt, 2008; Lilien, Morrison, Searls, Sonnack, & Von Hippel, 2002). This paper will fill this gap in the literature by means of a concrete case study, applying the lead user theory within the contextualization and identification phase of the living lab. The finding and lessons learned will be summarized into an identification model for lead users.

**Lead Users**

Research has indicated that the type of innovation, incremental versus radical, requires different users to be involved (Luthje & Herstatt, 2004). When innovating incrementally, a company can apply a variety of proven market research methods such as the assessment of current and future needs. Regular consumers can easily participate in this research because of their product knowledge and lack of barriers to think about their needs. For breakthrough innovations however, the situation is very different. It is rather impossible to determine the demands of tomorrow’s market via traditional research methods. One of the limitations seems to be that most market research techniques try to ensure representativeness by randomization of the customer sample. Another limitation is that the opinion about new products is
constrained by real life experiences. In order to forecast their new needs and potential solutions, the customers will have to integrate the potential product into a use context that does not exist yet, which is a mentally challenging task. Therefore the familiarity with current products, often inhibits the conception of novel product attributes (Lin & Seepersad, 2007; Von Hippel, 1986). A third limitation is that most market research techniques do not offer appropriate ways to discover new product attributes. They rarely assist in revealing emerging needs and identifying (new) solutions for those needs (Von Hippel, 1988). Therefore companies are increasingly working with the so-called lead users in the early phases of innovation (Herstatt & Hippel, 1992; Luthje & Herstatt, 2004). They are the ‘leading edge’, well qualified and motivated to make significant contributions to the development of new products and services. These lead users are different from ordinary users and can be identified by two main characteristics:

Lead users face new needs of the market and this significantly earlier than the majority of the customers in a market segment. They will profit strongly from innovations that provide a solution for those needs. Lead users do not just experience any new need, but those needs that most customers will face in the future. The incentive of satisfying those needs can become so strong, they will be motivated to dominate all stages of the innovation process (Von Hippel, 1986).

Different methods have been developed to detect lead users (Luthje & Herstatt, 2004), but there is still no consensus in how to identify them correctly (Schuurman & Marez, 2012). In theory and practice, mass screening is the primary method used to uncover lead users. It is a standardized, quantitative approach, screening a large number of potentially relevant users (Belz & Baumbach, 2010). Other methods have been suggested as alternatives to identify lead users, such as netnography, but the principal method remains screening. The major challenges to identify lead users appear in a business to consumer market, because of the distance between the products and the consumer (Hoffman, Kopalle, & Novak, 2010; Spann, Ernst, Skiera, & Soll, 2009). In addition the detection of these users is often situation specific and not based on user characteristics (Von Hippel, 1976). As a result, the elaboration of lead user identification methods is still a major challenge. By studying the iCinema project, we propose a combination of a dimensional scale with an open-ended question to identify lead users.

**Methodology**

iCinema is a project with different key players in the cinema environment. It intends to change the traditional cinema experience and workflow from linear to interactive. The main idea is to stimulate a higher involvement and participation of the current movie theatre visitors, trying to connect the movie theatres with the new digital world. The different stakeholders are brought together in a living lab environment aiming at the development of a new concept that should represent the cinema of the future. An added value has to be created for the different stakeholders involved: namely the consumer, the cinema exhibitor, the technical suppliers, broader film and media industry players and content partners. Since a new concept will be developed with these stakeholders (= radical innovation), the need for involving lead users arises.
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During the identification process of the lead users we followed the process (step I, II and III) of the lead user method suggested by Luthje en Herstatt (2004). Step IV will not be discussed because this is part of a later stage in the living lab and is of no relevance for the lead user identification. The lead user method was integrated into the different phases of the Living Lab methodology according to Pierson & Lievens (2005).

Following figure demonstrates the research flow:

![Flowchart](image)

Figure based on (Luthje & Herstatt, 2004; Pierson & Lievens, 2005)

**Figure 1: Identifying Lead Users in a Living Lab Environment**

During the first phase of the lead user method an interdisciplinary team was set up with cinema exhibitors, technical suppliers, technical developers and academic researchers. The boundaries and requirements for the outcomes of the research project were established in several meetings and a project outline. In a next phase the academic researchers made a state of the art by scanning the literature and the Internet to discover the most prevailing trends in the movie theater industry. Additionally, several experts were interviewed of which a script writer and movie producer, a product manager of hardware materials, a national spread movie theater and a transmedia consultant. They provided us with some extra practical feedback and information. During the entire phase insights were gained regarding the current trends, a critical aspect for identifying progressive or lead users since they are ahead of the market (Luthje & Herstatt, 2004).

Subsequent to the previous two steps, the indicators to identify lead users were determined in a third step. There are two basic procedures to identify lead users, either the quantitative, standardized screening approach, or the qualitative, non-standardized networking approach. According to Lüthje & Herstatt (2004) the screening method is appropriate in a manageable market with existing product users. It is a form frequently used (Herstatt & Hippel, 1992; Luthje & Herstatt, 2004) in the form of a written survey, asking a large number of potentially relevant users (e.g. loyal customers) to answer questions regarding user innovations and lead user characteristics (Belz & Baumbach, 2010). Considering the availability of a panel and
customer database provided by the movie theatres involved, we opted for this screening method. Based on a literature review (Belz & Baumbach, 2010; Luthje & Herstatt, 2004; Oosterloo, Kratzer, & Achterkamp, 2010), six constructs: having new needs, user expertise, expected advantages, user experience, opinion leadership and being ahead of trends were developed in a scale to identify lead users. Having new needs is a construct deducted from Von Hippel's (1986, 1988) lead user definition and Schuurman, Mahr, & De Marez (2012) suggest it as a main characteristic for classical lead users. The focus should be on the word ‘new’, meaning every consumer has existing needs, but only lead users demonstrate new needs. Furthermore, these lead users are ahead of a trend/the market. In other words, detecting trends in the market, helps identifying lead users (Luthje & Herstatt, 2004; Oosterloo et al., 2010; Von Hippel, 1986). Additionally, research has shown that lead users innovate, to acquire an advantage out of that innovation, namely the satisfaction of their new needs (Oosterloo et al., 2010; Spann et al., 2009; Von Hippel, 1986). A higher expertise and experience means a higher familiarity with the product and service and as such a better level of comprehension and ideation (Bilgram et al., 2008; Luthje & Herstatt, 2004; Schuurman & Marez, 2012). Opinion leadership is often referred to as the central characteristic of lead users (Bilgram et al., 2008; Luthje & Herstatt, 2004; Von Hippel, 1988), implying other consumers will ask opinion leaders for information and advice. By using these six dimensions, a scale was developed and the different items were scored on a 5-point Likert scale ranging from 1 (=strongly disagree) to 5 (=strongly agree). Two open questions were added, to identify current frustrations and first ideas to innovate the movie theater industry. They serve as a verification of the survey results (Belz & Baumbach, 2010) and to identify the true lead users.

The following model was developed to identify lead users:
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Figure 2: Conceptual model to identify lead users

A factor analysis was done to uncover the different dimensions/characteristics of lead users. A score above average on the different dimensions resulted in a potential lead user. Afterwards the results of the open questions were coded. They serve as an indication whether a potential lead user is a true lead user or not.

Results

The literature review and environmental scan indicated the major trend in movie theatres nowadays is the pursuit for audience involvement during the movie experience. Different products and services have been launched in the market to create participation before and during the movie as well online as offline (= interactivity). However, research has shown that creativity is key within participatory involvement, because boredom and annoyance are just around the corner (Phillips & Noble, 2007). The expert interviews gave us some deeper insights into the interactivity of the movie theatre industry. Experts believe the iCinema concept will work, as long as the emotional experience of the audience is enhanced and technological barriers stay low for the audience as well as the stakeholders. They mention the audience will not be prepared to pay for any changes in their experience. It will be a matter of accomplishing more and in a more efficient way, resulting in lower costs. Although interactivity is a new trend, they all claim that it will never accomplish the same level of experience one has when watching movies. In other words the entire experience needs to be enriched and not just one part of this experience.

Both techniques were necessary to gain insights in current trends, but we comply with Luthje en Herstatt (2004) that the expert interviews were the most valuable source to identify trends.

In the next phase, a survey was spread in Flanders, trying to identify lead users with the developed ‘lead user scale’. A response of N=2006 was generated, consisting of mainly younger people (<35) and more males (60%) compared to females (40%). These results are consistent with previous research of movie theatre visitors in Flanders (www.digimeter.be). The scale was analyzed via factor analysis (PCA) with varimax rotation to detect the underlying dimensions. After deleting the items with a factor loading below .30 (Wijnen, Janssens, De Pelsmacker, & Van Kenhove, 2002), four factors were found with KMO .922 and Bartlett ($\chi^2$ (231) = 14.468,888; p < .05). The total variance explained is 60%. In other words the pre-assumed conceptual model with six dimensions didn’t stand after the factor analysis. Some of the dimensions showed strong correlations. When looking at the four dimensional model, the Crohnbach Alpha proved high enough to continue with the model. Factor 1 ($\alpha$=.88) is a combination of the constructs experience, expertise and opinion leadership. Factor 2 ($\alpha$=.88) comprises the constructs having new needs and high expected advantages. Factor 3 ($\alpha$ = .77) defines the construct being ahead of the market. Factor 4 ($\alpha$ = .70) contains items that relate to domain specific knowledge.
The factor scores were calculated by averaging the score per factor. The potential Lead user score was designed by summation of the four factor scores. Considering the items were measured on 5-point Likert scales, a maximum score of 20, minimum of 4,13 and M=9.56, SD=2.4 was established. Only respondents with a score of 14 or higher were selected as potential lead users, meaning they have an average score of 3,5 or higher on the different factors. When following this procedure, we identify 54 respondents as potential lead users. They are predominantly male (98%), with an age of M=28 years. Often they have no children (80%) and are more motivated (98%) to participate in the entire innovation process compared to the non-lead users (50%) ($\chi^2 = 39.120$, df = 1, p<0.05). This is in line with previous findings of lead users being more motivated to participate in the innovation process compared to their counterparts (Herstatt & Hippel, 1992; Luthje & Herstatt, 2004).

In a following step the open questions of frustration and idea generation were analyzed to verify the lead user concept. When looking at the frustration question: ‘Give the reasons why you would not go to the movie theatre’, we did not find any qualitative differences compared to the non-potentials, except for the fact that non-potentials elaborate more on their frustrations. To support these findings, we compared the satisfaction scores of the potential lead users (M=4.01), with the non-potentials (M=3.82) and found that lead users are significantly more satisfied with the current movie theater experience compared to the non-potentials (T= -2.169, df=55819, p<0.05). A second open question was integrated to stimulate idea generation and link the evaluation of their ideas to the potential lead user score. The question: ‘People arrive later in the movie theaters and often skip the preshow partially or completely. How would you deal with this problem?’ was asked to the respondents. The quality of the different ideas were evaluated and the potentials came up with a higher variety of ideas and more innovative ideas compared to the non-potentials.

The results of the open questions are contradictory to previous research stating that lead users are dissatisfied with the current market offerings and therefore generate more innovative ideas (Luthje & Herstatt, 2004). Their ideas are more innovative, but this is not related to their level of satisfaction.

**Conclusions**

The results of this study imply a working model to identify lead users via a standardized scale combined with an open question. The final model suggested to identify lead users looks as following:

[Diagram of the model]

- **experience, expertise & opinion leadership**
- **Future: having needs and expected advantages**
- **Trends: being ahead of the market**

**Potential Lead User** → **Innovative Ideas** → **Lead User**
This study has various implications for the movie theatre industry. They can use the identified lead users for co-creation of a new concept and testing the concept in the movie theatre environment. Additionally, other industries can implement this method to identify lead users as part of their innovation strategy. The identification process has almost no additional costs when applying it in a living lab environment. It fits perfectly in the contextualization and selection phase, meaning it can become part of the living lab environment and as such avoid additional costs.

It is argued that traditional survey methods are only applicable for companies that have a known customer base. Companies that do not own one, lack the capability to efficiently identify lead users. Especially when resource and time constraints apply (e.g. fast moving consumer good environment). Nowadays the internet provides us with new ways of integrating the traditional survey methods in a more efficient way (Spann et al., 2009), meaning this model can be applied in an online environment as well. Hence, this model can also be applied by companies that have no knowledge of their current customer database.

The results contradict previous research in regard to the dissatisfaction of lead users with the product or service (Hoffman et al., 2010). Movie theater lead users are significantly more satisfied with the current offer in movie theaters compared to regular users. Therefore we believe lead users are not necessarily dissatisfied with the current product and services in the market place but are just inclined to improve whatever is out there. This can be a sign of the non-domain specificity of lead users. Especially because we noticed certain lead users deducted from this research, also prevailed as lead users in previous research, both handling different topics. Future research can determine whether lead users are domain specific or not. This might have implications to standardize a potential identification method.

Not all potential lead users are actual lead users. It might be that they cannot translate their needs into an innovation. The open question helped in identifying those lead users that understand the market better or that are able to formulate their needs or ideas better. Therefore the open question of idea generation is an important contribution to the scale and a necessary item to integrate when identifying lead users. Although the analysis of the open questions indicates the ideas of the lead users being more innovative, no objective evaluation was available. Future research
should focus on evaluating the ideas for example via a Delphi method, leading to a more objective scoring of the results.

Some limitations indicate that the identification model needs to be refined. The identified lead users are primarily male and score high on their needs towards interactive cinema. Previous research showed that leads users are often male (Von Hippel, 1986) but the self-assessment aspect of the scale can influence this. Gender research showed that males are more confident when self-assessing (Pallier, 2006) and therefore males will score higher on the current questionnaire to uncover lead users. A correction factor or adjusted scale is recommended to find the right lead users without having gender as confounding factor. Future research should also focus on a true cut-off point to identify potential lead users. For now we assumed a minimum score of 14 suffices to identify someone as a potential lead user. A more standardized method is needed.

The iCinema project is a work in progress, meaning results are only preliminary and we are currently optimizing and evaluating the identification method even further. In the near future we will be able to provide more results and conclusions about the effectiveness of this identification method.

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4. Co-creating an open working model for Experience & Living Labs willing to provide services to external players

Nicola Doppio, Fabio Pianesi

Abstract

Scope of this paper is accounting for the early results of an on-going participatory design process focusing at tackling the problem of the economical sustainability of Living Labs. Such process was framed as an Activity (yearly project) funded by EIT ICT Labs, and is currently being carried out by a number of EIT ICT Labs partners.
running Living Labs. In particular, the process involved Living Lab practitioners in the co-design of viable business models for Living Labs. After having described in details the whole co-design process and its conceptual foundation, the paper outlines its outcomes in terms a general working model aimed to have practical impact on the management of Living-Lab-related facilities, with specific regards to help Living Lab managers in shifting Lab’s operations towards a service-provisioning basis. The paper concludes stressing strengths and weaknesses of such model, as well as highlighting those of the co-design process that delivered it.

**Keywords**

Business models; Living Lab services; Experience & Living Labs; co-creation.

**Research questions**

Business models for Living Labs

**INTRODUCTION and progress beyond the SOTA**

So far, the concept of Living Lab has been defined in several ways. Living Labs may be defined as «a human-centric research and development approach whereby ICT innovations are co-created, tested, and evaluated in open, collaborative, multi-contextual real-world settings» (Bergvall-kåreborn, Holst, & Ståhlbröst, 2009). Such overall RDI approach (or methodology) has been largely described by many contributions; see, e.g., (Kusiak, 2007), (Følstad, 2008), (Mulder, Velthausz, & Kriens, 2008), (Almirall & Wareham, 2009), (Bergvall-kåreborn, Holst, et al., 2009), (Pallot, Trousse, Senach, & Scapin, 2010), (Salminen & Konst-Laakso, 2010), (Almirall, Lee, Wareham, & Schrage, 2012).

In the meant time, the European Commission defined Living Labs as «open innovation environments in real-life settings, in which user-driven innovation is fully integrated within the co-creation process of new services, products and societal infrastructures» (European Commission - Directorate-General for the Information Society and Media, 2008). Further addressing Living Labs in terms of environments, Følstad (2008) stresses the time-frame of innovation processes, as he defines Living Labs as «environments for innovation and development where users are exposed to new ICT solutions in (semi)realistic contexts, as part of medium or long-term studies targeting evaluation of new ICT solutions and discovery of innovation opportunities». Similarly, Bergvall-Kåreborn and colleagues defines Living Labs as milieu: according to the authors, they are «user-centric innovation milieu built on every-day practice and research, with an approach that facilitates user influence in open and distributed innovation processes engaging all relevant partners in real-life contexts, aiming to create sustainable values» (Bergvall-kåreborn, Ihlström Eriksson, Ståhlbröst, & Svensson, 2009).

Finally, other authors define Living Labs as ecosystems, apparently focusing on the territory-based governance systems underpinning them. According to Pallot (2009), for instance, a Living Lab is a «User-Centered open innovation ecosystem integrating
concurrent research and innovation processes within a business-citizens-government partnership». According to Niitamo et al. (2006), Living Labs are «emerging Public Private Partnerships (PPPs) where firms, public authorities and people work together in creating, prototyping, validating and testing new services, businesses, markets and technologies in real-life contexts, such as cities, city regions, rural areas and collaborative virtual networks between public and private players».

As it turns out, the concept of Living Lab is still in the course of its shaping, and the debate around the concept of Living Labs is still open (are they approaches, methodologies, environments, ecosystems, or milieus?). Above all, the lack of a clear understandings of the legal profile, the organizational structure, and the governance and management systems that should underpin and shape them brought about a delay in the provision of clear guidelines for helping practitioners managing Living Labs, once they are kicked off. Conversely, the array of methods to be applied in Living-Lab projects is huge, this being possibly due to the academic origin of the concept. Furthermore, this gap appears to be even more crucial considering the fact that the economical sustainability of Living Labs has come to be a serious problem, especially for those Labs that count mainly on public funding, or whose revenues are project-based.

Similarly, the debate often focused on internal actors, failing to facilitate the involvement of innovation players externals to the “Living Lab world”. Arguably, indeed, it is reasonable to consider that innovation players may not be interested in the exact definition of what a Living Lab is and/or in running or joining one of them. One might expect them to be more interested in pursuing their innovation goals, perhaps by benefiting from some value proposition (whoever the provider is) that may help them in achieving those objectives.

In this paper we present an overall working model that tries to make it easier for innovation players (be they SMEs, LEs, public administrations, or research bodies) to access and exploit the benefits that an open innovation ecosystem makes available. We do this by providing an overall working model to help Living Labs practitioners and managers making their Labs more open to external players.

To keep our target as large as possible, our working model addresses not only Living Lab but also all those innovation players that may be in a position/willing to provide similar value propositions to the actors mentioned above. For lack of a better term, we will use the term “Experience and Living Labs” (ELL in short) to refer to those players.

In order to make sure that our working model is capable to address the economic sustainability issue, we adopted a practical business model perspective. According to Osterwalder (2010) a business model describes the rationale of how an organization creates, delivers, and captures value (economic, social, cultural, or other forms of value). Osterwalder proposed an operative, nine-block configuration (value proposition, target customer, distribution channel, relationship, value configuration, core competency, partner network, cost structure, and revenue model ) and a “Canvas" template that can be used by practitioners in designing specific business
models. The STOF method developed by Novay proved to be very effective in managing the process of designing and refining business models, with specific regards to ICT service organizations. The tool helps practitioners in answering critical questions relevant for the four areas of “Service”, “Technology”, “Organization”, “Finance” (Haaker, 2012).

The attempts so far at providing business models for Living Labs have failed, in our view, to provide helpful hints to practitioners and managers, for instance in terms of viable business and/or management models. A major reason, we suspect, is that most of those attempts focused less on actual the Living Lab organization (or environments, or ecosystems, or milieu…), and more on living-lab projects activated by that, while the problem of sustainability is faced by the former, not by the latter; see, e.g., Johansson (2012). Similarly, the business modelling activity carried out in the context of the Apollon project provided a sound value network structure for cross-border Living Labs, but kept the revenue expectation at a pilot project level, letting them depend on the deployment of single services within local Living Labs, and not at a global or cross-border level. Closer to our goals (help Living Lab organizations gaining sustainability) is the work by Fahy et al. (2007), who highlighted the dependency of the types of services to be provided on the mission of the Living Labs. In this paper, we describe a co-creation activity, and its outcomes, that was performed in order to provide Experience & Living Lab managers and practitioners with a viable conceptual working model for re-structuring their operations according to a more business-oriented perspective. In our view, such framework facilitates the involvement of players who have been often neglected in previous works, consisting of: a) organization or R&D groups interested in performing user-centered open innovation; b) want to do so by accessing open-innovation services; c) do not have a strategic interest in becoming Living Lab members or partners. We also show that such working model does not disrupt the basic tenet of Living Labs as partnership-based ecosystems, but helps it thrive instead.

Methodology

The basic methodology consisted in:
A. public thematic workshops involving Living Lab practitioners in team-work activities aimed at sharing best practice and current experiences;
B. co-creation sessions that, by building on the results of the first activity, developed business models for Living Labs.

Step A consisted of two 2-days workshops held in the course of 2012. The first, held in Turin (April 2012), addressed the co-design of viable business models for Open Labs by leveraging existing business modelling methods and templates such as STOF method (Haaker, 2012), and Osterwalder’s Canvas (Osterwalder, 2010). The second workshop (held in Helsinki in October 2012) discussed, criticized and improved the outcomes of the first. Overall, the two workshops involved almost 50 attendees amongst ENoLL and EIT ICT Labs members.

The co-creation process (step B above) went throughout 4 stages:
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B.1 The design of a number of business model “personas” (Sanders & Stappers, 2008), meant to act as prototypes or templates that could be instantiated in specific real-life case ELL scenarios (real partners, real technologies, real finance constrains, etc.) . The STOF method was used in this phase at the team work level, putting together partners related to ELL facilities with a similar background in terms of mission and governance.

B.2 The design of a broad conceptual (yet operative) model for framing the operations of Experience and Living Labs willing to shift to service-provisioning; followed by

B.3 the identification of the value proposition in (terms of services). For both B2 and B3 a more rapid prototyping method was followed than with B1.

B.4 the identification of the practical tools and guidelines needed to adapt the model during daily Lab operations.

This procedure produced guidelines and practical tools that are currently being tested in 5 pilots, within project partners’ Labs. The final, validated framework, including guidelines, tools and recommendation will be disseminated in EIT ICT Labs and ENoLL communities in the course of 2014. We turn now to discussing the results available so far.

**Description and outcomes of the co-creation process**

The result from B1 were not positive: although the scenario setting was simplified, workshops participants did not manage to deliver a number of business model personas, the reason being that business models apply to real cases and cannot be abstracted from them. That is, personas cannot be outlined without a clear reference scenario.

Instead, a generic value-network model for ELL was delivered. Such model was based on the inclusion of a specific business development function within the Living Lab ecosystem value network, bridging the gap between internal and external players of Living Labs. Indeed, such player would have the scope of leveraging assets delivered by the ELL (and its members) to the extent of offering a value proposition to external players. Overall aim of such function, which could be played both by a startup or a free-lancer business developer, would be to spark business opportunities for Labs (perhaps under the expectation of a share of the related revenue). This appeared to be a viable solution especially for those Labs still facing the bootstrapping phase, thus perhaps not in the position of internalizing specific business development capabilities.

The following picture shows the overall value network of such open Experience & Living Lab configuration.

As a second step (B2), the co-creation activity was aimed at designing a general conceptual model for framing operations of Labs willing to adopt such open value network. In order to provide a framework to be adopted in the everyday Labs operation, the first important thing to
address was to clarify what roles should be played by what parties. To help advancing the work, the project team focused on the definition of Experience and Living Labs facilities adopted by EIT ICT Labs: “ELL are one-stop shop hosting co-creation and testing requirements from guests customers, on a service provisioning basis” (Doppio, De Vos & Melenhorst, 2012) Indeed, the definition includes two tenets that helps providing a deeper definition of the model:

1. operations of an ELL are based on the converging efforts of two different interacting players. Indeed, the definition speaks in terms of “guest customers”, hosted by some other player. We thus decided to go for the distinction between a “Guest” and a “Host” as leading players of an ELL;
2. such relation happens “on a service provisioning basis”. So that, ELL operations shall occur as the provision of services from a Host to a Guest.

Regarding the distinction of roles between the parties, the Host was defined as “whatever organization (public, private, project-based consortia, PPPP-based consortia), who is in the position of leveraging and making available Living Lab-related assets and resources (panels of users, HRs, methodologies, ICT and related infrastructures, territorial partnerships, etc.) in order to provide services to other organizations embarking in Living Lab-based innovation projects” (Ibid). The Guest was thus defined as the “organization [again, whatever the governance] exploiting those services, while providing a revenue stream […] to the Host” (ibid).

Coming to the specification of functions and responsibilities of the Host and the Guest, we proceed by ordering all the organizational functions/tasks which are commonly activated during Living Lab operations according to the expected added value in terms of R&D aims.

According to the service-provisioning tenet, we concluded that activities having an “infrastructural” value for the ELL should be exclusively performed by the Hosts: users outreach and selection, training and involvement in the innovation project; long term satisfaction management; territorial partnership setting up; Lab governance;
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basic ICT infrastructure management (smartphones, tablets, internet connections, cloud services); user-centered research operations (scheduling meetings, organizing workshops, performing surveys). Furthermore, the Host shall be the one establishing agreements and contracts to legally regulate the service provisioning to the Guest, as well as to regulate the involvement of other parties that need to be included in the value network (including the partner of the same Living Lab, in case).

