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Suvi Konsti-Laakso

CO-CREATION, BROKERING AND INNOVATION NETWORKS: A MODEL FOR INNOVATING WITH USERS

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Thesis for the degree of Doctor of Science (Economics and Business Administration) to be presented with due permission for public examination and criticism in the cabinet Haapa at Sibelius Hall, Lahti, Finland on the 19th of October, 2018, at noon.

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Abstract

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The most recent shift in the innovation paradigm stresses collaboration amongst many different stakeholders and areas of knowledge to emphasise the role of users. While the importance of users for successful innovation has been recognised for some decades, innovating with users has yet to become common practice. This calls for research to examine co-creation in a nuanced way and focus on processes for innovating with users.

This study examines co-creation as a new form of innovation. The focus here is user knowledge and the ways it can be obtained and utilised. This study discusses three concepts related to innovation: co-creation, brokering and innovation networks. The research question for investigation is as follows: How are co-creation, innovation networks and brokering interrelated in the context of innovating with users?

This research approaches the question with a qualitative research design consisting of two multiple case studies and three qualitative experiments. Empirical evidence is collected from living lab activities in Finland. The dissertation is constructed as follows: the first section introduces the topic and provides an overview of the dissertation's theoretical discussion, methodological aspects, results and conclusions. In the second part are five publications which form the empirical base for the results and conclusions.

The key findings of the empirical studies can be condensed as follows: first, the results indicate that user knowledge is often approached with inadequate actions considering the nature of user knowledge. Second, user co-creation is a trigger and driver for innovation networks; and third, co-creation as a process induces benefits for networks. The main contribution of this dissertation is a novel model for innovating with users, which clarifies the interrelations between co-creation, networks and brokering. In addition to its academic contributions, this study provides practical offerings for advancing the role of users in innovation activities.

Keywords: Co-creation, users, innovation, brokering

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My late mom used to tell me, whenever I lost something, that even a grain can be found when it sprouts. So far, this advice has never failed me, and it did not fail me during this dissertation process either. Nevertheless, I luckily was not alone wandering in the field.

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Suvi Konsti-Laakso
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Lahti, Finland

Contents

Abstract

Acknowledgements

Contents

List of publications **9**

1 INTRODUCTION **13**
1.1 Research background 13
1.2 Research gap 16
1.3 Research objectives and question 17
1.4 Definitions 21
1.5 Scope and limitations 21

2 THEORETICAL BACKGROUND **23**
2.1 User co-creation in innovation 23
2.2 User knowledge 25
2.3 Innovation networks 26
2.4 Brokering 28
2.5 Summary 29

3 RESEARCH STRATEGY **31**
3.1 Research approach 31
3.2 Data collection and analysis 33
3.3 Assessing the quality of the study 38

4 RESULTS **40**

5 CONCLUSIONS **44**
5.1 Discussion and theoretical implications 44
5.2 Managerial implications 45
5.3 Limitations 46
5.4 Further research 47

References **49**

Publications

List of publications

This dissertation is based on the following papers. The publishers have granted me permission to include the papers in my dissertation.

I. Konsti-Laakso, S. (2018). Brokering user knowledge. 24th International Conference on Engineering, Technology and Innovation (ICE/IEEE ITMC 2018), Stuttgart, Germany 18.-20.6.2018.

II. Konsti-Laakso, S. (2017). Stolen snow shovels and good ideas: The search for and generation of local knowledge in the social media community. *Government Information Quarterly*, *34*(1), 134-139.

III. Konsti-Laakso, S., Pekkarinen. S. & Melkas, H. (2018). Enhancing public sector innovation: living lab case studies on well-being services in Lahti, Finland. In van Geenhuizen, M., Holbrook, J. A., & Taheri, M. (eds.) Cities and Sustainable Technology Transitions: Leadership, Innovation and Adoption. Padstow: Edward Elgar.

IV. Konsti-Laakso, S. & Rinkinen, S. (2016) How to create a social enterprise: a case study. 9th International Conference for Entrepreneurship, Innovation and Regional Development. Bucharest, Romania, 23-24 June.

V. Konsti-Laakso, S., Pihkala, T. & Kraus, S. (2012). Facilitating SME Innovation Capability through Business Networking. *Creativity & Innovation Management* 21(1), 93-105

Author's contribution

I have been the corresponding author in every publication, which indicates my leading role in co-authored publications.