Conversely, high-R&D value-adding activities shall be made available to the Guests (e.g. in the form of services) by the Host. High-value adding activities may be accessing panels of users to perform co-creation activities or to measure user experiences for evaluating/validating service or technologies; or having support from Living Labs experts in managing the whole innovation process, included the go-to-market phase. Notice that, even though the Guest is supposed to perform/partake only high-R&D value-adding activities, a number of tasks shall necessarily be carried out by the two players in coordination, in order to make sure the Host’s effort in deploying the services meet the Guest’s needs.

Overall, the following figure was used to describe, in a glance, the Host/Guest service provisioning model.

![Fig 2: A graphical conceptualization of a service-provisioning based working model for open Experience & Living Labs.](image)

Coming to the description of the value proposition to be provided by the Host (step B3), an list of 10 Services below described was delivered by the Team and discussed by workshop participants. The list of services has a high granularity degree in order to allow completeness and, at the same time, scalability from one service to another. Designed services are currently the followings:

1. User-centric research & co-creation consultancy. The Host provides a qualified methodological support in designing the research and co-creation tools the Guest is in need in order to carry out an innovation project.
2. RDI methodological strategic consultancy. The same as the previous, but the Host provides a framework for the whole RDI cycle. From the conceptualization of the service/technology to be innovated, to the market launch/adoption.
3. R&D & Innovation project management. Similar to the previous, and possibly carried out on top of it, but the Host is also in charge of the results of the innovation project, for with is accountable towards the Guest.
4. **User’s and usage data analysis/mining.** The Host performs data mining and/or data analysis on behalf of the Guest, which provides the raw data. This both for quantitative and qualitative data.

5. **Asset hiring.** The Host gives open access to existing assets and hiring of technologies or infrastructures (e.g. smart spaces infrastructure, smart homes, sensors). Beside minimum coordination, no real effort is required by the Host.

6. **Real life experimentations setting up and deployment.** The Host sets up and manage the operative efforts needed to deploy pilots in real life setting. Core technologies shall be provided by the Guest, while the Host provides generic infrastructure. The Host coordinates the Guest access to the field activities, involving existing assets in-the-wild (e.g. users panels provided with technologies/services under innovation). In this case end-user’s data (whatever the type) is produced by the users and reaches the Guest with no treatment by the Host (less privacy and IPRs implication, and operation efforts by the Host).

7. **User-centric research and co-creation operations management.** In the case end-users’ data is not (or not only) automatically collected by the Guest, data may be collected by the Host by making use of research or co-creation tools (interviews, surveys, focus groups, …) either provided by the Guest, or designed by the Host as part of Service #1. Such data may refer to diverse phases of the R&D cycle: from the users’ needs and requirements, design inputs, to the user experience. This is also the case when some personnel from the Host perform cross-border activities (workshops, etc.) within some Guests' environment or facilities (e.g. smart homes, end-users panels, etc.).

8. **Showcasing and marketing.** By leveraging existing assets, such as smart homes, infrastructure households, users panels, etc., the Host might be in the position of building demonstrators for marketing purposes on behalf of the Guest.

9. **Business-related consultancy.** A Host having a specific business and management background provides consultancy to Guests for assisting the services/technology transition to the market, and after (perhaps on top of Service #3). The output of such service may be an innovative business model design, a business development plan, strategic market advisory, a marketing plan, etc.

10. **Coaching and professional Training.** The Host coaches personnel from the Guest interested in boosting its competencies in innovation management, or wishing to know how to manage an ELL according to a service-provisioning based working model (thus playing as a Host).

For what regards the provision of tools and guidelines to get to a real-life testing of the framework (step B4), the ELL Team partners made available a number of tools to help potential Labs in adopting the outlined working model on an experimental basis. Tools are the followings: 1) a 10-steps checklist to help the Host to shift ELL operations towards the service provisioning-based working model; 2) the service list, to help Guests in clarifying what could be their value proposition to potential Guests; 3) a service provisioning work plan template to help the Host in framing the service provisioning programs as a shared project where both the Host and the Guest have clear roles, efforts to put in place, shared deliverables, KPIs for quality check, and legal aspects to be addressed in order to deploy the project hosting. It is intended that the Host is in charge of doing whatever is needed to put in place and carry out the service provisioning work plan.
Discussion & take away message

First of all, with specific regards of the results of the tentative process of delivering business model personas, we recommend to adopt straightforward processes and methodologies when coping with business modelling activities. Trying to be all-encompassing seems not to be completely feasible, as because the complexity to cope with is overwhelming. It seemed to be more practical to adopt rapid-prototyping techniques, and to try to achieve “quick and dirty results”, capable to play as a discussion ground for the co-creation activity, and to be perhaps refined afterwards.

With regards of the delivered operating model, in our vision the related benefits are several. First of all, as we mentioned, while distinguishing Hosts and Guests within living lab common operations, service-provisioning programs can be deployed, thus generating revenue flows for Labs. Also, it allows making clear who is responsible for managing and taking the best out of the assets developed by Labs. Having a clear management and organizational structure behind a facility, including possibly a unique facility referent (the Host) allows an business-oriented management of those assets. For instance, this could make it easier to have multiple Guests entering the same hosting facility, thus pursuing economies of scale. Both the benefits may hopefully help Labs in tackling the issue of economic sustainability. Secondly, a clear distinction between the parties helps clarifying what are the activities that really provide ELL players (both internal or externals to the Lab ecosystem) with added value for their R&D needs. Indeed, ELL normally address a number of operational and infrastructural activities which do not provide strict value for the mission of the Lab. In our view, having a clear player taking care of such functions, helps distilling the real added value that can be offered by an ELL. Finally, having Labs adopting such model will help whatever organization interested in embarking in open innovation to have access to real living lab ecosystems with less barriers: indeed, as we defined them, Guests are not meant to join the ELL as a partner, thus facilitating the deployment of the whole R&D and innovation process (as well as the governance of the Lab itself).

Nevertheless, on the basis of the contributions given by partners and stakeholders involved in the process, some initial critical points related to the implementation of the proposed model emerged.

First of all, problems could be expected in the adoption of the model in real life condition because not all the time organization running a Lab may be in the position of clearly playing the role of the Host. For instance, for Labs ran or facilitated by a university might be cumbersome (if not impossible) to establish service provisioning programs with other bodies. This both for bureaucratic matters, but also because of the mission of the Host itself. Similarly, not all the Lab’s governance models can help identifying a clear Host, to be the one signing agreements with Guests, leveraging resources, managing operations, etc.: indeed, PPP consortia normally representing Living Labs might not be the proper legal entity capable of easily taking decision and acting within a service-based paradigm.

Secondly, and this is perhaps a less practical but more conceptual critique, such service provisioning working model might not be adoptable amongst partners of the
same Living Lab, with consequent limitation of pertinence (and thus validity) of the model. As to say, the question would be: within a normal PPP-based Living Lab, would there be several partners playing as the Host? Adding to this, some workshops attendees also claimed that any service provision framework would clash with the peer-to-peer vision underpinning the PPP-based Living Labs operations, and the paradigm of “openness” itself. To overcome this problem, we claim that a distinction between Client Guests and Partner Guests can be adopted, as follows:

• **Client Guests** are those players interested in making use of assets and services available by the ELL facility, yet not interested in participating to the value chain necessary to deploy them. For such reasons, they shall not participate to the governance of the Lab Facility, and they shall just act as the final end-users (customers) of the ELL facility.

• **Partner Guests** are those organizations that are interested in making use of the services available by the ELL facility, but are also willing to contribute to the deployment (and management) of its basic resources and assets. For such reason, Partners Guests may be interested in participating to the governance of the E&LLs.

Finally, the list of service was drafted during a brainstorming session and then refined by the ELL team member on the basis on previous personal experience, which may well depend on the methodologies, management paradigms, and governance settings of the involved Experience & Living Labs. The service list may thus be reviewed after the feedback provided by those ELL that are currently making use of it on an experimental basis.

**Conclusions and next steps**

Finding viable ways to help Living Lab ecosystems shifting to a more business-oriented attitude has proven to be a complex effort, for several reasons. Designing general business models at a “prototype” level, to be then adopted by Labs has proven to be hardly possible due to many possible configurations in terms of governance and management models, let alone mission. Nevertheless, the co-creation process managed to deliver a generic value network model, a conceptual working model, and a value proposition derived in a list of services capable to support Living Labs in shifting towards a more business-oriented everyday operations management. In addition, practical tools to give these finding a reality check were provided.

The adopted methodology has proven to be very valuable in the early stage of the development of the framework (workshop-based brainstorming and co-creation involving many Living Labs practitioners). However, the whole process had to be firmly lead by the Activity coordinator (Trento RISE) who often had to take strategic decisions at certain stages of the process, as well as in interpreting complex data and information coming from the co-creation sessions to the extent of building a common vision, yet more straightforward, but still viable.

The developed framework is currently being tested within 4 Experience and Living Labs led by partners of EIT ICT Labs, thus activating and providing certain services to relevant Guest Clients. Such service provisioning programs are aimed at boosting the value proposition of services and technologies developed by Guests, yet focusing
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on various R&D innovation stages (from prototype testing to market launch), as well as throughout various innovation domains (yet mainly Health & Wellbeing and Smart Cities). An evaluation workshop will be carried out in October 2013, bringing together Hosts and Guests currently involved with the aim of discussing the viability of the proposed working models, and, in particular, for highlighting suggestions from improvement according to what occurred in practice.

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References


5. Motivational Factors Influencing User Co-creativity in Living Labs

Anna Ståhlbröst, Marco Bertoni, Asbjørn Følstad, Esbjörn Ebbesson, Jesper Lund

Keywords: Living Lab, User engagement, Motivators, Social Media

In recent years, more and more users have become interested in contributing to innovation processes, with ideas, suggestions and opinions. Also innovation processes has evolved to answer to this trend, becoming more open for user involvement. In conjunction, the concept of Living Lab (LL) has evolved to support the creation of experience based IT-development in real-life, user-driven, and open innovation environment (Ståhlbröst, 2012).

Since Living Lab activities are based on user involvement and commitment, attracting and engaging people in its processes is of utmost importance for the success of the innovation process. However, recruiting and maintaining an active group of user participants is highly challenging. Furthermore, current LL methodologies largely depend on user participation in activities conducted face-to-face, which poses important limitations related to cost, time, and sample size restrictions (Bergvall-Kåreborn & Ståhlbröst, 2009).

A way to enable individuals, independent of location, to actively participate in Living Lab activities is by using social software (Ståhlbröst et al., 2013; Følstad & Karahasanovic, 2012). This technology enables geographically dispersed user
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groups to connect and share insights, knowledge, and content over the Internet, which eventually may increase the commercial value and uptake of Living Lab methodology.

However, even if social software is a powerful tool for user involvement, important and unresolved challenges hinder the effective use of social software in Living Labs (Ståhlbröst, et al, 2013; Schaffers, et al, 2009). As a result, it can be difficult to implement methods and tools that actually create engagement and commitment to the process for those involved. Firstly, the mobility of social software users suggests that recruitment and maintenance of user communities is highly challenging, and there is not sufficient knowledge today with respect to motivating factors in online groups (Antikainen et al., 2010). Volunteer activity in fields like the free software movement and online encyclopaedias suggests that users may be motivated also by intrinsic rewards, while experiences from public opinion polling and marketing research suggest beneficial effects of external rewards (Antikainen, 2011; Antikainen & Väätäjä, 2008). Also, little is known about the criteria against which to select the users likely to be most useful for Living Lab co-creation.

The purpose of this paper is to investigate the effect of user motivation and the perceived usability of the social software on the users’ (a) productivity and (b) co-creativity. We report on the findings of the SociaLL project in which an online questionnaire was distributed to 320 online users of the RECORD online Living Lab involved in three separate cases.

In all three cases, users were invited to review designs presented online and to contribute with feedback and comments. The user involvement was set up following the social design feedback method (Følstad et al. 2012) where all participants can see and respond to all other participants' comments and the development team can interact with the participants. The social design feedback method allows the participants to be involved as a group where the individual participants can discuss and build on each others' contributions, assumed to facilitate beneficial synergy (Dennis & Valacich, 1993). Ideas from one participant may trigger new ideas in others. In the three cases, the interaction with the development team was conducted via a study moderator.

Motivational factors were identified through a Principal Component Analysis (PCA) of the results from 20 motivational questionnaire items. Three main motivational factors were identified in the PCA. These were:

(1) *Interest in the innovation:* The participants are motivated by curiosity, their interest in the innovation, and a wish to make a contribution

(2) *Implicit benefits of the study:* The participants are motivated by a desire to be recognized, to engage socially, to be entertained or stimulated

(3) *Explicit benefits of the study:* The participants are motivated by the explicit rewards of participation; e.g. the study incentives

Perceived usability was measured by the standard questionnaire System usability scale (Brooke, 1996). Users' productivity was measured as the number of contributions they reported to have made during the study. Users' co-creativity was measured as three questionnaire items concerning the perceived benefit of
interacting with other participants and the study moderator, as well as the degree to which the user build on others’ ideas or suggestions.

The dependent variables, motivational factors and perceived usability, where then included in two multiple regression analyses to study their effect on user productivity and user co-creativity respectively.

User productivity, that is the users' tendency to contribute, was found to be affected by the perceived usability of the online environment more so than of any of the three motivational factors. The perceived usability of the online environment may thus be seen as highly important for the volume of user contributions.

User co-creativity, that is, the users' perceived benefit and experience of the co-creational aspect of Living Lab set up, was found to be affected both by the first motivational factor (interest in innovation) and perceived usability. Consequently, the motivational factor interest in the innovation was found to be a better predictor of co-creativity than the two other motivational factors. Furthermore, interest in the innovation was found to be just as important as perceived usability when predicting co-creativity.

In conclusion, the findings from the regression analyses tell that the motivational factors are not really important to predict how much people comment (here perceived usability is a much stronger predictor), but that one of the motivational factors is a good predictor of whether the participants engage co-creatively in the study.

6. Why collaborate in long-term innovation research? An exploration of user motivations in Living Labs

Bas Baccarne, Sara Logghe, Carina Veeckman and Dimitri Schuurman

Keywords: User involvement, User motivations, Open innovation, Collaborative design, Living Labs

One of the central elements of Living Labs is the focus on end user involvement in IT-product and service development processes (Ståhlbröst, 2008; Ståhlbröst et al., 2009). Whereas users definitely play a central role in Living Lab research, users’ motivations to participate in such long-term, rather intensive research and development tracks are nevertheless largely unexplored. The question is not any longer about why we should involve users, but rather how they should be involved in Living Lab research activities, and specifically in long-term collaboration initiatives. This article contributes to this gap in literature by providing an overview of current academic understandings and presenting the first results of our own research on this matter.

So far, research on user motivations has been conducted from different academic disciplines and has been applied to different domains. Therefore, the concept of motivation has a rather complex nature. One of the most solid and cited academic theories that can be applied on innovation and user participation is the theory of planned behavior (Ajzen, 1988,1991). While this theory is rather broad, other authors specifically focus on user involvement in the development of innovations (e.g. Hassinger, 1959; Rogers, 2003). An important dimension in most of these theories is the end users’ need for certain solutions or specific products (e.g. Xu, 2007; Yang & Liu, 2011, Von Hippel, 2005). Current understandings of user motivations to become part of a Living Lab are limited, with exception of Leminen & Westerlund (2012) and Ståhlbröst (2012), but we can learn from findings on motivation in firm-hosted user communities. These studies show that end users are mainly driven by willingness to
help, to support a good cause and to be part of a project realization (Berglin and Handberg, 2013). According to Lu and Wei (2011) personal interaction and exchanging information have the most positive effect on end user participation. Other authors such as Füller (2006) focus on the importance of intrinsic interest in the innovation activity and curiosity as the main motives for the consumers’ willingness to participate in new product developments. Participants in firm-hosted user communities are mostly hobbyists or people looking for firm recognition (Jeppesen & Frederiksen, 2006). In crowdsourcing literature, some of the main identified drivers of participation are idealistic reasons and career concerns (e.g. Hann et al., 2002) and building a meaningful product (Chandler & Kapelner, 2013). While intrinsic motivations seem to be very important (Kaufman, Veit and Schulz, 2011), Rogstadius et al. (2011) show that there also exists interaction between intrinsic motivations and extrinsic motivations, such as direct or indirect monetary compensation or recognition by others (Hars and Ou, 2002), for end users to participate in the innovation development process.

Existing literature on motivations of user participation is rather diverse and uses different measures and point of views. On top of that, there is a clear gap in literature when it comes to user motivations to participate in Living Lab research. Therefore, the central research question in this paper is: “What drives users to participate in Living Labs and which parameters affect long-term or continuous participation?” Within this research question we also take into account the diversity of the different Living Lab stages in order to capture some of the complexity of this question. Besides assessing the global motivations, this article also elaborates on the differences between motivations to participate in a survey, an offline workshop and a field trial within a Living Lab context. Finally, an analysis is made of the phenomenon of repeated participation.

The data for this research are collected in the Flemish Living Lab Platform, Mediatuin Living Lab and LeYLab. Measurements were conducted using a large scale survey (n:639), during nine co-creation sessions (n:63) and during a short survey after a field trial (n:26). The motivations to participate were being measured using binary variables measuring the following motivations: (1) collaboration with others (2) solving challenges (3) personal interest (4) being the first (5) contribute to society (6) curiosity (7) feeling part of a community (8) use of skills (9) learning (10) influence (11) fun (12) expanding the social network (13) expected professional benefit (14) financial or material incentive (15) doing friends a favor (16) peer influence and (17) duty. This article also compares these variables between three main Living Lab research activities: online surveys, co-creation sessions and field trials.

The results of our explorative research show that for Living Lab participation collaboration with others is the most occurring motivation (83,3%), followed by solving challenges (81,2%) and personal interest (78,1%). Nevertheless, 56,5% also expects a financial/material reward. Only 39,1% expects to have an actual impact on the innovation. In face-to-face co-creation workshops, the motivation to have an influence is more occurring than in field trials and online surveys. Compared to co-creation sessions and field trials, curiosity is a less occurring motivation for participation in online surveys. Furthermore, co-creation sessions have the highest
ratings for both the use of skills and the motivation to contribute to society. Overall, the main motivators to participate have an intrinsic nature, but our results show that for repeated participation, material incentives become more important and the motivation use of skills, decreases.

These findings offer a deeper understanding of user motivations in Living Lab research. On a practical level, the most important dimensions should be central in the management of Living Lab user panels in order to reach maximum user engagement and to increase the quality of response. On a more theoretical level, these data are an exploration of user motivations, but should be the first step towards a theoretical model, which understands voluntary engagement in Living Lab research. Many future research questions exist on this largely unexplored domain, such as the relationship between motivations and panel drop-outs and a typology of different types of users in a Living Lab. These insights are important to assess the validity of Living Lab research as well.

Author bio
Bastiaan Baccarne is a researcher at the Department of Communication Sciences of Ghent University, where he started working for the MICT (Media & ICT) research group in October 2012. Also being part of iMinds-iLab.o, the facilitating infrastructure for Living Lab research within iMinds, his research focusses on Living Labs for media and ICT innovation and the optimization of user involvement in this context. Bas graduated in June 2012 as a Master in New Media & Society (Ghent University). His master thesis took a closer look at crowdsourcing as a tool for the evaluation of innovative ideas within a smart city.

RESEARCH SESSION 2 : URBAN AND TERRITORIAL INNOVATION WITH LIVING LABS

1. Semiotic Web and Sign management as new paradigms for Living Labs in Education- Applications in natural and cultural heritage of insular tropical islands

Noel Conruyt, Véronique Sébastien, Didier Sébastien, Olivier Sébastien, David Grosser

Keywords
Living Lab, Semiotic Web, Sign management, e-service, Creativity Platform, education.

Introduction
In the context of sustainable development of insular tropical islands, and more specifically for sustainable education in the South West of Indian Ocean, data and knowledge management of specialists of natural or cultural diversity is at the heart of
designing new ICT services. For example, the objectives of these e-services are to manage biodiversity and musical information on the Web, in order to preserve insular tropical islands common heritage. But the method of building data and knowledge bases is moving towards more Open, Inclusive and Smart approaches for a new 2020 Horizon. Open was initially inspired by EU (INSPIRE directive) and is characterized by opening public databases, for them to be enhanced by companies in new useful e-services for citizens. As such, Web Services are used for mutual inter-operability of databases. Inclusive is related to the different types of people that can participate to data and knowledge creation, i.e. experts, managers, stakeholders, amateurs who wish to involve themselves in useful e-services for the benefit of the community. Social Web is thus a means to connect people and facilitate communications between them in the common society. Smart is a sort of collective intelligence where digital and structured knowledge is used to answer more efficiently to complex problems that have been formalized in ontologies. This decision help solution brought by Semantic Web is the third technological response for being sustainable in the UE worldview.

Problem

But for us, it lacks another dimension to reach the knowledge society rather than the knowledge economy for sustainable development. This can be termed Desirable, which is the first spirit dimension of such a digital ecosystem that is linked to information search. Desirable is at the root of human motivation to make actions in a certain direction. It is a psychological process (volition) that is anchored in living beings that are immersed in their milieu (umwelt). What is desirable today for young people who are digital natives? It seems that Immersive Web would be the fourth criterion to this new 2020 Horizon, because a lot of people play with video games today. But in an education perspective anchored on a territory such as in Reunion Island, the adequate answer would be to develop game-based learning e-services that are altogether desirable, open, social and inclusive. The New Media Consortium in its Horizon 2013 report pointed out the next challenges in education for the next five years [Johnson et al., 2013], learning games being expected to be adopted in two or three years. This is why we developed the Wisdom project (Wide Immersive Solution for Data Object Model) that makes use of Semiotic Web and Sign management as new paradigms for Teaching and Learning by Playing in the Future Web.

Semiotic Web and Living Labs

The problem that we have to solve in our research team is how to develop sustainable e-services that are really used for involving citizens in the preservation of their natural and cultural heritage (action research). It seems that Living Labs with their user-centred design methods are the best answer for co-designing these solutions with motivated end-users, i.e. lead users. So in Reunion Island, we instantiated our University of Reunion Living Lab in Teaching and Learning to tackle this problem, each of co-authors being a Ph.D. lead user specialized in one of the four different dimensions for biodiversity teaching (corals and forests) and instrumental e-learning of music (guitar and piano). We then found a new paradigm
called the Semiotic Web\(^2\) that combines social, semantic and immersive Web services (see Figure 1), in order to put human beings at the centre of innovative technologies. Living Lab (LL) is the overall conceptual frame that stresses on political and methodological principles for user-driven open innovation. On more pragmatic, scientific and technical aspects, we conceived a LL method based on Sign management and a tool, the Creativity Platform, used for co-designing e-services iteratively with the whole community users [Conruyt, 2010].

**Sign management**

Sign management is the new ecosystem of knowledge management that we want to promote on our Creativity Platform. For making e-services with people and not only with specialists, a more concrete vision of cognition is required. Sign management is a solution for managing living knowledge, which is bi-directional between teachers and learners. It stresses the importance on the sharing of subjects’ interpretations, i.e. subjective know-how of end-users, rather than on the transmission of fossilized objects, i.e. explicit knowledge of experts found in documents or books. This new framework tries to give sense to shared information for all the users (specialists, end-users, lead users) acting in their communities.

The notion of Sign is more central than Knowledge for our purpose. It is composed of Data (object), Information and Knowledge. A Sign is the interpretation of an object by a subject at a given time and place, which takes account of its form (Information), its content (Data) and its sense (Knowledge). What is exchanged on a support between subjects is called Information and this digitized codification can be managed. This makes our Sign management ecosystem a tetrahedron model (cf. Figure 1) that is more involved in concrete life with end-users. It emphasizes the signification of objects by different subjects (i.e. sobjects) by allowing them to show their interpretations of objects with multimedia (audio, video) annotated in textual descriptions. Signification or semiosis is the key psychological process that makes sense for practising usage based research and development with people by sharing data, information and knowledge [Conruyt, 2013].

**Conclusion**

Social Semantic Immersive and Service Web form the Semiotic Web by showing know-how (human performances) on top of written and formalized knowledge (machine representations). This endeavour matches recommendations of EU for an open, smart and inclusive innovation pragmatic action. The last pillar of such a vision with ICT is to render this pathway for Future Web desirable. A Semiotic platform such as Wisdom is thus an objective that should not be missed in the frame of our Living Lab methodology for a better education with people.

\(^2\) This term comes from Biosemiotics [Sebeok, 1992], a science that started by studying semiotic phenomena in animals and then in other living creatures.
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Figure 2: the four dimensions of Semiotic Web: Immersive Social Semantic Service

References


Biography of Noël Conruyt

Dr Noël Conruyt is Associate Professor in computer science at the LIM Mathematics and Informatics Laboratory of University of Reunion Island. Before joining Reunion Island University in 1994, he made a Ph.D. at INRIA and University of Paris IX Dauphine in machine learning and symbolic-numeric data analysis applied to the knowledge management of specialists in biology. Noël Conruyt is also an engineer in agronomy and a classical guitar player from the Regional Music Conservatoire of Reunion Island. Thanks to these other skills, he wants to study computer science through the eyes of an end-user of such domains.
2. Living Labbing the Québec Way: a Participatory Research, a Framework and Two Experimentations in Longueuil and Gaspésie.

Danielle Lafontaine

**Keywords:** living lab, knowledge acquisition, creation and transfer, methodologies, tools, scientific domains

In Québec, a province in east-central Canada that has a predominantly French speaking population, a research titled "Living Labs for Innovative Territories" was initiated (in 2010) by CEFRIO\(^3\) to assess the relevance and feasibility in Living Labs to support innovation with ICT for rural and urban development. That objective would have to be carried out by bringing together project partners, project management experts, university researchers, through "experimentation of Living Lab methodology". In 2011, following a request for proposals and with human, material or financial support from two Regional Councils and Québec authorities (MDEIE-Q Ministry of Economic Development, Innovation and Export Trade now Ministry of Higher Education, Research, Science and Technology of Quebec MESRST), two distinct Living Lab pilot projects were launched. The first one took place in the urban community of Longueuil (406 571 ha, 1,417 hab/km\(^2\) 2011) adjacent to Montréal, and the second one in Gaspésie-Iles-de-la-Madeleine, a rural and mostly maritime region (92,536 ha, 4,6 hab/km\(^2\)) located in the eastern part of Québec territory.

The first experimentation focussed on the creative participation of young people (16-25 years old) to public governance (e-government, cyber-participation, social network, inclusion, local well-being). Some activities have been realized by students returning to school after "dropping out ", and many others are in various stages of conception, test and deployment. The second experimentation, conducted by a cooperative business in collaboration with many participants, users and partners, focussed on creative media practices (multimedia, e-participation, user-driven content, social networking, Web 2.0). A regional interactive information platform (daily news and reports) operated by journalists, public and private organizations and citizens, is being experimented ever since September 2011 (http://www.graffici.ca/). Both projects are still ongoing after two years (the experiment’s final report has been filed to MDEIE/MESRST in March 2013\(^4\)). Although many activities have been conceived and held, many challenges exist to maintain, enrich and deepen the creative dynamics, to evaluate progress made to find satisfactory solutions and produce outcomes.

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\(^1\) CEFRIO (Centre facilitating research and innovation in organizations with information and communication technology) CEFRIO has specialized in the use and adoption of digital technology since its inception in 1987.

\(^2\) Various documents are available for download on CEFRIO’s website at: http://www.cefrio.qc.ca/projets-recherches-enquetes/numerique-territoires/projet-des-laboratoires-vivants-pour-des-territoires-innovants/
Our presentation has three objectives. Firstly, we will present our research design, (audaciously co-constructed *chemin faisant*, *learning by doing*), in which many participants took an active part, focusing on the many challenges involved for partners to remain mobilized; to find, acquire and share information; to co-create knowledge and some tools to sustain the Living Labs and their activities. Secondly, we will present our co-created methodological framework and some other tools to support the creation and monitoring of a Living Lab. Incorporating results from research, experimentation and innovation on Living Labs, the framework combines various choices of concepts and interpretations. Spatial or territorial dimensions of Living Labs and innovation have been explicitly integrated to our framework and tools. Thirdly, we will focus on the two living lab experimentations in Longueuil and in Gaspésie, summarizing the case studies that have been produced (after 2 years). Those experimentations are very different one from the other. In both Longueuil as in Gaspésie, the integration of the Living Labs approach and its methodology had tangible impacts for users and their organisations in a relatively short time.

For each experimentation, key achievements and lessons learned have been co-elaborated with each respective group of participants. These have also been summarized and published in case studies, which will also be briefly presented. In conclusion, we will share our reflections on the challenges found in searching for knowledge. Given Mulder (2012) reporting on three Living Lab cases that were intended to enable the citizens to co-develop their city and referring to *living labbing* "the Rotterdam Way" with the appropriate methods and tools, we shall submit that *living labbing* can be very demanding, especially when a possible new scientific domain (Shapere 1977) emerges through multiple paradigmatic debates.

In 2005, a variety of European practices of TEPs (Test and Experimentation Platforms for Broadband Innovation) were examined by Ballon et al., in what was then seen as a "new and relatively uncharted territory", since "a lot of confusion exists as to which types of facilities can be distinguished and which of those, if any, are most suited to fulfill these goals". In 2011, Pallot et al. were linking Living Labs research domain to "new paradigms such as open innovation and Web 2.0 as well as Living Labs operating as a User Centred Open Innovation Ecosystem". Von Hippel (user innovation 1976, 1986, 2006) and Chesbrough (open innovation, 2003, 2006) have indeed presented their approach of innovation as a search for a "new paradigm", Chesbrough (in Gasmann et al 2010: 213) admitting that many "perspectives are needed to develop an open innovation theory more fully". If different innovation models – to be conceptualized and combined – are at stake, our research emphasizes the importance of another group of questions about spaces or "places", from or toward which *living labbing* can be deployed.

We think that our challenging *endeavour* in *living labbing* will be of interest to researchers and participants who have encountered similar challenges related to the initiation of living labs and might inspire others wishing to do so.

Danielle Lafontaine is a specialist in Regional Science/Studies (*Revue d'économie régionale et urbaine* 2012)
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http://www.cairn.info/resume.php?ID_ARTICLE=RERU_124_0555) and ICT in organisations. She is associated to GRIDEQ at Université du Québec à Rimouski http://www.uqar.ca/specialistes/equipe/lafontaine-danielle/ where she has been full time professor for more than thirty years, and also to CRDT, a multi universities research center that she co-lead for 7 years http://crdt.ca/. She is currently an associated researcher at CEFRIÖ where she acted as the integrative researcher for CEFRIÖ’s project: Des laboratoires vivants pour des territoires innovants (http://www.cefrio.qc.ca/en/).

3. What to do with the information generated in a municipality lead Living Lab?

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This paper describes a need for information and knowledge management in Living Labs raised by the writers of the paper after participating in a series of projects developing municipal services and acting as mentors in building sustainable municipality owned Living Labs as parts of Innovation Environment in South-west Finland.

We begin by describing how the concepts of Living Lab and Innovation Environment are related to the strategies of the municipalities Pargas and Salo used as an example, then highlight four Living Lab projects and two Living Lab environments concentrating on the information generated within them and how the information has been used eventually. Both Living Lab environments are targeted to home care services which are regarded by the organising municipalities to be of key importance in light of aging population. Home care services are also considered to be the most likely field for shared innovation in national and international levels.

Based on the examples we then raise questions concerning information granularity to support produsage, knowledge management, and Living Labs as investments. And finally we propose an EU wide project to share, exchange, and manage knowledge within larger communities as well as a research project on Living Labs as investments.

**Keywords**

Produsage, Innovation Environment, Living Lab, Information granularity, Knowledge Object, Knowledge management

**Living Labs in municipal development strategies**

The examples presented in this paper define Living Labs firstly as physical or virtual real-life environments hosting user centred methodologies in experimentations that accumulate knowledge of a collective and networked content creation community
and secondly as the well-defined core of Innovation Environment aiming to reach relative competitive advantage among municipalities. The definition combines several presented in literature from open research and innovation ecosystem involving user communities (application pull), solution developers (technology push), research labs, local authorities and policy makers as well as investors [1] to environments for collaborative innovation and discovering knowledge whose objective is to be a real life collaborative development platform where knowledge is the most valuable resource for maintaining competitiveness [2]. In the collective content creation the definition refers to produsage [3] as a commons-based peer-to-peer form of content production.

Particular to public sector organizations there are two sometimes contradictory demands concerning the information generated and used. Openness of information aiming to increase availability of public sector information for reuse in accordance with the spirit of and the conditions established by Public Sector Information Directive 2003/98/EC resulting to new demand-led information products and services [4], and confidentiality on the other hand aiming to protect the interests of individuals [5].

Examples of Living Labs in municipal strategies

Municipalities in South-west Finland have been active in adopting Living Lab as part of their development strategies. The rationale behind the strategic choices wary but the common goals are attracting enterprises and offering good environment for living in the area. In addition there is growing economic pressure towards small municipalities that drive them to find means to collaborate and together find innovative and effective ways to organize their services.

For example the Archipelago Town of Pargas (formed in 1.1.2009 and its predecessors Pargas, Houtskär, Korpo, Nagu, Iniö and Väståboland) continue in their strategy the long tradition of being the forerunners in Finland to try international influences and thus attract innovative enterprises and citizens into archipelago. Pargas has been a member of ENoLL (under the name of The Turku Archipelago Living Lab) since the 2nd wave and has offered a bilingual piloting environment for several EU funded Living Lab projects. City of Salo, on the other hand, originally adopted the Living Lab way of thinking from Nokia that had a research centre, pilot plant, and manufacturing in Salo. In Salo the user centric approach has been seen as a means to develop better, more efficient and cost effective services in order to survive in the tightening national competition for government funding for municipalities and promoting effective public private partnerships in implementing the services. The strategic aim has been to build a self-sustainable test environment for municipal service development that offers services to private and public players nationally and EU wide.

Examples of municipal Living Lab cases

The four cases presented in table 1 eDemocracy Toolbox, eDT (as a part of Collaboration@Rural, C@R [6]) and PARTERRE [7] in Pargas and Definition of home service processes and Double checking of medicine prescriptions in Salo are
examples of typical Living Lab projects implemented in South-west Finland in the last decade. In eDT and PARTERRE the bilingual, sparsely populated, physically difficult to reach, and virtually well covered (broadband) archipelago has offered a good piloting ground to EU funded projects. Nationally the interest in the projects has been related to supporting local democracy in a municipality restructuring process that has been one of the most extensive in Finland. Similar municipality restructuring has also been the driving force behind the example projects in Salo but have been more technically oriented. Definition of home care service processes - project is an example of service development aiming for public procurement and Double checking of medication dispensing process - project is an example of collaboration with other municipalities (Salo and Tammela) to improve internal municipal processes.

<table>
<thead>
<tr>
<th>Living Lab project</th>
<th>Description</th>
<th>Information produced</th>
</tr>
</thead>
</table>
| **eDemocracy Toolbox, eDT, part of C@R 2006-2009** | • EU funded project FP6-2005-IST-2-034921  
• C@R aimed to define and develop EU wide Collaborative Working Environments  
• eDT as part of C@R was piloting systematic use of videoconferencing in local administration and local government | • Acceptance test cases for conducting and participating in official municipal meetings (council, government, board)  
• Prototype fulfilling acceptance tests  
• Korpo local service board's meeting protocol to videoconferencing  
• The Finnish Local Government Act (365/1995) change to allow videoconferencing in official (council, government and board) meetings  
• Two bachelor of engineering thesis  
• Project deliverables  
• Other (project level) publications and conference papers |
| **PARTERRE, 2009-2012** | • EU funded project ICT PSP 256244  
• PARTERRE aimed to test and validate the suitability and business potential of two ICT-based tools developed to support eParticipation and spatial planning in real life territorial development contexts in Cyprus, Finland, Germany (Hamburg), Italy and United | • Archipelago meetings in Houtskär, Korpo and Utö discussion guides and instant reports [8]  
• Board and government decisions to continue to conduct Archipelago meetings  
• One bachelor of engineering thesis |
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| Kingdom (Ulster). | engineering thesis and two final project reports by international exchange students (Turku University of Applied Sciences) |
| • Archipelago meetings as part of PARTERÉ project were aimed to regain the trust towards local municipal services in outer regions of the Archipelago Town of Pargas and to ensure the citizens that the restructuring processes in local, regional and national levels had not destroyed the possibilities to active citizenship | • Project deliverables |
| • Other (project level) publications and conference papers |

| Definition of home care service processes, 2009-2010 | • Nationally funded project (Tekes) |
| • Partners: Salo, Turku University and Turku University of Applied Sciences |
| • Aimed to build definitions to public procurement process for a new home service information system by mapping the existing work processes and information flows in implementing home services in Salo, defining improved and more information effective processes for the new system. | • Process descriptions of implementation of home care services in Salo |
| • Work flow descriptions of home care service employees |
| • Data definitions of entities involved in implementing home care services |
| • Interface descriptions for health care and administrative systems |
| • Master of Natural Sciences thesis |

| Double checking of medication dispensing process, 2010-2011 | • Joint project of specialization phase nurses and engineering (ICT) students of Turku University of Applied Sciences |
| • Aimed to improve the safety of internal work processes involved in medication dispensing by introducing systematic double checking as part of the normal process and build tools to support double checking along with automatic dispensing. | • Description of double checking process in use in Salo and in Tammela |
| • Description (in form of database definition) of data used in double checking process |
| • Prototype of a system to support double checking process |
| • Formal development project documentation required by specializing nurses (Turku University of Applied Sciences) |
| • A development project document in specialization in nursing studies |

The experiences on the actual use of information produced in projects are, however, not encouraging. In the case of eDT the prototype and particularly the acceptance test cases were targeted to be used in public procurement process when acquiring
videoconferencing systems into municipality. Instead the procurement announcement only contained “the town of Väståboland seeks offers on Adobe Connect Pro system”. In the case of PARTERRE there was a municipal government decision to continue Archipelago meetings. The implementations after the end of PARTERRE project, on the other hand, were not using the methodologies or ICT system employed in PARTERRE. The Definition of home care service processes were aimed to help to define the ICT support system to be acquired but the procurement announcement again only stated “the city of Salo is buying an ICT system for home care services”. And finally the double checking of medication dispensing process is implemented as a process in the service homes it was piloted in. However, the real benefit of the system comes from integration of the procedure and data used in it into patient records while entering the medication prescription in the first place. Some, but not all, of the patient record systems have extra space for notes which is currently used for the purpose. And furthermore the data consists of physical features of medication (appearance, form (pill, powder etc.) and chemical content) which are not currently available in such electronic form that could be integrated into patient records. And the dimensions of appearance (colour, size, shape etc.) are not standardized the way chemical content descriptions are. All and all the information generated in the example projects were not utilized at all apart from producing project reports to receive funding and thesis to be buried into libraries for nobody to read.

Table 2 describes the categories of information produced in example projects (artefacts, published documents, and decisions and guidelines), their intended use and the real use. Based on the examples the main role of produced information has been to ensure project funding and completion of studies of students participating in the projects. The latter is linked with funding since the studies are partly funded by project funding. In the strategic level the information is supporting the decision making as was originally targeted to. The practical level, however, is problematic since the generated information, the reason for the example projects to exist in the first place, has not reached the targeted use.

<table>
<thead>
<tr>
<th>Information categories</th>
<th>Description of targeted use</th>
<th>Use of Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Software artefacts</td>
<td>Targeted to be used in public procurement process</td>
<td>Not used in public procurement process</td>
</tr>
<tr>
<td>• Formal descriptions of processes and data (home care services, medical dispensing process)</td>
<td>• announcement to describe the desired system</td>
<td></td>
</tr>
<tr>
<td>• Interface descriptions for health care and administrative systems (home care services, medication dispensing system)</td>
<td>• evaluation of overall suitability of the offered system</td>
<td></td>
</tr>
<tr>
<td>• Acceptance test cases for conducting and participating in official municipal meetings</td>
<td>• scoring of offered systems to find out the solutions among of which the choice is made</td>
<td></td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Published documents</th>
<th>Decisions and guidelines</th>
<th>Bases for claiming the funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Prototypes (official municipal videoconferencing system, double checking of medical dispensing system)</td>
<td>• The Finnish Local Government Act (365/1995) change to allow videoconferencing in official (council, government and board) meetings (eDT)</td>
<td>• Requirements to complete studies (graduate and specialization students)</td>
</tr>
<tr>
<td>• Prototypes (official municipal videoconferencing system, double checking of medical dispensing system)</td>
<td>• Korpo local service board’s meeting protocol to videoconferencing (eDT)</td>
<td>• Project funding claims excepted</td>
</tr>
<tr>
<td>• Archipelago meetings discussion guides and instant reports</td>
<td>• Board and government decisions to continue to conduct Archipelago meetings (PARTERRE)</td>
<td>• Student graduation and formal specialization verified</td>
</tr>
<tr>
<td>• Project reports related to studies (specializing nurses, exchange students (Turku University of Applied Sciences))</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Bachelor of engineering thesis (Turku University of Applied Sciences)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Master of Natural Sciences thesis (Turku University)</td>
<td></td>
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</tr>
</tbody>
</table>

| Targeted to                                                                            |                                                                                     |                               |
| • guide the administration and implementation of democracy in municipalities (Act)     | • give practical guidelines of how to conduct official meetings particularly in case of technical problems (protocol) |                               |
| • give practical guidelines of how to conduct official meetings particularly in case of technical problems (protocol) | • announce the intention (decision to continue Archipelago meetings)                |                               |

| Examples of municipal Living Lab environments                                           |                                                                                     |                               |

Table 3 depicts two Living Lab environments, Salo Expert Village [9] and Kunnonkoti [10]. Expert Village is run by SaloTech, a development company owned by the city of Salo. Expert Village offers three levels of services: Express, where developers can spend a typical day with home care workers, Visit, which includes product evaluation and usability testing in home care, and Stay, which includes 1 - 6 months piloting of a product or service in real life environment. The Stay service might lead to immediate decision to acquire the piloted product or service, or a customer reference statement to be used in public procurement process id produced. The services are offered free
of charge. One practical service is to maintain a toolkit for home care service customers containing physical existing products that might help to cope in their everyday lives. In addition Expert Village facilitates regular After Work Buffets (AWF), networking events for representatives from companies, universities, user communities and home care service workers. The AWF discussions are considered confidential by mutual agreement. Kunnonkoti is a test bed consisting of a simulated home (living room, bedroom, kitchen, bathroom, toilet and sauna) run by Turku University of Applied Sciences and owned by the city of Turku. It offers companies usability and experience testing services in home environment conducted by both health care and well-being students as well as real life customers of home care services. The service is offered free of charge. Currently there is a virtual on-line 3D-home environment under construction to enable virtual testing and virtual presentation of products to complement the real-life environment.

Table 3 Examples of Living Lab environments

<table>
<thead>
<tr>
<th>Living Lab environment</th>
<th>Description</th>
<th>Information produced</th>
</tr>
</thead>
</table>
| Salo Expert Village, 2013 -  | • Test bed and usability lab for home care and home services organized by SaloTech, a development company owned by the city of Salo  
• Real life home service customers and employees as testers  
Maintains a toolkit for home care customers containing physical products helping in coping in home  
• Hosting regular idea generation in events and competitions  
• Hosting regular After Work Buffets (AWB) for networking | • Evaluation report (contract based, by default not public)  
• Public Business garage entry (contract based)  
• Presentations and discussions in After Work Buffets (AWB) (no memo, unofficial)  
• Idea database  
• Information products in toolkit (user testimonials, producer, price, availability, possibility to get compensation) |
| Kunnonkoti, 2011 -           | • Test bed organized and run by Turku University of Applied Sciences and owned by the city of Turku  
• Showroom for products in real home environment  
• Environment where products and work procedures can be tested | • Showroom presence  
• www-site presence  
• Evaluation report (contract based, by default not public) |

Both environments are described in their organizers’ development strategies as well defined (methodologies and organizations to implement them) cores in the Innovation Environments. Neither strategy mentions information strategy for the environments although both describe their security and privacy policy. And adversely neither municipality’s information strategy includes Innovation Environments or Living
Labs. Both environments are aimed to help in developing new home care services and products, raising awareness of available solutions, and boosting private companies in producing more innovative solutions and creating new business opportunities. In addition the environments host project that accumulate information so that new projects do not need to start from the beginning but there already exists a body of knowledge that not only shortens the time to get started with a project but also adds information into them raising the project into higher level in knowledge space. Both environments have established user communities of home care customers, home carers, workers and administrators in home care services and politically influential actors in social and health care sector. Participation in user communities is voluntary and the identities of users are not public information unless particularly agreed in case of user testimonials. Neither Living Lab releases their user information to third parties.

Table 4 Categories of information generated in Living Lab environments and their use

<table>
<thead>
<tr>
<th>Information categories</th>
<th>Description of targeted use</th>
<th>Use of Information</th>
</tr>
</thead>
</table>
| Reports (test, evaluation) | • Contract based, by default not public  
• Producers: reports targeted to be used in product/service development  
• Living Lab: reports targeted to be used in internal (home care service departments) training and service development  
• In conjunction with public procurement process to compare and/or evaluate offered solutions | • In use by producers in their product development  
• Internal training implemented separately and not utilizing the evaluation information  
• Not used in public procurement processes |
| Databases | • Product and product test and evaluation information to be shared in showroom (www-site, physical and 3D showrooms)  
• Business case descriptions to be published as demonstrations of public sector support to private sector. Include follow up information on implementation.  
• Ideas and proposals for products and services to be shared for entrepreneurs to implement. Include follow up information on implementation. | • Tests and evaluation information not published  
• Published product information contains only data released by the producers  
• Business case and idea database requires registration to follow the development of ideas  
• Database data not open data, accessible only through published www-sites |
| Showroom presence | • Demonstrate use of products  
• Demonstrate the home environment | • Showrooms (Expert Village Express) |
requirements for products and services
- Raise awareness of possible solutions among customers
- User testimonials are offered as part of product or environment specific information in order to clarify technical information
- Living Labs are acting as reference customers giving product/service reference including evaluation reports and user testimonials. Targeted to be used in public procurement process (evaluation and scoring).

service, Kunnonkoti) open by contract of during office hours
- Virtual 3D showrooms under construct
- Customer references used as additional information in public procurement by producers

Unofficial information
- Primary target to bind and strengthen the community
- Secondary target to share information and knowledge among Living Lab community
- Confidential by default

- Unofficial use, restricted into After Work Buffets (AWB) events
- No supportive (social media) tools in use

Table 4 describes the types of information generated in the example Living Lab environments (reports, databases, showroom presence, and unofficial information), their intended use and the real use. Showroom presence has a significant information part in addition to physical part (object placed in a physical environment) and is thus depicted as form of information. Based on the examples the nature of information is more of a product catalogue than the basis of knowledge for further innovation. However, the product information has not been used in public procurement processes indicates possible problems in the information itself.

Identified problems

Both the example Living Lab projects and environments are important parts in the strategies of their organizing municipalities. There are, however, gaps between strategic goals and the performance. The information generated in projects is not used. And the information created and hosted in the example Living Lab environments is too narrow to support knowledge creation and collaborative innovation. The problem is both in the information itself and how it is managed as knowledge.

Software artefacts and product evaluation reports that are targeted to public procurement process are not used partly because the process itself does not require that type of information. Procurer is not obliged to describe in detail what features and functionalities are required by the solutions or how the offered solutions are evaluated and scored. But the information itself is not adequate either since the professional procurers are disregarding it. There are public sector fields, such as construction, where such information is used by default. To reach the same level of
standardization and comparability in problem domain descriptions, descriptions of required features and functionalities and their importance in the overall solution as well as the assessment criteria and how the assessment is made when municipalities are in the procurer role has been one of the major goals in the example projects and environments. One reason for the failure might be that professional procurers do not recognize software artefacts. But more likely the granularity of information that currently is in product level is not correct and does not support the comparability of offered solutions nor evaluation of suitability to solve the problems the solutions are intended to.

Information granularity

In the presented examples the granularity of the information (software artefacts, evaluation reports, and databases) is in product level. Products are combinations of critical features to solve the most important problem, additional features that differentiate one product from another, and the service included in the package. The comparison and evaluation of product size solutions is not the evaluation of how well they solve individual problems but how good they are as a package. That is probably one reason why the generated information in examples has not been used in public procurement processes. In addition the problems that the solutions are solving are described even higher level, such as home care service production process, which makes it even more difficult to utilize in descriptions of solutions to be acquired in public procurement announcement.

The implementation of production of information in the examples has not yet met the idea of collective and networked content creation community set in the municipalities’ strategies. As stated in [3] it is clear that “produsage does not appear out of thin air … but by individuals or groups of individuals who begin to develop a first, basic and incomplete solution to their problem … and seed the larger community with ideas that are sufficiently interesting … and granular”. The granularity is a key to enable equipotentiality and makes it likely that there are aspects, however small, for all participants in the community to contribute and share and not just the experts whose view of granularity the current information reflects.

Knowledge management

In the examples the information (software artefacts, test and evaluation reports) is treated as traditional product information. The databases are defined based on traditional product data (name, description, dimensions, price, producer, tested by, test result). The core of a Living Lab; real life environments, situations and real users are not part of that data. And in addition the databases do not support data sharing within the community nor, indeed, building or maintaining the community. The information has been regarded as traditional pieces of (separate) information instead of knowledge objects which, with proper knowledge management, support collaborative innovation and discovering knowledge.

In their strategies the municipalities recognize information as an investment to acquire knowledge. To achieve this traditional (product) data needs to be redefined
as knowledge objects (KO) [11] which can have a variety of formats ranging from digital media to WEB 2.0 mashed objects. Instead of tradition relational databases to store the information knowledge object repositories (KOR) to store and manage the subsequent metadata as part of the semantic knowledge bases [2] need to be defined.

In addition to recognize knowledge as an asset the strategic view on knowledge is that it should be shared and managed [12]. The Internet and social media can provide for sharing by making knowledge available through knowledge elements. The role of experts in Living Lab environments or knowledge bases in collaborative processes is to ensure that they continually verify the various knowledge stores [2].

Living Lab as an investment

The municipalities involved in Living Lab projects invariably state in the evaluation discussions that “this is what we would have done anyway only this time part of the funding came from outside and we might have learned something new in the process too”. In the long run, however, when considering securing the continuation of Living Lab environments there needs to be evidence on the value of investment. Currently the value is considered to be in “buzz” around the projects that attract positive attention. Even though the services in both example environments are offered free of charge to companies in order to remain impartial implementing them is an additional cost.

Suggestions

There are a number of Living Labs already working on public sector aiming to develop and further improve public services, such as home care services. They are driven by diminishing means that is lead an EU wide need to restrict the spending to public services while improving them. Even though the legislative frameworks have differences throughout Europe and there are cultural variations (language, concept of family) the aging population is another powerful driver for Living Labs to develop home care services to enable people to live at their homes as long as possible is shared.

Both goals would be better served if the information produced in individual Living Labs or wider networks could be shared in a common Internet based Knowledge Management framework implementation. The framework needs initial seeds to attract the wider community to actually give their contributions to create a collective intelligence. The seeding process should be started as an EU wide (or wider) project concentrating on defining the minimum set of tools, portals, and fundamental rules concerning security and privacy. Defining the optimal granularity of information, and populating the knowledge elements on the Web with what is already known in the community of Living Labs. The project funding is needed for a dedicated group of ICT and home care experts to put their working hours into the basic seeding, tagging, linking and browsing.
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The aim is not to build yet another ICT platform but utilize the existing Web2.0 tools. In addition to share data Web2.0 technologies allow for tags and metadata to be collated and analysed as knowledge structures. When the Internet based semantic knowledge support portals offerings are attractive enough the real experts (users) come in when they have time, resources and good enough tools to use to share their knowledge and experiences.

In addition to implementing and seeding the knowledge object repositories and portals there should be education and training programs to help people to learn how to use the Web2.0 tools effectively and actually become part of collective intelligence.

And finally a thorough research on public sector owned or managed Living Labs as investments is needed.

References
4. Intelligent Territory as Ethic Space: how does Science and Technology Parks play the role of facilitator to the Urban-Rural Cohesion

Juan A. Bertolin, Chief Innovation Officer of espaitec, Paco Negre, Chief Executive Officer of espaitec; Francesc Santonja, Concierta; Laura Fidalgo, Concierta

Keywords

Intelligence Territory, science and technology parks, rural labs, living labs, convoy model, ethic space.

Executive Summary

The location of a Science and Technology Park (STP) has been considered very important related to the impact produced on its environment. However, this localist perspective of STP does not reflect their real driver nature of the local economy development in a region. The STP generates a dynamic sphere of influence, not located geographically but territorially, and that sphere is evolving based on the evolution of the innovation ecosystem and therefore no borders should be considered.

This new conception of influence forces the extension of the concept of territory. The new territory becomes a supra-entity among the innovation ecosystem where “smart-citizens” running inter-cooperation processes are the keystone of the process and thus, the relationship between STP and this territory ease the urban-rural cohesion.

New perspective of the concept “Territory”: Intelligent Territory as Ethic Space of Cooperation

The term “Territory” has been used, so far, to define a portion of geographical space that coincides with the spacial extended of a government’s jurisdiction (Gottmann, 1975) but this vision of “Territory” is quite limited due to the fact that it is not considering all the actors involved in the inter-cooperation process performed in that arena, that is to say to extend its conceptualization to a deeper level of abstraction based on a multidimensional nature that englobes the quadruple helix formed by economical, social and ecological perspectives plus the citizens as active agent. This is the first step to define the “Intelligent Territory” as a collectivity that gives add value to resources and capabilities of a no-border territories in which the intercooperation is a top priority (we could also named as “Smart Territory” but not from the “technology sensoring” point of view as the SmartCities are considered, but from a broader definition of “sensoring” where people plays the most important and active role).

This “Intelligent Territory” is visualized as an Ethic Space that engages tangible and intangible assets on an inter-territorial aggregation either supra-municipality or supra-region, in order to enable the development of the productive economy, social cohesion and environmental balance in their relationship with the environment.
leading to an ecosystem that prioritize resource knowledge as a catalyst for inter-cooperation.

An ethical space is configured from the people, their individual values converging with those of the various groups in which are integrated: in the value chain of market offering, in the complex reality of territorial scenarios and the internationalization process of their identity. This participation requires some sort of methodology that will educate the people to innovate through living labs paradigm and the new perspective leads us to an “economy value” where key resources to manage are not only the economics ones but all the resources that provide an added value to the binomial relationship offer-demand, such as time, knowledge, cooperation, applied technologies, etc... focused in easing a sustainable development based on the current situation (terms such as subsistence, environmental equilibrium or social cohesions require a deep consideration) and integrating concepts of social economy, common good economy, and cooperativism.

The Intelligent Territory Ethic Space behaves as a fractal reality implemented by an accumulation of actions aimed to compose a space in which sustainability, connectivity, innovation and equity are structural axes. The behavior of fractals is a good driver mechanism for project management model PTI.

We understand the complexity of the project, particularly because our partners are already generating resources and capabilities for the benefit of its territory. And their belief is that it is difficult to achieve a qualitative leap to the position of its offer with mechanisms that are difficult to implement: the management of information and knowledge generation, inter-cooperation that transcends local boundaries, the generation of new intercooperation mechanisms, etc..

The fractal behavior begins by defining a formal unit that replicates. That is, with criteria chosen for their strategic importance, it forms a basic structure easily acceptable for its simplicity. Thus, the start up process (micro) has identical configuration, and so does the way in which the process is displayed. This facilitates two projects initiated from different positions and with different contents end up converging thanks to the way they are managed.

Simple fractal shapes result from a combination of numbers, which results in a geometrical figure that is replicated. So when we chose the simple triangle configuration as processes get to grow always giving a three-dimensional view of the options, opportunities, implicables factors, etc.. And the model does not require extensive knowledge of organizational culture or strategic (business). Exchanges and memorizing the triangulation criteria allow almost universal involvement.

New Role of a Science and Technology Park

Science and Technology (STP) Parks role has been, so far, focused too much in a physical delimitation, providing support to a set of SMEs (Small and Medium Enterprises) and with a few involvement of citizens in their strategy for local economy
development. Living Labs paradigm could help to redefine its strategic plan to become a higher value resource for sustainable development of its environment.

Based on this new approach, STP definition has to be reconsidered extending their sphere of influence based on another vision: more cooperative than competitive, more collaborative than exclusivist, in an essential concept as a coopetitive agent at the Global Innovation Ecosystem less bound with the physical area.

Science and Technology Parks should be considered as a set of kaleidoscopic variety of tools for local and regional economic development supporting the innovation process and subsequent increase of competitiveness of firms and regions (Vladimír Székely, 2012) and therefore, they encourage national and regional development, engage the SMEs to foster R&D and innovation, job creation and business profitability creating a “sunrise future” for the territory.

This approach gives a new perspective, a systemic one (Bertalanffy, 1968) by which the interactions among the parts (in this case the SMEs and the society) determine the whole (i.e. Science and Technology Park) and at the same time the behaviour of the parts. The essential feature of this new thinking is the capability of detecting reciprocal relations among the SMEs and assessing its importance, most of the cases greater than the elements related (Bokin, 1979) that indeed, and sometimes unconsciously, most of the parks are actually performing it in one way or other.

STP + LivingLab Paradigm = binomial for the conception of an “Intelligent-Territory”

As aforementioned, it is required to view the “territory” from its global perspective not as a spatial area governed by a local institution but as supra-municipality entity that connect the government body and its community. In that point of time, it does make sense to talk about “territorial system” (Fernandes et al., 2005) and about territorial actors (namely STPs and their stakeholders).

The territory entity is part of the Regional Innovation System, that is indeed understood as existing in regions that possess a great diversity of innovative organisations located in an institutional environment where systematic connections and interactive communication are rather often among local actors. These organisations are universities, fundamental or application-oriented research

6 "AN INTRAURBAN LOCATION CHOICE FOR A SCIENCE AND TECHNOLOGY PARK IN BRATISLAVA: A FEASIBILITY STUDY”, Vladimir Székely, Institute of Geography, Slovak Academy of Sciences, Štefánikova 49, 814 73 Bratislava
7 General Theory of Systems, Ludwig von Bertalanffy, 1968
8 No limits to learning, James W. Bokin, 1979.
9 “Territories and Innovation Systems: Cooperation Strategies Between Universities and Companies in Taguspark”, Fernandes, Manish and Duarte, Rui, 41st ISoCaRP Congress 2005
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laboratories, technological transfer agencies, brokers, regional governance organisations, bank and the venture capital system and companies (Fernandes et al., 2005).

Due to its nature STP are changing its initial concept to become ‘creative learning villages’ (Bertolin et al., 2012) or Living Labs, that is to say a non-delimited geographical space that integrates not only business activities, educational and R&D centres and services but also residential, cultural, recreational and leisure areas with the involvement of the citizen in all the processes as co-creators and co-designers of their own surrounded context.

The aforementioned interaction is conceptualized as a multidimensional matrix with all the nodes interconnected and in continuous movement where STP plays a crucial role.

![Octagonal Innovation Ecosystem defined by espaitec](image)

By this attitude, the nodes act to enhance the competitiveness of a territory using the leverage of innovation created by interaction, therefore a **STP can be considerer as a metagorganiser of resources and capabilities** in order to develop coopetitive and innovative potentialities of its territory (Mastroberardino & Nigro, 2006)

So far, if STP has been used to be a “language” translator between University, as a Knowledge Center, and the network of businesses, it is now the time to become the main fibre to connect urban and rural intelligent areas. Therefore, it should become

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10 “eLivingLab: The Science & Technology Parks and Living Labs binomial as innoconnectors for SmartRegions creation”, IASP 29th World Conference Copenhagen 2012, Juan A. Bertolin et al.

11 “A Systemic Approach To The Study Of Science And Technology Parks And Their Relations With Regional Economic Growth” Prof. Piero Mastroberardino Prof. Claudio Nigro Dott.ssa Gemma Carolillo, 2006
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the main amalgamation of all the innovation agents, not one more but the driver, the orchestrator of all the resources (human and financial) and the networking linker.

The conception of “Intelligent-Territory” comes up under the necessity of identifying a new identity paradigm providing a new approach to the interaction among all the innovation agents under the Global Innovation Ecosystems under a Living Lab model (e'LivingLab, Bertolin et al. 2012) as it has been implemented in our park in Spain, espaitec Science & Technology Park, with a strong integration on the territory. The management of this approach follows the Convoy Model (Bertolin et al, 2011) that enhances the “coopetitiveness (Brandenburger, Nalebuff 1996)" of the territory.

The Convoy Model (Mensch, 1968) is a new approach to the region innovation generation which aims to be built over three main cornerstones:

- It is multidisciplinary and multi-synergic, as it allows the involvement of different agents (companies, institutions, governments, customers, providers and citizens) by means of “interactions” (out-in), “outreactions” (in-out) and coopetition relationships (cooperating + competing).
- It stimulates and reinforces the Open and Cross Innovation actions.
- It is a MIMO (Multi-input Multi-output) entity.

Fig.2 Fish-bone of tractor projects (proprietary development)

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12 “eLivingLab: The Science & Technology Parks and Living Labs binomial as innoconnectors for SmartRegions creation”, IASP 29th World Conference Copenhagen 2012, Juan A. Bertolin et al.
13 “The Convoy Model as a new “glocal” growth accelerator metaphor for the economy in the next decade”, IASP 28th World Conference Copenhagen 2011, Juan A. Bertolin et al.
14 Adam Brandenburger, Barry Nalebuff 1996 Co-Opetition : A Revolution Mindset That Combines Competition and Cooperation
16 “On Integral Complementarity”, G.O. Mensch, Working Paper No. 245, CRMS Center for Research in Management Science, Berkeley, February 1968; both papers solve the governance and coordination problems of “moving in sync” and provide the mathematical proof (Kuhn-Tucker conditions) of Existence Theorem of “movements in convoy”).
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The Convoy Model acts as a magnet attracting collaboration and initiatives that enable continuous improvement, continuous value creation, and synergies.

The Convoy Model can be used to regenerate traditional sectors and traditional management techniques, which have been unable to adapt to the future.

Urban-rural cohesion: Rural Labs to foster innovation on the “Intelligent-Territories”

More than 90% of EU territory is categorized as rural, so it constitutes an interesting environment for the creation of new businesses initiatives, basically supporting ICT innovative services and products, with public-private partnerships in order to ease the socio-economic development of the region (Navarro et al., 2010).17

Rural Labs are an extension of the Living Lab concept, with aim to involve and experiment new innovative approaches with real users in real-life environments, that will be able to remove rural development barriers by the integration of collaborative programs among all the agents of the "rural innovation ecosystem" and a catalyst of an Urban-Rural cohesion.

Rural Lab is the best scenario for engaging rural local communities to develop social innovation, it could be considered as well as Social Spaces for Research and Innovation (SSRI).18 However, when these local communities included in the municipalities and public entities do not sufficiently exchange information, that is to say there is a lack of efficient networking. When the concept of Rural Lab is taken, it is not referred to a specific municipality but a holistic system that conforms the territory as a whole so, such lack of current interaction provokes an inefficient common strategy to exploit synergies among all the entities and the appropriate societal sustainable impact.

The figure of “Intelligent-Territory” does not focus only in the rural development but to consider its connection with the urban side as a continuum bidirectional streamflow, a urban-rural cohesion that will capture the enormous diversity and dynamic nature of the development of those spaces. A technology and knowledge transfer of innovations from urban to rural, and viceversa, could improve economic development prospects of rural areas. and in the other way around. Nevertheless, the configuration of a “Intelligent-Territory” supported by a figure, such as a Rural Lab, accomplishes the “Contingency Theory” (Woodward, J., 1958)19 by which human combinations from the organizations, financial and technical could be effective in some contexts and not in others. So it is important to analyze the boundary conditions to reduce its uncertainty.

17 "Innovation Strategy for Rural Development Based on LivingLans for Humn Empowerment", Mariano Navarro et al., 2010
18 See http://www.researchspaces.eu
Espaitec reinforces its mission by providing an ideal environment in the province of Castellón called the e’LivingLab\textsuperscript{20}, a "Symbiotic Crowd-sourcing" instrument that will strengthen, whenever possible, the cooperative development of innovation across all socio-economic agents in Castellón what we call the democratization of the innovation. This e’LivingLab focused into the rural area of the province is the Rural-Lab aforementioned.

In addition to this, Espaitec is leading the implementation of a Capability and Technology Map of the territory of Castellón de la Plana\textsuperscript{21} that will embrace the hybridisation process among all the innovation agents of the territory, from the coast to the interior of the province, from the cities (our smart-cities) to the rural smart-villages reducing the gap between both environments (rural and urban) and facilitating their complementation.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{octagonal_rural_innovation_ecosystem.png}
\caption{Adaptation of Octagonal Innovation Ecosystem to Rural one}
\end{figure}

\textbf{Case study of Penyagolosa Intelligent Territory}

\textsuperscript{20} "eLivingLab: The Science & Technology Parks and Living Labs binomial as innoconnectors for SmartRegions creation", IASP 29th World Conference Copenhagen 2012, Juan A. Bertolin et al.

\textsuperscript{21} The province of Castellón de la Plana has got 135 municipalities, only 8 with more than 20,000 inhabitants. 100 municipalities represent only 80,000 inhabitants. It is the 2nd most mountainous province. The coastline mainly irrigation land, rich and populous. The interior is dry, mostly uninhabited, and with difficulties in transportation and communications.
The project **Penyagolosa Intelligent Territory** developed in the L'ALCALATEN region and led by espaitec Science and Technology Park in collaboration with Concierta and with the support of Provincial Council, aims to identify the relevance of the territory concept in the region of L'Alcalaten, located into Castellon Province. The scope of the strategy will pay attention also to the supply profile in different segments of the productive economy of the region. The progressive integration of the Territory factor in the intangible assets of the individual and collective offering will confirm their status as a distinct identity catalyst of that offer.

In order to join the nine municipalities, it was necessary to identify an element representative that could generate ownership, identity and that could be accepted by all the participants. In this case, it was the Penyagolosa mountain.

Penyagolosa is, geologically, part of the Iberian System and located at the eastern end of Iberian Peninsula. Its peak is at 1,813 meters above sea level and is often crowned with snow in the winter. The Penyagolosa is widely considered to be most emblematic mountain in the Valencian Community. Since it stands quite isolated, it was thought to be the highest peak in the region, but actually the highest is the 1,839 meter high Cerro Calderón, located in the Rincón de Ademuz, a Valencian exclave where there are three more peaks over 1,500 m.
The Territory as an intangible asset

It is clear that the current economic situation has caused a change in the profile of different consumer segments. And, as a result, companies are modifying and adapting the intangible assets of their offer.

The territory can be considered as an intangible asset if it optimizes the quality of their relationship with the companies, in a conceptional ecosystem, that would lead to the display of the region as Smart Territory.

The objectives of the project are:

- Identify a number of institutions and companies from different segments of the productive economy of the territory that can shape the study group. In practice, people who are interested and committed in participating in a process of generating knowledge that can be helpful, no matter what is their position in the institutions or companies.
- Identify the different formats that recognize consumption in relation to the market.
- Identify projects that actors are taking place, to see the possibility of inter-cooperation among them, thus improving their efficiency and effectiveness.
- Identify different intangible assets of its bid.
- Identify the relationship of companies with their local environment and the extent of its reach as a strategic
- Establish a work plan to optimize the ratio of each company and the group with the domestic ecosystem, strengthening of eco-efficient atmosphere.

The project is being deployed in different micro-processes, within a maximum of twelve months.
Identity and paradigm

The territory is identified as relational ecosystem where the inter-cooperation of agents in the value chain of local and global market is essential to deploy an effective strategy. Identity and Paradigm are the elements to make it happen.

Identity

Being aware of the diverse identity profiles of L’Alcalaten the starting point requires to identify their weaknesses and strengths, interpreted not only in terms of its economy, also those others who may be elected as definers of social reality and environmental relations and the management of environmental values.

It happens with the concept of GDP. Given the current economic downturn, restoring economic growth is a major concern, and GDP is a key indicator to evaluate the effectiveness of the recovery plans of the territory.

The GDP has also come to be regarded as a proxy indicator for overall societal development and progress in general. However, by design and purpose, it can not be relied upon to inform sustainable growth of the territory. In particular, GDP does not measure environmental sustainability or social inclusion. A Eurobarometer survey conducted in 2008 showed that more than two thirds of EU citizens think that social indicators, environmental and economic alike should be used to assess progress. So the conception of the identity of L’Alcalaten will be fixed with indicators promoted from the public debate based on a set of indicators that include elements from the OECD Better Quality Index, Human Development Indicators and Happy Planet Indicators.

Thus, a first task will be choosing the indicators that can help us establish more timely understanding of the identity of our territory.

Paradigma

The current situation calls for a review and update of the value system that allows us to face the new challenges that the relationship between supply and demand arise. The value system will specify the new parameters of the area’s identity.

Inter-cooperation is seen as paradigm, beyond other options as excellence. And from this consideration the value system will give priority to collective knowledge generation, innovation that considers cooperation between the agents of the value chain, the social collective involvement in setting priorities, etc..

The project will specifying the value system and its management, while guarantees of territorial identity and its construction as a collective endeavour intelligent.

24 http://www.happyplanetindex.org/
Microprocesses

The project is conceived as a macro-micro processes that concrete objectives and short-term trajectory. Each section will allow not only the identification and management of strategic factors that will enable the achievement of the objectives of the project but to incorporate new tasks based on the data and criteria that each process can contribute.

Microprocess relationship is as follows:

1. Identify implicables agents
2. Positioning: Consumption and Sustainability
3. Identity of intangible assets of supply
4. Positioning: "Local and global markets"
5. Frame of reference and shared leadership
6. Platform and technological mechanisms
7. Commissioning and energizing

1. Identify implicables agents
The first scenario that the project will face will be to identify the agents, people, companies, institutions will be invited to participate in a first task of reflecting on the different ingredients that make up the identity of L'Alcalatén: value system, indicators of economic growth, social and environmental and inter-cooperation mechanisms between the agents involved in collective supply.

The election shall be considered as natural selection, through calls to meetings of different groups, and interviews with individual agents whose profile it necessary in which it will been identified projects that actors are taking place, to see the possibility of inter-cooperation among them, thus improving their efficiency and effectiveness.

To develop an efficient and effective communication channel among all the agents, it is required to design and create online communication mechanisms the will allow agents to exchange their views, suggestions and information that will generate the project. The set of ICT tools used are being:

**Internal:**
- Dropbox (as a document repository)
- Skype for audioconferences (mainly due to transportation networks deficiencies)
- Yammer (as internal twitter tool to exchange points of view)

**External:**
- Linkedin Group to provide open discussions
- Facebook Fan Page, Twitter and Blog to communicate the main achievements obtained as front-end of the project to the world.

The process will conclude with a forum on the Identity and L'Alcalatén Paradigm, which will be as the assembly process management settings like Intelligent Territory region.

2. **Positioning: "Consumption and Sustainability"**

The second scenario that the project will face will be to reflect on the different formats of consumption that occur in the territory of L'Alcalatén, not only in the local trade but in all those business and institutional initiatives that affect the economy ecosystem.

The actions are specified in survey tasks that allow us to define the profile of demand in its various forms and formats, through the implementation of actions that exchange business, with consumers and creative planning, and report editing first proposals and acting in cooperation with those entities willing to revise your offer intangibles.

These actions will be specified in three meetings with the various groups described and the convening of a Forum set to be approved in a first working script which will affect the compatibility of actions to promote an offer adapted to the new consumer formats and sustainability indicators.
3. Identity of intangible assets of supply

The microprocessing seek to identify what is the degree of relevance and market reach of those intangible assets that support companies and organizations recognize their offer. The performance will take the character of meetings with companies and entities involved in the project.

In short we are talking about factors that often are not managed in the configuration of supply as with tangible assets.

An asset is a resource controlled by the entity that could and can get tangible benefits. The intangible term used with a restricted sense for assets that produce benefits similar to those produced by the assets or income and can not materialize physically.

Intangible assets include: branding, corporate identity, corporate communication, image, stakeholder recognition and reputation of an organization, business knowledge, operational, scientific or technological, intellectual property, patents and rights marketing, licenses, concessions and copyright, the customer base and how to relate to them, among others.

The project aims to identify the real extent of intangible assets in the market, and add to the portfolio of intangible assets of individual and collective supply territory factor.

Timely management of inter-process that enhances the relevance of individual and collective intangible assets, including land, will enable better continuous positioning of companies and entities in the market, and optimization of social and environmental balance in the ecosystem.

4. Positioning: "Domestic market and global market»

In this fourth microprocessing we propose convening a Forum to review the profile of the relationship between individual and collective deal with local and global markets, threats and opportunities in both contexts, identified uniquely in order to stimulate and modulate the activity entrepreneurship.

The emphasis of the discussion will be on identifying profiles and systemic disruptive innovation that are or can be deployed in the region. We will choose the most appropriate mechanisms for entrepreneurial activity can be raised and promoted.

The choice of projects that can be analyzed in the forum will involve the signing of a contract between the parties involved, which enables optimization of protection in order to consolidate the business.

5. Frame of reference and shared leadership
This crosscutting microprocessing allow you to configure a framework with strategic and operational criteria that encourage intelligent territory quality in the region of L’Alcalaten.

Criteria to materialize the following indicators:
- The territory is sustainable;
- The territory is connected;
- The territory is innovative;
- The territory is fair

The factors to achieve this dimension are:
- Setting new standards of quality
- Consolidation of a mode of operation based on active intercooperation
- Enhancing the knowledge economy
- Integration of advanced technology

By influencing the demand that the territory, through their organizations, respect the complexity, without rank or centrally organized, intelligently articulate interests, learn to cooperate, manage clutter and knowledge govern well, we are endorsing the need for a shared leadership, explicitly recognized in each of the areas of operation.

6. Platform and technological mechanisms

The project was created with the purpose of hold on the deployment of a technology platform that optimizes the management of information and knowledge.

This micro process will also cross character shaping their goals and go depending on the needs that arise in each of the micro mentioned.

It seems clear that the project will require innovative materialization of a technological approach can interpret the randomness of a reality that evolves continuously at both the tangible and face as in the intangible and virtual. And, ultimately, optimize the use of technological devices used in an advanced society without avoiding the challenges that arise from the complexity management:

The growth and development of a postindustrial society, or technological advanced, is the result of a complex set of social factors and not just the accumulation of capital. Innovation, creativity, and sustainable growth depend much more directly than before the level of knowledge: information management, education, scientific research and technical training, the ability to schedule and regulate the change in the social relations, forms of management and organization, etc..

6. Commissioning and energizing

A macroprocess have to develop cognitive strategies to act in uncertainty. Among the most important knowledge is the risk assessment, management and communication. We must learn to move in an environment that is no longer clear relationship between cause and effect, but blurry and chaotic, systemic.
At this point, the behaviour of the agents will be linked to real interests, with targets capable of regenerating the system incorporating new assets continuously. In short, the model of Intelligent Territory will be able to increase confidence in an identity defined by active intercooperation.

**Current situation**

On March 8 began the preparatory meetings with the municipalities, with a meeting in L'Alcora. From then until now we have had over 60 meetings with people from different municipalities and local or county attended events as the Mostra de L'Alcalaten, on June 1 in Figueroles and Wine Fair, held in Les useres.

Among the more than 350 people with whom we could exchange views and proposals, we have recognized, and they have shown us, to those who are willing to join us in the management of some of the processes of a project, which has been progressively incorporating a framework with strategic and operational criteria typical of similar scenarios what we call Intelligent Territory.

We have collected the assessments that were made on local identity, regional and supra: twenty indicators explaining we left and we had to select nine in which to work during the first year of the project, and a set of micro-projects projects have been grouped into five areas, after evaluating 43 proposed.

All of them have incorporated the term Penyagolosa as geography symbol economic, social and environmental planning.

**Penyagolosa Declaration** project is part of a concept that gives more relevance to people, that seeks to activate the collective inter-cooperation between the territory and to this end encourages communication, especially through the active use of the tools and mechanisms that we provide information technologies. The project was realized with a statement of commitment to the people with the deployment of intelligent territory.

**Penyagolosa Landscape** proposes to make visible the importance that the environment has on the deployment of sustainable development of the territory. It adds value to distinguish, differentiate places, flora and fauna unique. Enable knowledge about the relevance of the symbiosis between architectural models, uses of materials (dry stone) and definition of structures, and the environment. The collective action as hunters and effectiveness of educational action are the focus of attention.

**Penyagolosa Rural** focuses on the positive encounter between people who inhabit the land and those who visit, whether temporary resident tourists settled either by blood or by properties. The rurality is enhancement of an atmosphere as guarantor physical, social and emotional that increases the enjoyment of a healthy existence. The craft creative action in its broadest conception is given special attention.
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Penyagolosa Food began his involvement in the process of cultivation, in the field of agriculture and livestock. And since the recognition of the relevance of the attachment to the land, the project aimed to activate the intelligent power, which not only nourishes, but enriched by the pleasure of their perceived sensory, social and cultural rights: seasonal cuisine, traditional, creative cuisine. A job that involves all actors in the value chain of agri-food supply, and to extend the application of consumer engagement in different markets.

Penyagolosa Innova proposed promoting creative action, reflected not only in the technological transformation but also the renewal of the management models in the development of new business initiatives and opening up new markets with the addition of policies that promote the internationalization of the supply of an intelligent territory which is secured around a characters own identity and a symbol of his willingness to intercooperation: Penyagolosa.

Each project involved a management action, with individuals and entities to the front, which sought Arrange Espaitec and provide resources and capabilities, and seeks to identify appropriate funding mechanisms to optimize the results of micro to be deployed by it.

Indicators

The nine indicators (KPI) were selected and the election gave a way to establish an assessment methodology, which verified the effectiveness of the measures implemented. So, we understand that Penyagolosa Intelligent Territory is a reality in the region and in their areas of influence to the extent that:

- Encourage actions that increase the population
- Encourage good governance in the management of collective
- To enhance cooperation in improving physical and technological infrastructure
- Increase funding mechanisms
- Module tourist action as a catalyst for careful attention to the environment
- Put on the landscape value
- Reclaims the activity in the food industry
- Put in the tourism value
- Enabling the growth of intergenerational communication

Conclusions

The project Penyagolosa Intelligent Territory is still alive but, at the moment, these are the first conclusiones that we have got:

- The Macro-process launched is the engine of projects that is able to deploy the region's potential in their different meanings, optimizing performances mainstreaming through knowledge management as a catalyst for innovation.
The involvement of people is through the recognition of the values off the territory that matter. Values that conform projects in the field of management, as in the technologies to implement.

The implementations were displayed by means of micro-processes with short-term objectives that increase the confidence of agents in the project. The inter-cooperation as a paradigm allows us to incorporate resources and capabilities that would otherwise hamper the achievement of the objectives.

The relevance and timeliness of the various areas in which we have intervened allows us to establish priorities. Putting some example online connectivity in the territory, the management of olive oil, the map of unique places, generating entrepreneurial initiatives in areas such as food, crafts, etc.

5. Living labs for user-driven urban planning – Empirical findings regarding new ways to engage citizens in the development processes

*Lotta Haukipuro, Tommi Heikkinen, Anri Kivimäki*

**Keywords**

Living labs, user-driven urban planning, citizen participation, user engagement methods, developing new procedures

**Abstract**

This paper presents the empirical findings of a living labs pilot project in which citizens of Oulu, Finland were involved in developing a new part of the city. Citizens were engaged through various living lab methods; this was considered an efficient and fruitful way to involve users in the development process.

The largest new part of the City of Oulu, known as Hiukkavaara[^25], will be developed into a model neighbourhood of sustainable urban planning. Feedback for the development of Hiukkavaara is being continually collected from citizens in all phases of planning and implementation. Feedback collection in this pilot project was conducted in April 2013 in cooperation with the City of Oulu development projects and the MAINIO project[^26] which develops user-driven open innovation methods within OULLabs Oulu Urban Living Labs. The aim of the feedback collection was to


[^26]: MAINIO (Methods and Innovation Networks in OULLabs) is a two-year (1 January 2012 through 31 December 2013) project financed by the Council of Oulu Region and the European Regional Development Fund, University of Oulu (Center for Internet Excellence and Media Team Oulu), Oulu University of Applied Sciences, City of Oulu, and VTT Technical Research Centre of Finland. OULLabs has been further developed during the MAINIO project.
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involve users in order to improve the sustainability of the city during winter and the new city part, as well as to develop citizen participation and research new forms of user involvement.

Citizens were recruited for online discussion and an e-survey in an online forum. Another group was formed to evaluate a 3D model in a 3D virtual laboratory. Additionally, a survey was implemented on 15 large interactive touch screens in the city area. More than 200 citizens of all ages were involved in the development project and many ideas were raised to support urban planning. As a new age group in terms of urban planning, young people were reached through novel methods, such as a combination of an online discussion forum and the 3D virtual laboratory. The use of multiple methods enabled rich feedback to support urban planning.

Research question

How can citizens be engaged in user-driven development processes with various methods in urban planning, especially in the development of a new city part?

Methods and results

A variety of methods were used for feedback collection in this pilot project. Based on the experiences, the PATIO online forum was selected for collecting qualitative deeper insights of citizens, UBI Poll for quick evaluations and reaching unregistered users, and the ZEF questionnaire for comparing the quantitative results with UBI Poll answers. These methods are described more specifically and analysed below.

PATIO\(^{27}\) is a web-based test user forum. Test users register voluntarily and are invited to participate in various user tests, moderated online discussions and evaluations. In this pilot project, an announcement of the development project was published on the PATIO web page. Word of the project was also spread via a Facebook advertising campaign targeted at citizens of Oulu. Eighty-three users signed up for a two-week online discussion led by city planners in April 2013. Discussion was fruitful and, according to the city planners, produced a lot of ideas for the planning and various related aspects.

An electric survey was implemented through PATIO forum using an e-survey tool ZEF\(^{28}\). Forty-eight responses were collected in this survey during two weeks. To collect more responses, the link should be placed more visibly on the public project description at PATIO. According to the users, the survey was too long, resulting in the number of disrupted responses.

A 3D virtual laboratory (CAVE) was used together with the PATIO forum for visualising and evaluating the new city part with citizens. A 10-person test user group was formed from voluntary PATIO users who were invited to the 3D virtual laboratory

\(^{27}\) [www.patiolla.fi](http://www.patiolla.fi)

to view, discuss and evaluate the 3D model. Further discussions were held online at the PATIO forum for a week. Feedback of the evaluation session was also collected. The 3D virtual laboratory and PATIO online forum created a unique combination that was used for the first time in urban planning. Due to successful implementation and fruitful results, the method will be used again in the future. As the 3D model will be developed further along the forward-going plans of the new city part, more evaluations are needed in different phases. In this very first evaluation, the 3D model was simple and contained no details; according to users, this made evaluation difficult. Users would welcome the opportunity to view and comment the further developed 3D model of the area later.

**UBI Poll**\(^{29}\) is a touch-screen-based questionnaire application that utilises a network of large public displays, known as UBI hotspots\(^{30}\). The UBI Poll shares the principles of an electric survey in that it allows systematic creation of questionnaires and automatic collection of response data. However, instead of specific invites, the responders come from a spontaneous group of people who walk by and use the UBI-hotspots’ services. UBI Poll was developed in the earlier MAINIO pilot project to involve citizens, especially the elderly, in the evaluation of future welfare services. The Hiukkavaara UBI Poll questionnaire contained 29 claims regarding what type of qualities the city part should or should not have. The answers were collected using a five-point Likert scale. As planned, uncompleted questionnaires were included in the results. The UBI POll also contained a short information section, a conceptual picture gallery of the city part, and a lottery system among the responders. The UBI Poll questionnaire ran for a month and collected responses from 124 individuals, containing a total of 1,758 answered questions.

Overall, feedback on the UBI Poll questionnaire was positive and the results reflected the same trends as the other surveys mentioned above. The majority of respondents did not answer the whole questionnaire (the average was eight questions answered); this was expected due to the uncontrolled situation in which the displays present the questionnaire to anonymous people without observation. The questionnaire also spanned several pages, which is not ideal for a public display. Forty-six percent of people responded only to the questions on the first page.

In order to include UBI Poll into continuous user-driven urban development processes, the application needs to be improved. For example, the length of the questionnaire was the critical factor for the number of the responses. Among the rich content such as commercial advertisements on UBI hotspots, the survey needs more visibility. In this case, visibility was improved by an advertisement and an icon on the main view of the UBI hotspots.

**Lessons learned**

Results of the pilot project show that citizens can be engaged in user-driven development processes, and especially urban planning processes, by using multiple

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\(^{29}\) [http://docs.ubioulu.fi/](http://docs.ubioulu.fi/)

\(^{30}\) [www.ubioulu.fi](http://www.ubioulu.fi)
living lab methods for collecting feedback. Unique methods such as bringing a group of voluntary users to a 3D virtual laboratory to evaluate a 3D model of the new city part, and a survey application on public touch screens in the city area, were perceived as being successful, both from a user point of view and from a developers’ point of view. Last but not least, the use of a variety of methods makes it possible to compare results, ensures the liability and improves urban planning. This pilot project contained similar questions in each survey conducted through different methods and similar dispersion was perceived in the responses in all surveys.

In conclusion, if living labs are to involve and motivate users to participate, new procedures must be developed that include new type of tools and methods. To make urban planning into a continuous user-driven development process, living labs and city planners should establish long-term cooperation and form sustainable practices in which citizens are always involved through user-driven methods.

6. Retailpower – Urban Living Labs and their contribution in retail innovation

Igor Ter Halle (Windesheim University of Applied Sciences), Michiel Galama (NHL University of Applied Sciences) and Sjoerd de Vries (NHL University of Applied Sciences)

Abstract

The social, cultural and economic developments of countries, cities and villages are strongly influenced in positive or negative ways by digital media developments. A negative example is the decline of the retail sector in city centres partly due to the growth of online shopping resulting in shop closures and declining viability of town centres. Clearly, the innovation power of SMEs and various efforts of social and cultural institutions are not sufficient to cope with these developments (Molenaar 2010). Retail Power aims to use a Living Labs approach to create an innovation platform that will contribute to the development of digital city centre concepts and business models that will help to transform town centres from shopping to experience centres.

Starting in September 2013 Retail Power Labs are introduced in six city centres in the North en East of the Netherlands. In these labs students and faculty members of three universities work together with the town centre occupants (SMEs, social and cultural institutions, the municipality, and inhabitants) to co-create a viable city centre. A Retailpower lab is considered as an open innovation network where various other partners are invited to participate. In this paper we argue that this Living Lab approach is perfect environment for combining vocational education, applied research and retail innovation.

Keywords

Retail, shopping centres, SME’s, Co-creation, applied research, social innovation
Our position

In this position paper we introduce the living lab concept as a perfect approach for universities of applied sciences (UAS’s) for combining vocational education, applied research and retail research and innovation. In the Netherlands there is, like in most West-European countries, a second higher education sector; the so-called universities of applied sciences. These institutions are oriented towards professional education (de Weert and Leijnse 2010). Since 2001 they also have the task of transferring and developing knowledge for the benefit of the professions in both the industrial and service sectors. Their primary focus is on regional and local needs. Because research (transferring knowledge) never has been ‘core business’ for UAS's, many institutions are struggling with the implementation of research programs. Given the objective of research – knowledge exchange with industrial and service sectors – it is clear that the demand for problem-solving knowledge from professional practice dominates the research agenda. It is seen, as a challenge for UAS’s to combine effectively the development of their research agenda with curriculum development and innovation, and the active involvement of teaching faculty and students in research projects.

In this paper we argue that Living Labs provide an ideal environment for combining education, research and innovation. This is because a Living Lab approach fits well with the ambitions of UAS's:

- Regional participation and networking (eg. the participation in regional strategy work, in regional centre programmes, programmes of centres of expertise and other development projects in the area)
- Pro active role of UAS's and influencing the innovation activities in the area (eg. strengthening of knowledge in the area, increasing social capital, building an innovation environment and anticipating proactive response on the needs of the area)

From these ambitions it seems logical that UAS’s will develop an innovation environment. Such an environment start at the UAS's. The study programs should be based on what Kettunen calls an innovation pedagogy (Kettunen 2011). Innovation pedagogy is a learning approach based on the ideas of experiential learning (Dewey 1958); and e.g. connectivism (Siemens 2005). In these learning theories knowledge is assimilated, produced and used in a manner that can create innovations. Such pedagogy does not start with knowledge and move later to its application; new information is applied to practical situations immediately, even before the information is assimilated. Innovation pedagogy combines learning with information creation and its application.

Background

In our project we focus on the commercial centres of cities and villages. Our main research question is: what are successful ‘city centre concepts’ as an answer to the town centre decline due to digital media developments?
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An example of such a concept is the so-called ‘Het Nieuwe Winkelen’ (New shopping) concept, currently implemented in Leeuwarden and Enschede.

Our second research question concerns the development of the innovative power of SMEs and institutions. We want to study the innovative concept of a retail lab as an answer to the SMEs’ lack of innovative power. The question is: How can we develop successful retail labs as instruments of strengthening local innovativeness? A retail lab is a city or village acting as a networked living lab.

The key objectives of Retailpower are:

1. Development of six retail labs in Leeuwarden, Bolsward, Harderwijk, Elburg, Nijverdal en Enschede as an environment for strengthening the innovative potential of town centres.
2. Development of practical digital centre concepts to contribute to viable large and small town centres.
3. Study of the effects of the implementation of ‘digital centre concepts’ on the viability of town centres.
4. Study of the effects of the implementation of Retaillabs on the local innovation power.

In this project three universities (NHL University of Applied Sciences, Windesheim University of Applied Sciences and Twente University) and the cities of Leeuwarden, Harderwijk, Nijverdal, Elburg, Bolsward and Enschede. All cities agreed to participate. These cities vary in regional setting (urban /suburban), size (big / small) and touristic attractiveness (touristic appeal versus non-touristic appeal).

Our argumentation

A Retail lab seems to be an ideal way to study complex processes with a large number of stakeholders such as the transformation of city centres. We think that the use of a retail lab has advantages for all participants:

For students:
- Students learn in an off-campus study environment where students work together with lecturers, researchers and SME’s.
- A study program and culture in which multidisciplinarity, innovation and entrepreneurship are key competences.
- Students are learning and working directly in their future workplace.

For lecturers:
- Lecturers have a real life environment for challenging education in which theory and practice can be combined in real time.

For researchers:
- Researchers have a complex context for studying new concepts and bridging the knowledge – doing gap.
- Research and development not only evaluated through publications, but also based on how they add value for customers and SME’s.
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For SME’s:
- Small SME’s do not have time and resources for innovation. Participating in a retail lab provides SME’s an accessible innovation environment.
- In this lab retailers and their partners can learn from experiences in other (non-competing) communities / city centres.
- SME’s have access to educational and research resources of UAS’s

For city councils:
- Viable city centre’s where jobs and business are co-created and a living city centre for their inhabitants, customers and visitors (tourists).

Take aways for the Living Labs community

In our vision a Living Lab is a valuable and innovative environment where 'education' (students, lecturers and researchers) meets practice. A living lab is a learning network where UAS’s, SME’s, city councils learn (and work) together on solutions for regional city centres. As a starting Living Lab we would like to discuss the design and purpose of these Retailabs with the Living Labs community from an pedagogic point of view.

References

Short biography

Igor ter Halle is research fellow at the Centre of Customer Experience and Customer Co-creation at the Windesheim University of Applied Sciences. His research interests are social media and media technology. He is also head of the online communications program at the same university. Igor is also working as a social media consultant at a communication agency.
RESEARCH SESSION 3: CASE STUDIES IN LIVING LAB APPLICATION DOMAINS

1. Building on a living lab in health care: A transnational multiple case study on user involvement in open innovation in dementia care

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Keywords
Health care, dementia care, innovation, living lab, user involvement

Introduction

One of the most important developments challenging the sector of health care at the moment is the global aging of the population, which leads the prevalence of dementia to increase largely. Dementia is a long term and progressive condition caused by neurogeneration (e.g. Alzheimer’s disease and vascular dementia) that affects cognitive functioning, emotional control, social behaviour, beyond that what might be expected from normal aging, resulting in a decreasing capacity for independent living (WHO, 2012; Prince et al. 2013). Dementia is one of the main causes of disability in later life. There are currently 35.6 million people worldwide living with dementia and this number is expected to double by 2030 and more than triple by 2050 (WHO, 2012). Local governments and healthcare institutes have the important task to build sustainable health care system structures to provide these people with the appropriate care. Helping these people to live independently and with a high quality of life as long as possible is part of this task. Independent living is preferable from the perspective of the individuals’ well being as well as from an economic point of view to keep health care expenditures controllable. To support this goal, new innovations are necessary that can support both persons living with dementia as well as their informal care givers in their daily routines in order to support independent and high quality living in different stadia of the disease (Prince et al, 2013). It is known that providing support can be an serious burden for informal caregivers, often being partners, children or neighbors, and that it can negatively affect their mental and physical health (Zwaanswijk et al, 2013). Furthermore, despite the available informal en professional care they receive, not all needs of persons with dementia can be met as they have many needs during the progression of their disease (Lauriks et al, 2007). Also, the upcoming growth in number of people having dementia is expected not to be in line with available professional care and health
care budget (Zwaanswijk et al, 2013). Technology can probably contribute to overcome these problems.

Lauriks et al. (2007) concluded in a review study that there is a lack of appropriate technologies for persons living with dementia, especially considering informational websites, and on the domains of behavioral and psychological changes in dementia. There are some promising technological developments that can be used here, but they have not been used and tested for this target group so far. Furthermore there are some promising technological developments aimed at compensating for disabilities and social contact, however these still need to be tested in real life environments before implementing them in the care for people with dementia.

This was confirmed in a current study by Nijhof (2009) who concluded as well that based on a number of qualitative and some small scale studies there are promising experiences with the use of technology to support persons with dementia and their informal care givers, but that large scale studies and evaluations and further development of innovations in real life environments still need to be done. She also pointed at the fact that persons with dementia are seldom involved in the development while this is highly important to match the users’ needs, and that the purchasing costs of technological instruments are quite high so far.

In order to further build on the usefulness of technological and social innovations for persons living with dementia, it is needed that users will become more involved in the development of these innovations, and that the innovations make it to the market for an affordable price. Living labs which are currently being used in several application areas including mobile technology, tourism and media and is started to be used in the sector of health care (Svensson & Eriksson, 2009; Mulvenna et al. 2009) might be helpful in achieving these goals.

In a living lab new innovations are created and validated in collaborative multi-contextual empirical real-world environments and the end user is thereby seen as a valuable source of innovation (Svensson & Eriksson, 2009; Bergvall-Kareborn et al. 2009). Over twenty five years of research showed that a strong involvement of users in developmental processes, especially persons having high ‘lead user characteristics’ (i.e. being ahead on an important market trend and experiencing needs that are experienced by many users), resulted to commercially more attractive products or processes than traditional innovation models without user involvement in several sectors (von Hippel 2005; Mulvenna et al. 2009). These findings support the importance of taken notice and including user needs and wishes in (different stages of) innovation processes. Conventional market research techniques have difficulties in realization of need information (Mulvenna et al 2009). As a result of these findings, open innovation models including end users, called living labs, started to emerge in the beginning of 2000 (Markopoulos and Rauterberg 2000; Svensson & Eriksson, 2009).

Working with the concept of living labs within dementia care is more difficult than in other sectors were users are involved because of the deteriorating effect of the disease and the large stakeholder network involved in the care of these people (e.g.
informal and professional care givers, health insurers, municipalities) as was elaborated by Brankaert and den Ouden (2013). Regular user-centered design methodologies need to be adapted and take into account the cognitive, social and emotional impairments of the persons with dementia, and customer-supplier relationships are more complex as the result of the large number of stakeholders and are best described by a triple or even quadruple helix model, including end users and their surroundings, health care system, researchers and business partners (Mulvenna et al 2009; Etzkowitz 2003).

In order to understand how the concept of living labs can be applied to dementia care, a recent transnational three year project called Innovate Dementia was initiated. In the project four North West European regions, i.e. Liverpool (United Kingdom), Krefeld (Germany), Eindhoven (The Netherlands), and Geel (Belgium) have agreed to all build on living labs in their regions for this target population and to share their experiences. The project aims to develop innovative, transferable dementia care models by exploring how technology and innovation can develop products and ways of living that will improve quality of life for people living with dementia and their families (Woods et al 2013).

This paper focuses on the set up of these living labs and describes the first year of development. The aim of the paper is to get insight in what is needed to build an infrastructure for a living lab in dementia care, and the difficulties in doing so. The research questions are: What are the experiences in the regions involved in the Innovate Dementia project in building up an infrastructure for a living lab in dementia care and more in specific: what activities and elements are needed, what are the facilitating factors, and what are the difficulties? In this paper preliminary results of the first year’s data are presented.
Methods

Since living labs are a rather new research area and phenomena, the amount of supporting theories for understanding the concept is limited (Bergvall-Kareborn et al. 2009). Further, though there exist a plethora of methodologies, methods, and tools used in individual emerging as well as mature living labs, there is a lack of systematic analyses and reflection on their suitability in different contexts and situations (Bergvall-Kareborn et al. 2009).

Therefore, the four Innovate Dementia living labs are systematically followed using several data collection methods: project documents are analyzed, a focus group is organized, individual stakeholders are spoken, and during international meetings participative observation is used. This paper describes the development of the living labs in their first year. Analyses were qualitative. Because the partners from Belgium started in April 2013, after the analyses started, this paper includes data from three Living Lab regions included in the project. See Table 1 for the structure of the Living Labs at the start of the project.

Project documents
As a start document and to compare state of the art of the dementia care between the different project regions a baseline report (Woods et al. 2013) was written for the project. This report gives an overview of the incidence and prevalence of dementia in each country, the dementia healthcare system and costs. This report was here studied for background information. Another project document included, a status quo report which every project region filled in which contains the following topics:
- The definition of each Living Lab and their main aims;
- A short summary of the developments till the moment of assessment concerning each Living Lab;
- Description of the actions taken for the set-up (preparation) of each Living Lab and planned for the long-term implementation and consolidation of the Living Labs;
- Desired concrete (sub)goals and outputs for each Living Lab. All individual status quo reports were analysed and compared on their similarities and differences (Table 1) resulting in an overall status quo report. This overall status quo report had two reasons: it would be helpful to come to a shared vision on how to set up the Living Labs for the project and it provided insight for this paper on the baseline situation of the Living Labs.

Participative observation and conversations
In a project meeting (January 2013) the overall status quo report was discussed with all project partners resulting in agreement about a minimal set of requirements (i.e. protocol) for all living labs in the Innovate Dementia project. During this meeting participative observation was done and additionally, a focus group was organized to discuss the facilitators and barriers in setting up a living lab structure for dementia. In a two-day transnational symposium (March 2013), presentations, site visits and a steering meeting was organised to share experiences between the living lab regions. During these activities participative observation was performed and individual partners of each region were spoken. Notes were made structurally, and additionally the focus group was video taped and later transcribed into a summary.
Analyses
Analyses included grouping of information on themes for both the activities undertaken to build up the living lab, and for the facilitators and barriers and comparison between the living lab regions.

Results
As all regions join in one project, the partners committed to the following shared definition and aims of a living lab, based on the results of the status quo reports and the project meeting in January 2013. These included:

The partners see a living lab for the Innovate Dementia project as a dynamic structure, using pragmatic and real life methodology to explore, evaluate and validate innovations, in an open and collaborative environment, which is user-driven and aimed at improving care for people living with dementia. The setting of the living lab can differ: persons own homes, institutional facilities or in a care network. The main aims of the partners in the project Innovate Dementia are to generate innovations in care for person living with dementia that are adjusted to all their needs, to improve participation and autonomy of persons living with dementia, development and testing of care innovations for these persons, networking nationally and transnationally in a quadruple helix structure, build a sustainable living lab architecture, and generate economic activity.

According to the project plan, each project partner has its own specific start focus on type of innovations that will be developed and tested in the living lab which can include one or more of the following: intelligent lighting systems, dietary and exercise programs, living environments, or models of assistance for persons living with dementia and their caregivers.

The results of this study (table 2) show that all partners first made a selection of innovations to test in the living lab and chose methods for user involvement. The innovations that were selected (including prototypes from design researchers, existing technologies, and health care models developed by health care partners) and methods for user involvement (including evaluations at home, need assessments, interviews, regional stakeholder meetings) were initially different in the living labs.

In the Netherlands, leading partners are a mental health care institute, a technical university, a network organization aimed at business acceleration, the municipality and the province a technical university. Innovations first evaluated in the living lab were technological prototypes from students. These prototypes needed further iteration which was done in the living lab. An example of a prototype was a smart, interactive calendar. Later, sought is for existing innovations and new ideas for development, including a high lux lamp meant for use at home to improve day and night rhythm. These lead partners shared responsibility for building up the living lab. User involvement was at first realized by searching information to understand the disease and health care system and by interviewing clients. Furthermore prototypes
were evaluated by clients at their own homes providing information for further iteration of the product. At a later stage, a structure was build to perform structural need assessments for all clients including the project, and a client platform was set up.

In Germany, the leading partner is a research institute of a general hospital. An existing health care network was there starting point for the living lab. Innovative health care models that were developed by this network, including the dementia case manager and the dementia friendly hospital, were tested in the living lab setting. User involvement was realized by literature research on health care needs of persons with dementia and input during regular client contacts of the care providers.

In the United Kingdom, a mental health care institute and an university were leading partners. Innovations were selected in events especially organized for this purpose, including different stakeholders and users who were invited to discuss the needs of persons with dementia and possible innovative solutions. First innovations chosen were existing technological instruments that still needed to be evaluated for the target group. User involvement was realized by these same events and by building an experience room in which users can test technological innovations. (In the attachment a short subscription is provided of the partners included in each living lab region).

Facilitating factors mentioned by the project partners in the first year included: a good network, engagement of technical developers in the living lab, evaluations at home, input from stakeholders, budget for the living lab, partners who lose the fear to innovate together, easy access to clients, politically the right time (due to the current need for solutions for persons with dementia) (Table 3).

Barriers mentioned included: explaining to clients and potential stakeholders the name and intentions of a living lab, fear for change in general among stakeholders, fear with partners for open innovation, medical ethical aspects as living lab is not regular research, translating needs in innovations, logistics with home based evaluations, engaging business partners, and putting economic value to successful prototypes or new innovations.

Some of the facilitators and barriers mentioned were shared by all partners (such as medical ethical issues and explaining the term living lab to stakeholders), others were specific for a region (such as having technical developers as stakeholders).

**Discussion**

Although all regions had the same goals and target group for their living labs, and used the same key principles, still differences were seen in the methods used to build on the Living Labs and innovations selected to evaluate in real practice. The differences found between the living lab regions might most logically be explained by the differences between regions in lead partners and structure by start up. As Germany started with an existing care network, it was most logically to use that network as site for their living lab activities. Also the care models developed by that
network were the most logical innovations to test first in real life. In the Netherlands, the technical University was one of the leading partners, resulting in the inclusion of prototypes developed by their students as first test objects for the living lab. The United Kingdom had to search for stakeholders for input on which innovations to start with and decided to organize a regional stakeholder platform at first.

As the living labs in this project share their experiences on a regular basis by site visits, steering committees and also in monthly teleconferences since May this year, it is to be expected that they will learn from each other and will show increasing similarities by time.

Follow up of the living labs will show what is needed to further develop and sustain a living lab structure for dementia care, and what is helpful and what hampers its development.
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**Table 1 Start and development of the living labs**  
Structure of the living labs at the start of the Innovate Dementia project

<table>
<thead>
<tr>
<th></th>
<th>The Netherlands</th>
<th>Germany</th>
<th>United Kingdom</th>
<th>Belgium</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Start date LL</strong></td>
<td>September 2012</td>
<td>April 2012</td>
<td>April 2012</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Living lab structure</strong></td>
<td>No existing structure</td>
<td>Existing Dementia network, since 2002, was used as living lab.</td>
<td>No existing structure</td>
<td>Belgium partner started in April 2013</td>
</tr>
<tr>
<td><strong>Partners</strong></td>
<td>1. Mental health care institute (GGZ E)</td>
<td>1. Research institute from general hospital (Alexian Research Center Krefeld (ARCK) - from Alexianer Krefeld GmbH)</td>
<td>1. University (Liverpool John Moore’s University)</td>
<td>1. Community College (Thomas Moore)</td>
</tr>
<tr>
<td></td>
<td>2. University of technology Eindhoven</td>
<td>2. Mental health hospital (Mersey Care NHS Trust)</td>
<td>2. Expert Center for Dementia Flaedern (Leuven)</td>
<td>2. Expert Center for Dementia Flaedern (Leuven)</td>
</tr>
<tr>
<td></td>
<td>3. Municipality</td>
<td>3. Hospital Geel</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Brainport</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main organisers of network</strong></td>
<td>University of technology</td>
<td>Organizationaly: Research institute from general hospital Network: psychosocial association of geriatric psychiatry (PSAG)</td>
<td>University Hospital</td>
<td>Community college Expert center for Dementia Flaedern</td>
</tr>
<tr>
<td></td>
<td>Mental health care institute</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2. Activities undertaken to build up the living lab
Assessment 1 analyses of the status quo report November 2012 & participative observations and focus group at the project meeting in January 2013

<table>
<thead>
<tr>
<th>Age LL</th>
<th>The Netherlands</th>
<th>Germany</th>
<th>United Kingdom</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4 months</td>
<td>9 months</td>
<td>9 months</td>
</tr>
<tr>
<td><strong>Infrastructure</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Triple helix:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- research/care users</td>
<td>Summarized: A basis network is build with regular meetings between mental health care, university of technology, municipality and Brainport (gate way to business partners). Building on structural user involvement (platform and standard assessments)</td>
<td>Summarized: Using available network and contact care, business and user organisations.</td>
<td>Summarized: Organizing RSPs/KBAs with all partners and establish links with external partners.</td>
</tr>
<tr>
<td>- business partners</td>
<td>In detail: Primary group (meets weekly): 1Mental health care institute - geriatric psychiatrist - specialist nurse - researcher 2University of technology - PhD student</td>
<td>In detail: To expend living lab region other care institutes are contacted</td>
<td>In details: Started with organising RSPs in june and october 2012 including triple helix</td>
</tr>
<tr>
<td></td>
<td>Secondary group (meets monthly): 1 primary group 2 mental health care institute - senior researcher - professor 3 University of technology - Professor</td>
<td>Symposia are visited</td>
<td>Pre open lab event with users</td>
</tr>
<tr>
<td></td>
<td>Tertiary group</td>
<td>Companies are contacted</td>
<td>Some links with external partners are established</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Innovation opportunities in exploration</th>
<th>Design students Tu/e come with design ideas on lighting. Now: at home maybe later at the wards.</th>
<th>Lighting on the hospital wards</th>
<th>Memory assistance: Stickers, software, television/telefone, Next stage of dementia: dynamic lighting Nutrition Exercise Now: on the ward, later at home</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovations in development/tested so far in living lab</td>
<td>Smart calendar (PhysiCAL) High lux lamp (Vitaal lamp) – therapy lamp for the home situation All technological (so</td>
<td>Accompanying Independent Casemanager Medico-Social-Team Demenzfreundliches krankenhaus All to improve recognition of</td>
<td>Intelligent lighting on ward – 15 bed Ambient technology in demonstrator lab/experience room at university to evaluate lighting on cognitive function</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>How were innovations selected</th>
<th>early dementia</th>
<th>Focus on technological (so far), interested in nutrition and exercise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students from Technology of University of Technology developed prototypes based on user input. Project group selects. Existing technological devices are explored. Project group selects with information from user needs in mind. Platform is build up for direct user input.</td>
<td>All care model (so far)</td>
<td>By network 3 concepts were chosen</td>
</tr>
<tr>
<td>By network 3 concepts were chosen</td>
<td>RSP/KBA: in discussion with business partners and clients: existing technological devices are selected as high potentials</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Role of users</th>
<th>Indirectly: Needs assessments helps project group selecting innovations Platforms provide input for project group. Directly Users evaluate and help improving prototypes Platform provides ideas (is being build up)</th>
<th>Indirectly: On the job conversations with clients helps network think of new innovations</th>
<th>Directly: Within group discussion (RSP) existing devices are selected for further testing.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indirectly: Needs assessments helps project group selecting innovations Platforms provide input for project group. Directly Users evaluate and help improving prototypes Platform provides ideas (is being build up)</td>
<td>Indirectly: On the job conversations with clients helps network think of new innovations</td>
<td>Directly: Within group discussion (RSP) existing devices are selected for further testing.</td>
<td></td>
</tr>
</tbody>
</table>

1 RSP = regional stakeholder platform / KBA = knowledge business acceleration

Assessment 2 at March 2013 – Participative observation and conversations at two day transnational symposium in the UK

<table>
<thead>
<tr>
<th>The Netherlands</th>
<th>Germany</th>
<th>Uk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age LL</td>
<td>5,5 months</td>
<td>10,5 months</td>
</tr>
</tbody>
</table>
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| Triple helix | KBA’s planned with Brainport to check market value of innovation tracks | Dementia week including stakeholders planned for Sept 13 | Transnational symposium including workshops on challenges and solutions: integrating the four themes (living environment, lighting, nutrition/exercise and care models) |

Table 3 Facilitators and barriers as experienced by partners per living lab region

Assessment 1 at 31 January 2013 – Focus group during project meeting in the Netherlands

<table>
<thead>
<tr>
<th>The Netherlands</th>
<th>Germany</th>
<th>UK</th>
</tr>
</thead>
<tbody>
<tr>
<td>LL Age</td>
<td>4 months</td>
<td>9 months</td>
</tr>
<tr>
<td>Facilitators top 3</td>
<td>Real life testing in own homes. Developing ideas and test how prototypes work. Workshops, volunteer groups, and input professionals and people living with dementia: insight project and in what needs are → how to develop LL. Is helpful for getting to ideas. Structure: small group LL leader tue, city of eindhoven, ggze: sharing ideas + everyone has different connections Deltaplan</td>
<td>Existing network Every organization/person joining the network and who loses the fear to work with someone else Financials: Alexian Krefeld GmbH allocated resources from the government project ‘a barrier free service’ : i.e patients and relatives receive financial support for activities that bring patients and relatives together to do something nice with the support of volunteers and professionals. It is a certain amount</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Barriers top 3</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dementia: provides money for the coming 10 years and will provide a change to get some extra money for the LL.</td>
<td>for every patient per month. You know the money is there and the providers are asked what they can offer. So everything that is created is financed from the start. We are free to develop everything we want.</td>
<td>Language, explain, define what the project does. Presentation to the people in concrete ways. What a LL is.</td>
</tr>
<tr>
<td>Language too. LL is not directly clear as a concept. And it is an English word. Terminology might scare people to join the project. Also on the website (PR).</td>
<td>All institutions (all over the world) have difficulties with new things. They think the old way was the best way. Providers who fear in collaboration they loose users to other providers. Language / terms: others don’t understand you as they have another name for the same concept. Difficult to explain why LL is important and useful, that we have to prove it in real practice.</td>
<td>Cultural: fear about how to manage innovation as it does not fit research protocols. Innovation is different as it is not pure research. There is a lot of anxiety of how to manage risks, how to get informed consent, how really get to things. NHS wants new governmental guidelines. Also about to join businesses. Towards accepting risks</td>
</tr>
<tr>
<td>Good need assessments and translate it into innovations. We want to like to measure the questions of the end users: problem domains and solution to their problems. Practical things: combine prototype with client, logistics: eg. transport of prototype to client’s home. How to do it more efficient. Now it is Rens on his bicycle.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
there is almost a zero tolerance in the UK. This does not help to innovate. It is a barrier that will not go away. We need to have slow change.

No previous business relations and experience in establish such relationships.

Assessment 2
11 and 12 March 2013 – Transnational symposium UK & steering committee
Participative observations and individual conversations

<table>
<thead>
<tr>
<th>Facilitators</th>
<th>The Netherlands</th>
<th>Germany</th>
<th>UK</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5,5 months</td>
<td>10,5 months</td>
<td>10,5 months</td>
</tr>
</tbody>
</table>

**Cooperation with University of Technology:**
- developers for new prototypes, easy access to web designers, students

**RSPs / KBAs:**
- innovation selection and cooperation with triple helix partners

Financials from the Interreg grant for equipment (ambient lighting)

<table>
<thead>
<tr>
<th>Barriers</th>
<th>The Netherlands</th>
<th>Germany</th>
<th>UK</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>If innovations work: how to implement it? Who will fund it?</td>
<td>Knowledge needed on networks around dementia (cases/evidence from science)</td>
<td>Ethical approval for tests with technological innovations from hospital is a long procedure. Cross border exchange of data might need ethical approval. Don't have developers / students</td>
</tr>
</tbody>
</table>

If innovations work: how to implement it? Who will fund it?
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If innovations work: how to implement it? Who will fund it?
Attachment 1, Short description of the partners of the three Living Lab regions included in the analyses

United Kingdom
1. Mersey Care NHS Trust Liverpool
Mersey Care NHS Trust provides specialist mental health, learning disability and substance misuse services in Merseyside. Mersey Care is one of only three trusts of its kind in the country providing the entire range of specialist mental health services. Offering medium secure services for Merseyside and Cheshire, and high secure services for England and Wales.

2. Liverpool John Moore’s University
The University is organised into five Faculties spanning Arts, Professional and Social Studies; Education, Community and Leisure; Health and Applied Social Sciences; Science; Technology and Environment. New advances in digital technology and science have placed LJMU at the forefront of exciting developments in areas such as multimedia, sports science and space exploration.

Germany
3. The Dementia Research Centre, Alexian Krefeld GmbH, Germany is working on the development of the best possible care for people with dementia. The Alexian Krefeld GmbH, Germany, is a leading company in health and social care in Krefeld and surroundings. Somatic, psychiatric, rehabilitation, senior and integration assistance, health promotion, home care services, nursing school: Approximately 40,000 patients per year

The Netherlands.
5. Mental Health Care Organisation Eindhoven (GGzE), the Netherlands
GGzE provides help and support to people with psychiatric problems. The organisation consists of three divisions, focused on children, adults and the elderly.

6. University of Technology Eindhoven (TU / e)
TU/e is a research university, specializing in engineering science and technology. TU / e has nine faculties: Industrial Design, Biomedical Engineering, Civil Engineering, Electrical Engineering, Industrial Engineering and Innovation Sciences, Chemical Engineering, Engineering Physics, Mechanical Engineering, Mathematics and Computer Science.

7. Brainport
Brainport is a network organization aimed at business acceleration.

8. Municipality of Eindhoven
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2. Pop-up Living Labs: Experiments in Co-creating Service Design with Diverse Stakeholders in Hackerspace Communities

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§TRAIL Living Lab, University of Ulster, Northern Ireland, UK
¶Farset Labs, Belfast Northern Ireland, UK

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**Abstract**

This paper outlines some experimental work undertaken to help co-create service designs in the healthcare domain of reablement. The paper outlines the background to the experimental work before reviewing relevant academic literature in the innovation space, specifically encompassing triple-helix concepts and living labs. The paper then presents the findings from the experimental work before concluding with a discussion on the findings. The discussion is primarily concerned with the usefulness of a novel ‘pop-up’ living lab conception.

**Keywords**

Co-creation, ideation, innovation, living lab, healthcare, hackerspace, hackathon, stakeholders, reablement.

**Introduction**
The ageing population in most countries is projected to more than double by the year 2050. As a consequence there will be a significantly increased burden on healthcare services to treat the large number of elderly people with chronic diseases. Unless a new model for healthcare delivery is conceived, the costs associated with these services will become unprecedented and unsustainable. However, one possible solution to reduce costs is the concept of reablement (Glendinning and Newbronner, 2008). Reablement is an emerging health and wellbeing service concept in the UK that encourages and supports people such as the elderly to live in their own homes whilst providing a programme underpinning the skills and confidence necessary for daily living. However, after the person has proven their ability, it is anticipated that they can maintain their independence and perhaps even withdraw from the programme. Although reablement is a straightforward concept, it is a relatively new initiative and requires innovation in service design as well as in how technology can support the intervention.

The paper is structured as follows. The paper outlines the background to the work undertaken and then presents the methodology and research questions in subsequent sections. The third section of the paper describes the review of the literature, from innovation, triple-helix concepts to living labs, and also patient and public involvement (PPI) in healthcare development. The paper then presents the results of the actual process from a selected event, before discussing findings and presenting the conclusions.

Background

Farset Labs, the TRAIL Living Lab at the University of Ulster, and a network of community and voluntary care stakeholders (including Ardmonagh Family and Community Group, Engage with Age, Volunteer Now, Oasis Caring in Action, and Shopmobility Belfast) embarked on a programme of events focused on identifying and prototyping possible solutions for reablement services in the community.

Farset Labs is a hackerspace, funded mostly by the hackers, developers and inventors that use the space every day for their ideas and projects. Every member has a say in what goes on and has voting powers in decisions made at Town Hall meetings. For this reablement project, we identified Farset Labs as a place to bring together technical and non-technical people to focus on problem solving and innovation. This type of venue is somewhat different from conventional venues for such events.

The purpose of the events was to provide an open platform for idea generation around the opportunities for reablement services to be supported by new technologies and new ways of thinking. The outcomes sought for the events was clarity in the provision of a standardised engagement framework, enabling service users to get back into the community through an online world linked to their real-world lives.

The initiative to develop new thinking in reablement capability arose through CO3 (Chief Officers Third Sector) Health and Social Care Group, where three
organisations (Age NI, Bryson Care and Extra Care) took the initiative to collaborate with the aim of influencing the new Belfast Health and Social Care Trust reablement programme. To explore further the opportunities and challenges for the Voluntary and Community Sector, at both strategic and operational levels, a Reablement Stakeholder Network was formed in early 2012, which attracted representation from eighteen Voluntary and Community agencies delivering services to or advocating on behalf of those in later years.

**Methodology and Research Questions**

The methodology for the work is based upon the creation of an open platform to create discussion and seek consensus about service design of reablement services in Belfast, Northern Ireland. The methodology sought to create an experimental physical space that brought together a heterogeneous group of people interested in developing new reablement services. This group was comprised of persons from stakeholder healthcare organisations, local government, social enterprises, academia and users of the Belfast hackerspace, Farset Labs. All of the events took place in the hackerspace.

The technical objective was to explore how technology could support a large number of unconnected or loosely connected social enterprises to coordinate their reablement activities in a region of Belfast city. A series of meetings and events were planned with a mix of stakeholders present, together with young members of the hackerspace.

The research questions arising from this experimental setup focused on exploring if the location context and mix of participants created a beneficial effect in the process of capturing the needs of the stakeholders. Specifically, does this kind of experimental co-creation process support ideation, and how? How does the creation of a 'pop-up' living lab that brings together the triple-helix of partners - plus users - work?

We have hypothesised that stakeholder involvement through a co-creation ideation processes will lead to an improvement in the appropriateness and quality of the resulting service design. This protocol is based on several main concepts, 1) co-creation ideation events using diverse stakeholder involvement and 2) the use of hackathons. This paper presents the results from the first stage of the project, i.e. the co-creation ideation process. The purpose of these processes is to generate new opportunities to improve reablement services by involving all relevant stakeholders in a triple-helix innovation process.

**Literature Review**

Innovation is a “change in the thought process for doing something, or the useful application of new inventions or discoveries” (McKeown, 2008). Historically, innovation has been characterised as a linear process, driven and controlled by the industrial developers of products for the marketplace. In the information society, it is increasingly seen as a catalyst for growth and competitiveness and has been
enthusiastically promoted at regional, national and international levels and included in new policy formulation. However, it has evolved from a linear process more towards a network model involving partners supporting innovation, often focused on cycles of innovation activity. These partnerships of interaction can take many forms but one model that is increasingly being used is a triple-helix model of engagement (Etzkowitz, 2003), where the three types of stakeholders are industry, government and academia, often also called academic-public-private partnerships. This model and its variants works well within the concept of network economy, facilitating ad hoc or permanent partnerships as required, focused on problem solving and commercial exploitation of intellectual property and know-how arising from the partnerships.

The use of models such as the triple-helix explicitly recognises the value of partnerships and the different stakeholders along with their roles in facilitating and supporting innovation. However, there is one other stakeholder who has merely on occasion been fully involved in innovation processes around service co-creation and development, but this person is only now becoming recognised as perhaps the ultimate stakeholder in these processes. That stakeholder is the user, and the following paragraph describes user-driven innovation.

The importance of users in the design process for product and service innovation has long been recognized. It is natural to involve users, and indeed the resulting quality of a product or service suffers if users are not involved in the processes that together make up the design stages. User Centred Design (UCD) is an approach that puts the customer or user at the centre of the design process (Rubin, 1994). UCD has been successfully used in many product designs and is supported by standards (ISO-13407, 1999). The key aim in UCD is to learn what product or service is best suited to meet the needs of the user. It is also used to determine whether the intended benefit arising from the application has better usability and improves the resulting designed product or service. There is a long tradition of user-orientated, experience-based approaches developed to realise these aims and benefits, including user experience (Norman et al. 1995), contextual design (Beyer and Holtzblatt, 1998), action research (Lewin, 1946), and cooperative (participatory) design (Bødker et al. 1993). Siew and Yeo (2011), for example, use participatory action research to augment software development in rural communities.

Many of these new approaches in user-centred innovation are facilitated by technology, and can thrive in a network economy society. The developers of products and services now have extremely powerful, useful and potentially profitable techniques and approaches that are centred on technology-enhanced innovation processes that embrace the user, whether that be a customer, citizen or a patient. However, while there are models such as triple-helix for engagement in innovation partnerships, until recently the support has been focused on science parks, business incubators and other activities that are more related to supporting fledging new companies rather than partnerships that support research and development and innovation activities around new ideas tested with users across less obvious commercial sectors such as social enterprise or social healthcare. A new paradigm of support has emerged that extends the triple-helix model to involve users, and
indeed its name reflects its philosophy to create a research laboratory wherever the
users are testing products and services; in effect, a living lab.

William J. Mitchell created the concept of living labs from an interest in encouraging
city dwellers to get more actively involved in urban planning and city design (Mitchell,
2003). The ideas of citizen involvement in the design process was subsequently
taken up and developed further in Europe by various research communities.
Successive waves of new living labs have since been created and there are many
living labs across Europe and beyond.

Living labs are “collaborations of public-private-civic partnerships in which
stakeholders co-create new products, services, businesses and technologies in real
life environments and virtual networks in multi-contextual spheres” (Feuerstein et al.
2008). A simpler definition is “a collection of people, equipment, services and
technology to provide a test platform for research and experiments” (FarNorth, 2010).
Some position living labs as a kind of technological test-bed (Ballon et al. 2005) while
others classify them as “innovation methodologies” (Kallai and Bilicki, 2008).

How living labs actually work centres on methods, processes and services. The
methods encompass approaches, tools and techniques that often make use of
advanced and innovative application of technology to create and sustain dialogues
with users, for example analysis of system logs or automatically collected
behavioural data, ethnographic research, questionnaires, focus groups, and
observation (Følstad, 2008). The processes are varied but can be described along a
development spectrum. This spectrum includes the creation of ideas, engagement
with user communities and stakeholders, the collection of data using a variety of
methods usually facilitated by technology, and the evaluation of results alongside the
methods employed (Mulvenna et al, 2009). These can be summarised as co-
creation, exploration, experimentation and evaluation (Pallot, 2009).

Services are a useful way of presenting the stakeholders with a set of competencies
with which the living lab is familiar. A living lab can be seen as a “service providing
organization in the topic of Research and Development (R&D) and innovation” with a
set of resources including: areas of competency, local partners and stakeholders,
ICT infrastructure, operational methodology and administrative resources (Molinari,
2008). Services in living labs have been listed as co-creation, integration and data
preparation (Feuerstein et al. 2008). Co-creation is described as a core service
facilitating the development of a product, service or application, decomposed further
in to four phases, i.e. addressing the idea, concept, development and the market
launch of the product or service (Reichart, 2002).

The literature on triple-helix innovation systems also presents different models or
configuration of the triple-helix (Ranga and Etzkowitz, 2013). These include a statist
regime model where industry and academia are driven by the government, which
also limits their autonomy and capability to develop their own initiatives. Another
variant is the laissez-faire regime, where there is limited intervention by state and
where industry is the driving force. The third variant, emerging in the network
knowledge society is the balanced regime, where all government, business and
academia have a more equal partnership, offering the best environment for innovation with the three types of organisations even interchanging roles and responsibilities in response to the dynamics of particular situations.

The strengths of living labs are in offering support for co-creation and ideation phases in these kinds of balanced regime triple-helix models. Essentially the living lab is an innovation intermediary in the four-part partnership between users and the triple-helix of industry, the public sector and academia, offering fluidity and flexibility in how the innovation processes work but also bringing a strong well-articulated vision to enable the stakeholders to understand the goals and motivations of all involved.

The chosen domain of healthcare service design has a long track record of research in both patient and public involvement in healthcare. For example Staley (2009) explores the impact of public involvement in the UK’s health service and Nilson et al. discusses the methods of involving consumers in developing aspects of healthcare policy, while Smith et al. (2010) review the area of service user involvement in some key health service domains. Crawford et al. (2002) review the involvement of patients in the planning of all aspects of health care.

From the literature, it is clear that the work reported in this paper is the use of a living lab in a ‘new’ space, i.e. the Belfast hackerspace of Farset Labs. We created a ‘pop-up’ living lab in this space to provide support for the co-creation ideation processes.

Results

Stakeholders at the co-creation ideation events represented over fifteen different institutions ranging from universities, hospitals, charities, social enterprises and government organisations. Amongst the stakeholders were healthcare workers, academics, researchers, technologists, policy makers, entrepreneurs and anticipated users of reablement services. In this section, we report on a single event and the outputs from that event.

The events involved setting up a number of groups each consisting of 4-7 persons. Each group comprised of a relatively equal number of different stakeholders. The groups were then tasked to independently explore the unfinished question ‘Reablement would be better if…?’ It was hypothesised that productivity would be optimised if the question is explored in multiple stakeholder groups as opposed to one large group. After the question was explored independently, each group was asked to present one particular procedural problem or opportunity within the reablement sector. The entire stakeholder audience then critiqued and refined each opportunity being presented. Subsequently, in the form of an open discussion, a democratic practice was then used to prioritise all opportunities. After the prioritisation process, the technologists then worked closely with all stakeholders to identify potential digital solutions to the problems and opportunities that were identified.
The aforementioned methodology identified four main opportunities that could be addressed to improve reablement services. Interestingly all four opportunities were identified from four distinct groups.

The first opportunity is data capture. Within reablement, healthcare workers should be able to capture relevant data about the service users whilst they visit the person’s home. This data could then be used as part of a continual care assessment plan. Although the healthcare worker should collect certain data, the service user should also have the ability to upload a subset of this data.

The second opportunity is data sharing. Given the fact that people using reablement services can be referred to various voluntary, charity and healthcare services, it was apparent that the user’s data should be up-to-date and shared amongst all relevant organisations. Moreover, given the large number of referrals within the reablement sector, it is also imperative that all authorised organisations have the ability to view the complete and current patient pathway.

The third opportunity is the need for an intelligent service directory of all available reablement services. Given the large number of services, it is important that all services know about one another. This directory should allow both reablement organisations and even the service users to view which services are available within a given geographical location.

The fourth opportunity is governance. If service user data are collected and shared between all organisations, then there is a duty of care pertaining to its governance. This data could also be used to justify prospective funds to sustain a number of reablement services.

Having identified these opportunities, the technologists alongside the other stakeholders co-proposed a web-based system that would address all four areas. This system would allow healthcare workers and service users to upload data based on the service user’s health and wellbeing for the purpose of continual assessment. The system will also allow all organisations to view up-to-date user pathways and to even make appropriate referrals. The system will involve a single point of access intelligent service directory. This directory will allow the user to filter services based on geographical location and real-time capacity level for each of the reablement services. Capacity information will allow an organisation to make appropriate and rapid referral decisions. Finally, this system will include a tool that would automatically generate reports regarding the performance of any reablement service. Performance data may also be made public to service users through the service directory. Although this data can be used as a quality control measure, it can also be used to support applications for prospective funding.

Discussion and Conclusions

At the level of the project’s technical goal, we can conclude that the co-creation ideation process attracted a large number of relevant stakeholders and did in fact generate innovation in service design. As a result of this activity, a web-based
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A system has now been proposed to meet all four opportunities that were identified by stakeholder interaction. Future work will however involve a number of hackathon events. These events will serve more as an innovation process regarding the technical implementation of the web system.

Although a number of reablement opportunities were identified as a result of the project, the larger conceptual questions relating to the exploration of the use of the location, context and mix of participants were arguably more interesting. We found a significant beneficial effect by bringing together stakeholders from healthcare, local government and social enterprises away from their normal environments into a neutral community-owned hackerspace. The balanced regime triple-helix partnership can be utilised by living labs in a fluid and flexible manner, offering in effect, an experimental 'pop-up' living lab, which embraces community-driven, grass-roots initiatives such as, in this case, an open hackerspace. This kind of experimental co-creation process does support ideation by offering heterogeneous groups of people from different domains of knowledge and levels of expertise to ideate freely and generate new knowledge, which ultimately leads to an improvement in the appropriateness and quality of the resulting service design.

Acknowledgements

Thanks to Invest NI Innovation Voucher programme for their support in this project.

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3. Defining a strategy to attract stakeholders into an open innovation ecosystem for precision agriculture in the region of Vojvodina (Serbia)

Grigoris Chatzikostas\textsuperscript{31} and Spyros Fountas\textsuperscript{32}

Abstract

Adoption of PA technologies is a key enabler towards the realization of the full potential of the farming sector in Vojvodina, Serbia. Open Innovation methodology can significantly contribute to this aim, by engaging users in the development of Precision Agriculture solutions. The key challenge is to overcome mindset barriers preventing farmers from getting involved and a gradual strategy towards that end is defined. We suggest that a small number of stakeholders prone to innovation can function as a paradigm to attract the critical mass of end users needed for the initial deployment of a Living Lab.

Keywords

Precision Agriculture, Open Innovation, Technology Adoption, Farmers’ Engagement

1. Research Question

Precision agriculture (PA) technologies can provide multiple benefits to producers through input savings, improved time, labor and equipment management, and environmental benefits. Currently research observes a significant difference in the levels of PA adoption by farmers between USA and Europe. While in USA the percentage of farmers applying some kind of PA technology ranges from 20-80\% (Winstead et al 2009), in European countries the percentage of farmers applying PA ranges from 0%-24\% (Lawson et al, 2011; Reichardt and Jurgens, 2008). As existing data mainly refer to some of the most technologically advanced European countries (Germany, Finland, Denmark), it is reasonable to assume that in less developed

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countries, such as Serbia, PA will be less widespread and the associated economic and environmental benefits much less realized in the local socio-economic systems. Agricultural land in Vojvodina covers 1.747 million ha, which is 35% of the total agricultural land in Serbia. With the fine quality of its land (52% is chernozem, also known as “black earth”) compact geography and abundant water, Vojvodina has great business potential in European agriculture. Vojvodina’s agricultural sector made up almost 40% of the province’s total industrial production in 2009 (VIP, 2013). Although Vojvodina has great potential in developing agriculture, several studies (Mijacic, 2010; Rodic et al, 2007) suggest that the province is technically and technologically lagging behind other European regions, and a change in the mindset of all stakeholders (farmers, technology providers, scientists) is needed to accelerate adoption of PA technologies in the region, thus fostering development of agriculture in Vojvodina to its full potential.

While PA systems are obviously based on technological devices, the role of farmers who use the devices and information must not be understated or ignored. PA development often represents technology-push, with farmers as end users receiving little attention. In this techno-centric mindset there is a focus on creation of devices, rather than development of a system involving learning and knowledge development among users (Eastwood et al, 2009). In this paper we argue that it is of equal importance to engage users (mostly farmers, but also agronomists and farm advisors in general) in all steps of solutions’ development, therefore the aim of our research is to conceptually adapt/customize the open innovation methodology so as to fit the local and technological particularities of both the Vojvodina region and the concept of PA.

2. Results: Proposed model

A significant challenge faced when attempting to customize the open innovation methodology to an agricultural setting arises from two different but intersecting factors, namely: (i) the methodology is mostly developed to address challenges in the software/digital services domain and requires a minimum level of familiarization with ICT on behalf of the users, which unfortunately is not always the case with farmers (Labrianidis and Kalogeressis, 2006) and (ii) The ultimate necessary condition for applying the open innovation methodology, requires significant involvement on behalf of end users, which has been proved challenging in previous attempts of setting up Living Labs devoted to PA (Bertoldi et al, 2010).

Our proposed model aims to guarantee a sufficient stakeholder support base, with farmers being at the core focus of our strategy. Under this framework we propose a parallel and multi-level procedure aiming to identify appropriate stakeholders for each phase of our Living Lab implementation plan.

A key step towards this methodology is the mapping of our stakeholders as presented in the following table, where we distinguish among stakeholders according to their attitude towards innovation (based on the categorization proposed by Foray,2009), their features and their strong and weak points as potential members of an open innovation ecosystem. Finally, we categorize accordingly the stakeholders in
the region of Vojvodina case, based on our preparatory work towards setting up the Living Lab for Precision Agriculture (PA4ALL) in Vojvodina, namely personal interviews and invitations to participate in the Living Lab (LL).

<table>
<thead>
<tr>
<th>Features</th>
<th>Strong Points</th>
<th>Weak Points</th>
<th>Vojvodina Case</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Excited Goblins</strong></td>
<td>Stakeholders eager to innovate and engage in co-design activities, even without external stimuli, essential for the inception phase of the LL</td>
<td>Early adopters, able to attract others, already familiar with concept of innovation</td>
<td>Very likely to dominate the LL and attract all resources at later stages of deployment</td>
</tr>
<tr>
<td><strong>Sleeping Giants</strong></td>
<td>Stakeholders that have a great potential and a great impact in the innovation process but require a specific strategy to be engaged in an open innovation assignment</td>
<td>Huge benefits from getting involved into the process, able to provide insights and validate technologies</td>
<td>Difficult to approach individually, low level of familiarization with innovation processes</td>
</tr>
<tr>
<td><strong>Hungry Dwarves</strong></td>
<td>Stakeholders that would not enter early stages of innovation but would rather wait until the innovation process becomes financially lucrative</td>
<td>Able to contribute in the long-term sustainability of a LL and the commercialization of its results</td>
<td>Unwillingness to participate at early stages, interested only in short term financial benefits</td>
</tr>
</tbody>
</table>

Table 1: Categorization of potential stakeholders of Vojvodina

3. Lessons learnt: Roadmap for deployment

The above categorization defines our strategic roadmap towards the further development of PA4ALL. Our conclusions can be summarized as follows: (i) At the establishment phase, we attracted mostly “excited goblins”, namely a Research Center (BioSense), the Cluster of ICT companies of Vojvodina and Delta Agrar, a large and technology prone company of the farming sector. Additionally we also attracted a “sleeping giant”, the Regional Government of Vojvodina, as a result of successful previous cooperation with academia. (ii) During initial deployment phase, our aim is to attract individual farmers familiar with ICT technologies by
leveraging of the paradigm of Delta Agrar as a pioneer company in the field and the show cases established in experimental farms of Delta Agrar and BioSense. (iii) We expect "hungry dwarves "to engage themselves to PA4ALL, in its maturity/sustainability phase, once the first result will be available and the business models to introduce them to the market will be defined.

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Brief Biography of primary author

Grigorios Chatzikostas works as Business Development Manager at BioSense Center, University of Novi Sad and as Manager of Precision Agriculture Living Lab (PA4ALL). He has over 10 years of international experience in fostering successful win-win research collaborations and partnerships between industrial players, government organizations and leading academic institutions to increase the
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rate of innovation in agricultural clusters. His experience also includes writing successful proposals, carrying out contract negotiations and acting as coordinator on a number of large scale EU-funded projects.

4. Open innovation systems for value creation and knowledge exchange: results from the Flemish LeYLab Living Lab

Dimitri Schuurman

Keywords
Living Labs, open innovation, innovation ecosystems, user innovation, knowledge spill-overs

Problem
What specific problem does the submission focus on?

Living Labs are seen as facilitators of sustainable innovation practices with a user-centered approach (Schuurman et al., 2012), but academic research into the methodological building blocks of Living Labs is still lacking, resulting in a diversity of definitions, approaches and characteristics (Følstad, 2008; Almirall & Wareham, 2011; Leminen & Westerlund, 2012, Veeckman et al., 2012). In nowadays knowledge economy, no more general 'best practice' innovation management exists. Within this paper we investigate the potential of Living Labs as open innovation systems that foster different knowledge transfers amongst the actors participating in them. By means of an in-depth case study research of the LeYLab Living Lab we explore a variety of hypotheses abstracted from the open innovation literature on knowledge transfers and other variables influencing exchange and collaboration in open innovation systems. We conclude that given certain criteria are met, Living Labs can be a solution for sustainable innovation development.

- Current understanding: What is known about this problem?

For companies, it is necessary to attain an optimal level of ambidexterity, or the capability to explore external knowledge and valorize or exploit this knowledge for internal benefit (Andriopoulos and Lewis, 2009). Traditionally, Europe scored high in terms of research (exploration), but underperformed in terms of market success (exploitation), a phenomenon referred to as the ‘European Paradox’ (Almirall and Wareham, 2011). In order to overcome this paradox, several initiatives were kickstarted on the European policy level, such as the promotion and support of industry-university links and relationships (Perkmann and Walsh, 2007). A specific case of industry-university relationships are so-called Living Labs, which also received considerable support from the European level starting in 2006 (Dutilleul et al., 2011). Within this paper, we will explore the value of Living Labs as a possible solution for the ‘innovation paradox’, as they facilitate university-industry
relationships, but also relationships between large companies and SME’s, start-ups, entrepreneurs, and, last but not least, involve the end-users themselves, commonly referred to as public-private-people partnerships (4P’s) (Westerlund and Leminen, 2011). Such collaboration between different types of actors in a structural way has the opportunity to unlock knowledge on several levels, create value and helps to obtain different goals which would not (as easily) be possible without the existence of such networks, which can be seen as a solution for the innovation management challenges companies have to deal with (Pyka and Küppers, 2002). In order to fully understand the dynamics and benefits of such ecosystems, Perkmann and Walsh (2007) argue that more attention needs to be paid to the specificities and roles of networked inter-organisational relations within these kinds of networks to help resolve the open questions in this area of research. Therefore we will use an open innovation perspective to analyze the roles of the various actors within the Living Lab and the knowledge and technology transfers that occur during the Living Lab operations and cases.

- **Research question:** What is the submission's goal?

To explore whether the open innovation processes of exploration, exploitation and retention (Lichtenthaler, 2011) occur in Living Labs and how these knowledge spillovers generate value for the various stakeholders.

- **Design/methodology/approach:** How was the study/work executed?

We have used a case study design as case study research excels at bringing an understanding of a complex issue or object and can extend experience or add strength to what is already known through previous research. Case studies are especially suited for investigating new and poorly understood processes, with their emphasis on detailed contextual analysis of a limited number of events or conditions and their relationships (Eisenhardt, 1989). Yin (1984) defines the case study research method as an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used. Given the complexity of the studied phenomenon, the multiple levels of analysis (actors, knowledge flows,...) and the participation of the author team in the Living Lab itself, this research design seems most appropriate.

- **Findings:** What are the main outcomes?

The different roles that are assigned to the different actors are associated to certain open innovation activities, but during the Living Lab-operations, some actors may switch roles. One of the main findings was that the studied Living Lab clearly succeeded in attracting SMEs to engage in open innovation, a group that was lagging behind (van de Vrande et al., 2009). The role of utilizer seems to be most fitting to them as this allows them to benefit the Living Lab-infrastructure in order to explore their technology, with the potential to be noticed by a partner inside or outside the Living Lab which offers exploitation possibilities. The role of provider of the Living Lab infrastructure seems to be best suited for larger companies with more
established and stable technologies, as the smaller providers from the case study failed to deliver. Besides exploitation of their infrastructure, Living Labs also facilitate the exploration of new ideas and technology through the multiple (external) Living Lab cases that take place in the Living Lab. The researchers in the Living Lab have an important mediating role between the utilizers and the users, as they make information regarding user needs ‘unsticky’ (von Hippel, 2005) by means of specific research methodologies. The enablers of the Living Lab play an essential role in supporting and facilitating the Living Lab. Therefore, Living Lab activities should be tailored towards the policy objectives of the enablers. A city appeared to be quite suited for this role. As general guidelines, the thematic focus of the Living Lab and the number of partners are of utmost importance in order to be able to align the goals of the different partners, something which did not fit well in the case study, but which was solved in a natural way through the actual degree of collaboration between the parties who did share common goals. Another important lesson is that the definition of internal use cases is of utmost importance in order to ‘headstart’ the Living Lab with cases that activate the users and generate research data and showcases to attract external utilizers.

- Contribution: What does the submission add to current understanding?

This paper approaches Living Labs from an open innovation-perspective and looks at the knowledge and technology transfers that are facilitated between the various stakeholders participating in the Living Lab and by external utilizers that initiate innovation cases in the Living Lab. This way it adds to the knowledge and theory-building regarding the Living Labs-concept. It does so based on the findings of the LeYLab Living Lab, which ran over two years, involving in total more than hundred households and by looking at six concrete innovation cases that ran in the Living Lab.

- Practical implications: Who will gain why and in which way from the findings?

The findings and ideas presented within this paper will be of interest for researchers with interest in Living Labs, open innovation and user innovation, and more in general for anyone interested in user-centered innovation.

5. New User-centric approach to impact assessment. Case express to connect-project

Anne Äyväri, Laurea University of Applied Sciences

Keywords

Impact assessment, service development, connectedness, serious games, older adults
Express to Connect (E2C) was a service development project funded by EU-AAL JP. It started in March 2010 and ran for 36 months. The overall objective of the E2C consortium was to develop, test, and deploy digital storytelling games. These games stimulate and facilitate social connectedness among older adults, hereby empowering them and enriching their lives. (See more [www.express2connect.org](http://www.express2connect.org).)

The task of Laurea University of Applied Sciences was to assess the impacts of the new service (to be launched on the market within the next three years) on the social connectedness of older adults during the user-centric service development process. At the first glance the task seemed rather impossible to execute. A totally new approach was needed.

Following the user-centric approach adopted in the E2C project we decided to rely on the opinions of the potential users, the test persons themselves, and to ask them to anticipate the impacts of the service concepts and prototypes.

**The evaluation of the anticipated impacts by the users**

We started our impact evaluation planning process by studying the well-known questionnaires on wellbeing, for example: WHOQOL, 15D, PGC Morale Scale, and LEIPAD and scales on social connectedness. We compared the items in the scales to the desired outcomes identified in the E2C ethnographic study. We came up to the conclusion: the generic scales are not sensitive enough to be able to identify the changes in the everyday life of a senior the new service is designed to achieve. Therefore it was necessary to design a new questionnaire based on the understanding of the social connectedness among older adults adopted in the E2C project.

The questionnaire focusing on the anticipated impacts was used in all the tests starting from the experience prototype test in November—December 2010. In the demo test of the digital game (April—May 2010) the participants of the test anticipated e.g. the following impacts (percentage of “Yes”-answers in 2011, N=16):

- I am able to better outline the life I have lived so far by reminiscence. 81 % agreed.
- I perceive the joy of learning and the feeling of being capable more often than before. 75 % agreed.
- The feeling of being related to other people has become stronger. 69 % agreed.
- I’m able to tell and share the memories of my life, especially of those persons who have been important to me. 69 % agreed.

In the final field trial we followed the same procedure with impact evaluation as in the previous tests. The participants were asked to imagine that they had played the Storyville games for months, even for a year. At least six out of ten older test players agreed with the following items:

- I am at peace with myself and with the current state of my life. 77 % agreed.
- I feel that I am of importance to somebody. 65 % agreed.
- The feeling of closeness to people important to me has grown stronger. 61 % agreed.
- A sense of belonging has grown stronger between me and my friends/peers. 61 % agreed.

When the gaming sessions create opportunities for high quality encounters between family members, next of kin, friends, acquaintances, neighbours, and peers at the meetings of senior associations the social connectedness of the players will be strengthened and thus the risk of falling into loneliness will be diminished significantly. When interpreting the answers given to the questions concerning the anticipated impacts we have to keep in mind the shortness of the testing period.

**Cost-efficiency analyses based on the Portraits**

The Personas created by our consortium partner Copenhagen Living Lab were the starting point for our work on developing a new approach for estimating the cost-efficiency of a new service to be launched on the market in the near future. We chose three Personas — later called Portraits out of six, and started writing scenarios for the persons described in the Portrait.

Two kinds of scenarios for a period of one year were written. The first ones describe the lives of the Portraits when the risks of falling into loneliness come true. The second scenarios describe the lives of the Portraits when the Storyville gaming sessions work as a trigger for strengthening connectedness.

We presented the E2C Impact Model, the descriptions of the three Portraits, and the scenarios to ten Finnish and four Danish experts in elderly care and wellbeing of older adults. In the meetings with the experts we gathered feedback on the E2C Impact Model, and identified several potential chains of effects in the lives of the Portraits.

One of our tasks included in the evaluation of the impacts of the Storyville gaming was to analyse the cost-efficiency of the new service, that is the games to be played on an iPad together with family members, next of kin, and friends. The task was extremely challenging as the games had not been launched on the market. We decided to work with the Portraits, and the chains of effects identified in the discussions with the experts.

For each Portrait we chose one chain of negative effects, and one chain of positive effects. These two chains were kind of mini scenarios, or opposite sides of one coin. We started putting the price tags on the chain of negative effects. The following table presents the costs of negative effects for one of the Portraits and for the public sector.
Table 1. The costs of the chain of negative effects for Kirsten and for the public sector.

<table>
<thead>
<tr>
<th>Costs for the individual and her family</th>
<th>Costs for the public sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visiting doctor in local health center twice a year, including EKG, labs.</td>
<td>Visiting emergency unit at night time because of the flu (instead of day time visit to health center)</td>
</tr>
<tr>
<td>13,80 € x 2 -&gt; 27,60 €</td>
<td>27,50 €</td>
</tr>
<tr>
<td>242 € x 2 -&gt; 484,00 €</td>
<td>295,00 €</td>
</tr>
<tr>
<td>Her daughter’s family has to hire a babysitter 15 times 4 hours/year (Kirsten used to babysit)</td>
<td></td>
</tr>
<tr>
<td>8,20 € x 60 h -&gt; 492,00 €</td>
<td>Tax reduction 45% -&gt; 271,00 €</td>
</tr>
<tr>
<td></td>
<td>221,00 €</td>
</tr>
<tr>
<td>Safety services</td>
<td></td>
</tr>
<tr>
<td>361,00 €</td>
<td>0,00 €</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
</tr>
<tr>
<td>687,10 €</td>
<td>1,000,00 €</td>
</tr>
</tbody>
</table>

When we manage to avoid the risks of falling into loneliness, the costs presented in the above table, will not come true. When assessing the cost-efficiency of the new service from the individual’s point of view, the costs avoided can be regarded as “savings”.

To be able to calculate the net effect of the new service we have to assess the costs of the usage. In this case Kirsten has to buy an iPad if she doesn’t already own one, and she has to download the games from the iTunes Store (around five euros). In addition to buying the game board and the games, some money has to spent on organising the gaming sessions (total 325 euros). The net effect for Kirsten could be 357,10 € (= “the savings” minus the costs of the usage).

Discussion

In the E2C project we have learnt that assessing the anticipated impacts of an innovation during its development process is a mission possible. The solution lies in the user-centric approach. The evaluation of the anticipated impacts of an innovation has to be based on the desired outcomes the users themselves have defined. In the case of E2C project a new questionnaire was designed to be used in the evaluation. The idea of utilising Portraits as the basis for the assessment of the anticipated impacts in monetary terms is a new one. It is promising but more work has to be done to develop the approach further. Especially it will be very interesting to try to find out ways and procedures how to scale up the net effects from the level of one Portrait to the level of a larger population.
Anne Äyväri, D.Sc. (Econ), works currently as a Principal Lecturer at Laurea University of Applied Sciences, Finland. Her main responsibilities include managing RDI projects aiming at developing services and processes in the social and health care sector. Her research interests include small firm networks, networking abilities, and learning in networks. Her research has been published in the International Journal of Arts Management, Knowledge Management Research & Practise, and Marketing Intelligence & Planning.

6. A Living Lab approach to the development of a consumer care service platform for older people

Nikki Holiday, Gill Ward, Darren Awang, David Harson

Biography of main author

Nikki Holliday, Senior Research Assistant, Health Design & Technology Institute, Coventry University

A Senior Research Assistant in the field of Assistive Living Technologies (ALT), Nikki focuses on informing ALT solution design through user-centred techniques such as co-creation, co-production, usability studies, interviews, and rapid prototyping. Nikki has an undergraduate degree in Psychology (University of Leeds, 2005) and is now completing an MSc in Assistive Technology (Coventry University). Nikki specialises in running consumer and user-focused co-creation activities for nationally funded projects such as UK Technology Strategy Board funded COMODAL and I-FOCUS Warm Neighbourhoods®. I-FOCUS is part of the prestigious DALLAS (Delivering Assisted Living Lifestyles At Scale) program revolutionising ALT use in the UK.

Other authors

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Abstract

The research aimed to explore what potential users would want from a consumer care service platform that could help people live independently and help their friends and relatives more easily support them. A Living Lab approach was utilised to develop the service with stakeholders, and test the service in situ with older people and their families and friends. The results of this first phase were that overall, older people and their families and friends found the system non-intrusive and easy to use without reducing social contact. The results from this initial pilot, along with development work from co-creation groups are now being used to improve the service to move into a larger-scale trial. By including both potential users and
industry stakeholders throughout the development of the service, and adopting an iterative attitude to the research, we are ever closer to the development of a scalable service with the potential for large-scale commercialisation, which takes into account the wants and needs of its potential users.

Keywords

Co-creation, co-production, user engagement, consumer, living labs, carers, ageing in place

Research Questions

With funding from the UK Technology Strategy Board’s Delivering Assisted Living Lifestyles at Scale (DALLAS) program, the research aimed to explore what consumers would want from ‘AroundMe™’ – a self-buy (i.e. outside of statutory Telecare provision) informal care service platform that could help people live independently and help their friends and relatives more easily support them. A Living Lab approach was utilised to develop the service with stakeholders, test the service in situ with older people and their families and then to use the results of these phases to inform future development of the service, allowing users to become “co-creators of value”, providing a user-driven innovative service. Both potential future users and industry representatives were included as stakeholders in the co-creation groups, as whilst users have the most valuable insights on service itself, insights from developers tend to be more realisable), and the aim of this project was to develop a feasible, scalable service which meets user’s needs.

The AroundMe™ service uses connected home sensor technologies to help support an older or vulnerable person, allowing their friends or relatives to be notified, if for example, the temperature in the house gets too low, or if an appliance that would normally be used regularly (such as a kettle) doesn’t appear to have been used. It also sends messages to friends and family to let them know that their loved one is up and OK. There are three iterative phases to the project, the development of each phase being informed by the results of the previous. The three stages are:

- Development of the pilot service with potential consumers, and piloting of service with up to twenty participants (Winter 2012/13)
- Refinement of the service and prototyping a scaled version of the service with up to 1000 users (Winter 2013/14)
- Commercial deployment of up to 10,000 users (Winter 2014/15)

This submission will present the results of the first phase, and describe the actions to be carried forward into the second phase.


Main Results

The results from the first year of the project are that overall, potential customers, and their families and friends find the system non-intrusive, reassuring and easy to use, without reducing social contact amongst the neighbourhood. Participants were easily able to see the service as a consumer offering, and separated it from traditional statutory support offerings. For the pilot stage, it was important to focus on a user centred design approach, and test the concept of the service prior to installing final technology solutions. To that end, the initial pilot was supported by repurposed equipment, which was not the ideal technical solution for a full service, but sufficient to trial the users’ perceptions of the service experience. Participants viewed the service concept very positively, with all participants wanting to keep using the service following the end of the trial. Following this positive feedback and the suggestions provided via in-depth participant interviews and subsequent co-creation events, the learning from the pilot stage is now informing the selection of specialised equipment to provide to provide a consumer look and feel, which has easy installation and set up, suitable for a mass-market, scalable service.

Main Lesson/Takeaway for the Living Labs Community

The importance of conducting Living Labs, that is exploring innovative new products and services in situ, is demonstrated in this project. The use of repurposed technology allowed the testing of a service concept without commitment to a final technology solution. The feedback from participant interviews and co-creation sessions on this prototype equipment is now allowing us to move forward in the next phase with equipment more suited to user needs. By including both potential users and industry stakeholders throughout the development of the AroundMe™ service, and adopting an iterative attitude to the research, we are ever closer to the development of a scalable service with the potential for large-scale commercialisation. For HDTI, we have been able to see the value Living Labs and co-creation can bring to a project – by allowing the testing of concepts and prototyped services in situ. Because of this value, HDTI will be using the technique in future, to allow useful, valuable and scalable services to be developed, deployed and evaluated with the end users, quickly and effectively.

7. “Living Labland” – Co-creative Innovation Lab Integrating Cross-border Co-creation of services to research, development and innovation in Higher Education

Seija Jäminki, Marika Saranne

Living “Labland” Supporting Elävä Lappi - Living Lab by means of RDI

“Living Labland” refers to spoken Finnish - the consonants “p” and “b” merge into one letter pronounced alike, without any difference in meaning.
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Keywords

Living Lab, Co-creation, RDI, Higher Education

(Full paper)

Abstract

This research paper outlines the shared development efforts of the Kemi-Tornio University of Applied Sciences, the regional decision-makers and other partakers of the Elävä Lappi Living Lab located in Tornio, in the gateway of Lapland. Service design was used in the Lab as a tool to increase local development activities and support stakeholders’ participation in regional development. When efforts are being made to find working and sustainable solutions, it is hard to agree on what should be done, by whom, how and when the measures should be taken. (Living Lab 2012) Experiences prove that despite the existing systems to foster innovation, the various parties and stakeholders have their own and, unfortunately, isolated roles in the development process. Living Labs, at their best, can offer solutions that are not only efficient and co-creative, but even more economical and user-friendly for all the parties. Despite the number of the existing Living Labs, collaboration requires new ways of working together. This research paper approaches the research and methodological issues in Bachelor studies at the Kemi-Tornio University of Applied Sciences (UAS). The research questions were formulated as follows:

- Why should RDI in Higher Education be integrated into the regional Living Labs?
- How should RDI be integrated into Living Labs and what kind of research methods boost innovation and development?
- What kind of learning tasks support the Living Lab activities?

1 Catapult for Living Labs

Societal challenges have forced all the stakeholders in the regions to find new solutions for development. Living conditions, especially in rural and distant areas, require new innovations and collaboration that are tailor-made for the special conditions of the region. Being a sparsely populated area, Lapland is a challenging context for co-creation and innovations. In Lapland the distances, decreasing number of population and aging citizens cause further challenges in most sectors in the society, making participation and involvement in decision-making and development Remarkably challenging. Networking and multidisciplinary approaches have become important
factors for competitive entrepreneurial activities; therefore existing ways of creating services and products are no longer sufficient. These challenges require contribution and involvement of all the actors in the region. The service debate in Living Labs approaches the themes of societal change, new emerging patterns in value co-creation and developing service design methods that can be used to facilitate development processes. Service design is establishing itself as a practice and an academic discourse (Miettinen & Valtonen 2012). Innovative methods used in service design process facilitate users’ participation in service development. (Thomas 2008)

2 Elävä Lappi Living Lab introduction

“Elävä Lappi” Living Lab was established in a real-life setting in rural, sparsely populated pilot environments, Kemi-Tornio city area and Rovaniemi, the capital of Lapland. The pilot project is financed by the European Regional Development Fund (ERDF) for the period of August 2010 to December 2013. The partners represent all the three universities in Lapland: Kemi-Tornio UAS, Rovaniemi UAS and University of Lapland.

The purpose of the “Elävä Lappi” is to pilot and promote Living Lab methods in a sparsely populated area. By developing methods for joint, open innovation co-creative processes, concrete service innovations are developed. The Living Labs follow the principles of the so-called ‘Quadruple Helix model’ (Quadruple Helix 2010) underpinning exchange, shared understanding and local policy development. The Living Lab culture is supported by innovative test methods and models which facilitates the inclusion of higher education - i.e the students and the staff- to the project contents.

Elävä Lappi Living Lab development Case: Multi-sensual Shopping Centre

The actual case arose from the need identified by the Shopping Centre “Rajalla På Gränsen” staff together with its entrepreneurs and companies. One of the aims was to develop customer experiences in theShopping Centre, while the main objective was to be able to increase the overall time customers spend in the Shopping Centre. The development and learning task was planned together with the researchers, teachers and students of Kemi-Tornio UAS and University of Lapland.

A specific non-stop Workshop area was designed within the Shopping Centre in order to study, observe, participate and activate customers’ in real-life surroundings.
The purpose of the workshop was to offer the Shopping Centre customers a possibility to develop the Shopping Centre to an enjoyable place to shop and spend time in. Approximately 150 customers visited the non-stop Workshop and all of them left either individual or joint ideas for a more creative, experimental and multi-sensual Shopping Centre.

A range of methods were utilized in the Workshop in order to activate the users, such as a candy paper vote (which also included a reward for the user). Images, sounds, a touch screen element (Sinco), 3-D paper Shopping Centre, stationary and pens, ideation wall, building formulas and marking spots were for example used. When the customer entered the Workshop, (s)he could receive assistance from the students/researchers if needed. The participants were able to see the other participants’ ideas and they could also further-develop suggestions made by others. The workshop truly managed to lower participation obstacles among the participants.

Figure 1 Creating more experimental Shopping Centre (photos Minttu Merivirta)

3 RDI and learning activities in Higher Education context

All the universities of applied sciences have wide responsibilities for the well-being and development of the region; therefore research, development and innovative (RDI) activities have to promote the wellbeing of the entire region. The priorities of the Universities of Applied Sciences (UAS) highlight a strong orientation to working life and the integration of theory to practice. The RDI processes are, as often as
possible, integrated into studies and implemented through authentic, real-life innovation tasks, theses and RDI projects. RDI is carried out cooperatively by students, lecturers and representatives of various organizations. The Kemi-Tornio UAS has designed an evaluation template which can be used for project evaluation but quite often it needs to be complemented by project specific evaluation tools. In the Elävä Lappi Lab, a Living Lab Quality Barometer “Laatupuntari ja Menetelmäpankki” (2012), was utilized. The following figure shows how projects are evaluated and developed by the Kemi-Tornio UAS.

Figure 2 Evaluation system of Elävä Lappi (modified from Ponkala, Kemi-Tornio UAS RDI Unit)

The integration of theory and practical issues lead to learning processes in which development tasks have to be performed in authentic contexts. Authentic learning has demonstrated its benefits both for the learners’ competence development and the regional competence and development (Herrington & Oliver 2010; Okuogume & Jäminki 2011). The orientation toward innovations, an integral part of Living Labs, provides unique grounds for knowledge development and acts as an innovation driver for the changes in the region. This kind of an implementation structure has far-reaching impacts not only for the success of the organizations but also for the competitiveness of the entire region. However, if we wish to foster growth and well-being, RDI activities have to be targeted at identified needs in the region; all-for-one systems no longer produce either the required goals, or develop the region in a fruitful way. The process can be supported by higher education since research and development processes already form an essential part of the studies. When the “Elävä Lappi” Lab was being planned, research and evaluation were made an integral part of the Living Labs and by these measures, students and staff were engaged in the system.

Prior to Living Labs, Kemi-Tornio UAS developed an Innovation “Liike” concept (the Finnish term liike means both an enterprise and movement) during several years and included the innovation process in all the curricula leading to an undergraduate
Bachelor’s degree. The tasks, in a system like this, are introduced by the stakeholders and local enterprises with the aim of familiarizing the students with project work and work-related tasks. However, there is no guarantee that demanding learning tasks for all the students in the programme are found. In the Living Lab concept, on the other hand, the approach is proactive and the learning tasks can be better planned on the basis of the contents of the study unit and the level and competences of the students.

Figure 3 Living Lab vs. “Liike” concept (image modified from: Marjo Jussila)

The “Liike” concept engages mainly students (developers) and local companies (utilizers) and it has a narrow development approach to the contents of the tasks compared with the Living Lab approaches. The Living Lab concept, on the other hand, offers a wider perspective to the development process and the quadruple helix involves end-users/customers, developers, utilizers and enablers simultaneously with the co-creative development process.

4 Results of “Elävä Lappi”

Physical and digital labs

The physical labs of “Elävä Lappi” located in Rovaniemi and Tornio, proved to be efficient collaboration places for all the living lab actors. The implementation of the workshops was made in collaboration with all the actors and it was fairly easy to activate the participants; after all, people are interested in developing their region. However, for some groups participation was not always easy; the employees from working life and those belonging to younger generation (i.e. digital natives) found it difficult to attend the face-to-face work-shops. The digital world, on the other hand,
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seemed to offer more easily accessible and affordable meeting places for the above mentioned groups. Therefore, the social media tools were taken to use in the lab.

The following image shows how the Web 2.0 tools were used to support the Elävä Lappi activities.

Figure 4 Digital Lab All on-line activity in the project was referenced in Facebook, without this site becoming the main repository (image modified from: Marjo Jussila & Hanna-Riina Vuontisjärvi)

**RDI & collective development in Lapland**

We live in a time of social changes, not at the least in Lapland. According to Andersson and Kaivo-oja (2012) changing phenomena and trends are affecting our society and environment. In practice, constantly occurring changes have drastic consequences: doing things a little better and in a slightly different way is not enough. Entrepreneurs, business-life, public organizations (such as universities) or decision-makers truly have to be involved; they have to be present and able to collectively develop their unique culture. New innovations and ideas do not come from an individual researcher; they arise from the society where we act together, are co-creative and share ideas. Together communities are significantly more intelligent than the individuals alone. It is often perceived that change stems from ideas, inventions and finally from innovations. However, experiences prove that in general the change is the outcome followed by imitating others. The extent of the imitation correlates with the successfulness of the innovation: value is measured by the number of groups that have imitated the idea. Innovation scalability term is frequently used by researchers. (Andersson & Kaivo-oja 2012.) Elävä Lappi Lab also applies the imitation approach.
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The Elävä Lappi Living Lab represent a bridge between the RDI processes of the KTUAS and the identified development tasks of the region. The Living Lab system and the Quadruple Helix approach make it possible to identify the needs and wants of the region, its inhabitants and users. These needs and wants may be weak signals or inscrutable and unobtrusive factors which arise when multidisciplinary research methods are applied and a group of actors simultaneously collaborate in the development process. Different parties find it easier to respond to future challenges or change business models in order to respond to the current situation. RDI integration into the regional development projects has to have a coherent view. Strategic actions have to be based on the integration of working life, research, development & innovation and education. The aim is to promote the quality and productivity of working life, as well as the RDI integration and educational know-how. (KTUAS Strategy 2012.)

Research focus

As stated earlier, Living Labs, from the point-of-view of RDI, enable research activities in authentic context. However, there are certain differences in the ways RDI activities are carried out in Living Labs and other study contexts. In Living Labs, Service innovation and design are always placed at the forefront of research and practice priorities. The term service is currently understood as holistic solutions which are both meant for and co-created together with the users/customers/residents in the region (SID 2012). This philosophical starting point offered working and sustainable grounds for the integration of RDI in the identified core areas of the labs in Lapland. During all the phases of the Elävä Lappi it was rewarding to see that in a region, where the Living Lab participants know each other, it was easy to collaborate.
Figure 5 Elävä Lappi Living Lab Quadruple Helix (image Minttu Merivirta)

The Elävä Lappi Living Lab project aims at piloting, developing and implementing user-centred business services. RDI facilitates reaching the objectives, as the emergence of innovation calls for interaction between the different parties and different types of knowledge and expertise. In working life, innovation is not a distinct and separate function; it has to be integrated into the organizational business operations.

RDI activities have greatly contributed to the Elävä Lappi Living Lab project. All development tasks, needs and wants have arisen from the Lappish context with the help of university researchers. When a need was identified, actors started to plan method(s) in order to reach consensus of the target in question. One aim of the approach was to widen the students’ perspective to understand different actors (enablers, utilizers, developers and end-users) and their needs and wants in the society and in the specific development task. This supports students’ competence development; in the future they can utilize Living Lab methodology, understand the meaning of the Quadruple Helix, open innovation in real-life context and a coherent Living Lab ecosystem in their working life.

During the existence of the Living Labs, various research methods and evaluations were used. The various phases and areas of the living labs were evaluated using the evaluation tool (Laatupuntari) described in the figure 2 on chapter 3 and the Living Lab as a project was assessed. The external processes are not covered in the
present paper; priority is placed on the RDI efforts that form an integral part of the staff, students and regional developers.

Even though the paper describes the integration of RDI, standard research measures were carried out throughout the existence of the Elävä Lappi Living Labs, which is only a natural consequence of the role the universities have in the society. The data was collected in the Elävä Lappi Living Lab project applied by two cities, Tornio and Rovaniemi in the Region of Lapland during 2010–2013. The data consists of interviews, observations, questionnaires, video recordings of innovative group activities and community workshops. The data was analyzed through qualitative content analysis by the research team.

**Students’ competence development**

The priorities of all the degree programmes of UAS emphasize the orientation to working life, as stated earlier. This is done by integrating theoretical studies to practice and efforts are made to maximize the potential of joint-learning and development between the students, university and students organizations, whenever possible. The Kemi-Tornio UAS revised its competence-based curriculum in 2010 and included the core competencies defined by the European Competence Framework (EQF 2008) in the curriculum. The programmes are designed to strengthen the participants’ personal and organizational development; therefore the focus is placed both on subject specific competences and generic competences. The EQF system shifts the focus from the traditional system, which emphasizes ‘learning inputs’, such as the length of a learning experience, or type of institution (EQF 2008). It also encourages lifelong learning by promoting the validation of non-formal and informal learning which strengthens the need for Living Lab activities. Orientation to RDI provides unique grounds for knowledge development, thus acting as change and competitive drivers. In addition, the new orientations have far reaching impacts on the competitiveness of the region as a whole.
When learning and competence development is in the main focus, learning tasks become complex, sustained activities that draw on realistic situations to produce high-order competence development. In order to reach the goals, the main principles of authentic learning have to be applied throughout the programme. (Okuogume & Jäminki 2011) When dealing with working adult students, the integration of the RDI process is easier, for full-time students without any workplace, the University has to offer different solutions. Living labs provide authentic contexts for competence development and learning from professionals. Results from Living Labs (for example Herselman & Pitse-Boshoman 2010) indicate that competences can be enhanced in innovation through the application of the Living Lab methodology. When users are part of the creation of innovation in real-life contexts, it can have a positive effect on competence development. This methodology allows the user to be an active participant in the co-creation of knowledge and innovation. As flexible ecosystems, Living Labs proved to provide a demand-driven ‘concurrent innovation’ approach by iteratively engaging all the key actors across the phases, and putting the user in the driver’s seat, as found in other Living Labs as well (for example Cunningham & Cunningham 2010).

5 Methodological issues

The ability to interact with the users and the underlying idea that people’s ideas, experiences and knowledge (Niitamo, Kulkki, Eriksson, & Hribernik 2006; Bergvall-Kareborn, Hoist and Stahlbrost 2009) are the features that distinguish the Living Lab approach from other cross-disciplinary approaches, even though there are numerous similarities with basic qualitative research. Living Lab research can be seen as the place where research and pure applied research meet (Cunningham & Cunningham 2010). During the design phase of the concept, the Living Labs concept was defined as an environment, as a methodology, and as a system. Bergvall-Kareborn, Hoist and Stahlbrost (2009) point out that these three definitions are not contradictory but rather complementary perspectives. Depending on which perspective one takes, certain themes come into focus and by accepting the complexity, implementation is
made easier. With the environment perspective, objects such as technological platform and user communities come to the forefront. With the methodology perspective, processes such as data transfers and methods for user involvement are highlighted. No matter how Living Labs are defined, interaction channels and places have to be organized.

Because of the similarities with other research approaches, it is easy to lose the core difference between Living Lab research and qualitative research. It is only natural that, especially when Living Labs were introduced, there was strong criticism of the methods applied by Living Labs (For example Living Labs: kriittistä arviointia blog 2008).

Living Labs draw on the general principles of the main streams of qualitative research such as action learning and ethnographic research, yet (Higgins & Klein 2011) stressing the application of methods that give emphasis on user involvement; the principle was followed in Elävä Lappi. Instead of using electronic questionnaires, the students observed the participants’ behavior and tried to retrieve knowledge in an easier way; with the aid of images, photos and interviews. In many other studies where Living Labs were not involved, the students did not contact the users directly; questionnaires and eMail-messages were sent and analyzed. The difference in the approach made a tremendous difference for the students; the human contact made the research and innovation process more engaging, interesting and lively.

The Lappish context proved to be challenging for the participation of people because of long distances. By the integration of various online tools some of the problems were solved.

**Students as researchers**
Research in Living Labs symbolizes the collective learning and reflection that take place in the Living Labs. The role of the students is important; the students not only represent the new developers and users of services and products, but they also need the competences of Living Lab practices and methods. Student participation and involvement in the "Elävä Lappi" Living Labs can be perceived from two perspectives. The most visible area is formed by the activities carried out to support the actual Living Labs. The second perspective can be seen from the point-of-view of the participants' competence development. (Heikkanen & Österberg 2012.)

In the Elävä Lappi Living Lab, the cities of Rovaniemi and Tornio were used as living laboratories in which the research focuses on the complex and challenging relationship between all the actors of the labs. The students had various and important roles in the RDI processes. The students mainly acted as

- researchers producing new knowledge during face-to-face workshops
  - planned qualitative, mainly ethnographic research encounters
  - gathered information in the form of observations, modeling, interviews
  - planned and organized several events and co-creation workshops
  - analyzed the Elävä Lappi communication system, website and social media use
  - developed and innovated social media use
    - took part in the co-creation of knowledge
    - innovated integration of social media
      - people living in rural, remote areas need flexible participation channels
      - digital spaces were important for the younger generation
- designers producing new visions for developing the City of Tornio, Shopping Centre Rajalla/på Gränsen, the City of Rovaniemi
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Figure 6 Idea-generating Workshop in Tornio with students, entrepreneurs, residents, staff (photo Essi Kuure)

6 Reflective conclusions

A detailed description of the phases and experiences can be found in the final report (Merivirta 2013), but the following chapter summarizes the most important findings.

The collected feedback and experiences demonstrate that the integration of RDI was rewarding for all the Elävä Lappi Lab parties. Produced knowledge first of all helped in targeting the measures in right places; on the other hand the entrepreneurs and service providers gained tailor-made information on what the residents and users really wanted. For the students working in the Living Lab, using modern methods where contacts were made with people was rewarding, yet even challenging. A lesson learnt from the research practices was that early-stage preparations including staff training have to be made by the university. Teachers have to master the Living Lab methodology and practices before they can work in Living Labs. The best way to succeed is to integrate the research goal into appropriate study units with a teacher tutor supporting the students in their work. Other possibilities include thesis work and practical training, especially in cases where a long-term RDI is needed in the Labs.
In addition to the focus on research, which is a compulsory part of studies in higher education, the students mentioned that they gained valuable competences for working life. Team skills, working with the local entrepreneurs and persons with various backgrounds gave insight into the complexity of working life. The students were hoping to benefit from the new network connections - after all, it is not necessarily easy for students to establish professional contacts with local developers.

The results clearly prove that there is a need for involvement and drastic actions by university staff when establishing a Living Lab when participants have no previous experience of such an approach. On the other hand, even though this kind of an open innovation is a fairly unknown and unused method, people are ready and willing to take part in the development actions. Despite this, it is not easy to involve all the actors in the region. Even though the work of the university staff and researchers functioned as a catapult for development, the ideas also come from all the parties involved. Another finding suggests that the implementations need to be tailored to the local conditions.

The involvement of designers, local entrepreneurs, actors and citizens, students and researchers has been both rewarding and challenging. Working in a multi-disciplinary community is a fairly recent development approach and requires new ways of working together. At its best, a living lab can be a real-life environment for different stakeholders where added value can be co-created. Since the RDI involves a lot of hidden knowledge between the various parties, more research and collective knowledge sharing is required. By opening the results and experiences from the Living “Labland” we are hoping to be able to lead the way for others.

Issues to be developed

It is a well-known fact that there are many characteristics in Living Labs that need to be addressed in order for the labs to operate satisfactorily (Nilamo, Kulkki, Eriksson, & Hribernik 2006). This was the case also in the Elävää Lappi Living Lab. As stated earlier, especially the physical, but even to certain extent the virtual lab functioned well enough, but with minor changes the labs could be even more efficient. The research clearly proved that if we want to serve the majority of the participants, both the physical and virtual spaces have to be used. In other words, the virtual spaces
complement co-creation and collaboration in Living Labs, they do not exclude the physical ones.

Old practices sometimes cause obstacles for the application of new methods. For instance, the research methods resembled those applied in traditional research approaches and without a proper staff training it was difficult to perceive the differences. It proved to be easier to equip the students with Living Lab practices than the university staff because research methods are included in the research-related studies.

The contribution of local stakeholders is important, but in some cases the entrepreneurs adopted a passive role, most likely because of the lack of time. Entrepreneurs wanted to receive feedback and information on the results but they did not wish to spend the time needed for listening to the presentations at the University. One solution to the time management problem would be to separate Living Lab information from the standard research processes and organize sessions where crucial information would be given in a concise format, for example as concise “Pecha Kucha” presentations. The students, the future Living Lab members, also need feedback. Shared moments with entrepreneurs would be needed so that students would learn from the process and receive feedback of their learning activities. The “Elävä Lappi” results prove (Merivirta 2013) that in some cases the students were not able to see the gained results of the tasks. The entire RDI-process should be opened and made visible for all the participants. This can act as a reward for participation.

In Living Labs the development efforts heavily rely on the voluntary participation of the parties. The majority of the participants wanted to develop the region and the targets, but in some cases the students would not have liked to take part in all the phases, especially if the students came from another region. However, it would be important for the Living Lab developers to learn about the reasons for not participating. Anna Sthålbröst reported in her research (2006) of the reluctance of the users to change their opinions of the services and the importance of the negative ideas. By including non-users’ ideas in the RDI processes, valuable information on why the users do not want to choose the service in question is achieved and more importantly, on what should be done so that the passive persons would like to participate.

**Sum up: answers to research questions**
The Elävä Lappi Labs could be presented in versatile ways, but the present paper seeks to address the issues regarding research-related issues of the labs. The simplest way to sum up the results is by answering the three research questions. The answer to the first question ‘Why RDI in Higher Education should be integrated into the regional Living Labs’ is fairly straightforward. Societal changes, as stated at the beginning of the paper, call for new, more innovative practices, and Living Labs provide efficient and reasonably economical collaborative spaces for all the actors in a region. For the identification and follow-up of the existing problems and solutions, reliable research data should be available for the developers.

The answer to the second question (How should RDI be integrated into Living Labs and what kind of research methods boost innovation and development?) is not as straightforward as the first one. Regional and societal challenges are extremely complex, and the results from the “Elävä Lappi” indicate that several methods have to be applied. The Living Lab methodology shares similarities with the traditional qualitative research approaches, such as ethnographic and action research, but user involvement and the easiness of participation always have to be ensured in the research processes. The approach highlights the role of interaction, communication and observations aided by the use of images, photos and cards. Innovations, on the other hand, require involvement of all the actors and stakeholders; therefore, multidisciplinary approaches as well as various channels need to be applied.

The third question ‘What kind of learning tasks support the Living Lab activities?’ involves the students’ everyday life. Since Living Labs should function in real-life contexts, learning tasks should be authentic and complex enough, just like the society is. What is important, is that the tasks are not designed in advance by the teachers. Despite the staff expertise, the regional complexity may be ignored if the local actors are left out. The versatile nature of Living Lab with many actors ensures a rewarding learning context.

The next step in the “Elävä Lappi” Living Lab might include transnational partners in the process and turn the Lappish region into an International Living Lab.

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