I am the sole author of Publications I and II, which means that I designed, wrote and published the paper. However, it should be acknowledged that in both of these studies, other researchers were involved in planning and conducting empirical studies. In Publication I, another researcher designed the data collection, functioned as leading interviewer and conducted preliminary data analysis. In Publication II, other researchers were involved in designing and conducting the experiment.

In Publication III, I was responsible for the paper's overall research design and coordination, which includes writing the living lab – part, methodology and analysis. The conclusions and responses to reviewers were joint efforts with co-authors.

In Publication IV, I was responsible for the overall research design, methodology, data analysis and publication. The literature review and conclusions were joint efforts with co-authors.

In Publication V, I was responsible for the methodology, empirical case-data collection and data analysis. Theory formulation, conclusions and responses to reviewers were joint efforts with co-authors.

LIST OF FIGURES

Figure 1. Structure of dissertation

Figure 2. Study frameworks

Figure 3. A model of innovating with users

LIST OF TABLES

Table 1. Overview of publications in Part II

Table 2. Research choices

Table 3. Data description

Table 4. Principal phases of analysis

1 INTRODUCTION

"If I'd asked customers what they wanted, they would've said a faster horse" (Henry Ford).

1.1 Research background

Innovation is widely viewed as the driving force of economic growth and development. Innovations can be technological, social, cultural or organisational; in general, they refer to new ways of doing things. Current thoughts on the innovation process emphasise openness, knowledge and collaboration (Chesbrough & Bogers, 2014; Baldwin & von Hippel, 2011; Chesbrough, 2006), and companies, universities, private research centres, governmental institutions and customers are all growing in their understanding of innovation as a collaborative process (Bessant & Tidd, 2007). In the case of firms, to accomplish innovation they must seek knowledge and competencies outside their organisation boundaries. This applies to many industries, as the networked and interactive nature of innovation applies to all types of innovations: technological, social, cultural and others in different industries such as manufacturing and services (Christopherson, Kitson & Michie, 2008).

In this shift towards open collaboration, customers and users rise in importance. Studies have shown that users or customers are a major source of innovations in that they possess valuable knowledge. This knowledge can be needs, use experiences and even new designs and prototypes (Chatterji & Fabirizio, 2012; Laursen & Salter, 2006). In the field of innovation studies, Eric von Hippel (1978) suggested that there are two different innovation paradigms: manufacturer-active and user-active. The manufacturer-active paradigm emphasises the role and responsibility of the manufacturer in making innovations; manufacturers carry out all the activities needed to launch an innovation (Raasch, Herstatt & Lock, 2010). The user-active paradigm refers to the user-driven innovation theory presented by Eric von Hippel in the early 1980s. He conducted studies, most notably in the sport and medical industries, where active hobbyists and highly skilled surgeons developed tools for themselves that were then commercialised by manufacturing companies. User-driven innovation, therefore, urges users to innovate for their own benefit and manufacturers to commercialise these innovations (von Hippel, 1986). Later on, the open-source movement reinforced the user innovation paradigm. With open source, users take an active role in innovation processes; they test and modify existing products and even develop and design new ones (Raasch et al., 2010), then freely reveal their designs and modifications to others.

For the last decade, the rapid development of communication technology has provided new opportunities for customers and end-users to be more involved and active in expressing needs, giving feedback and participating in the development of products and

services. This has led to the emergence of “the new form of innovation”, co-creation (Reay & Seddighi, 2012). However, already some years ago, Kaulio (1998) identified three distinct forms of innovation: innovation for, with and by users. Grabher et al. (2008) labelled these as 1) user information, 2) co-development and 3) user innovators. This study focuses on innovation with users and refers to this approach as ‘co-creation’, like Piller and West (2014) do. To use Gemser and Perks’ (2015) conceptualisation, this co-creation is a process wherein users consciously and actively engage in an innovation process and take over activities traditionally executed by an organisation; in doing so, user and organisation interact jointly.

Co-creation is also an interesting concept in the public and third sectors. Many authors, such as Voorberg, Becker and Tummers (2015), Selzer and Mahmoudi (2013) and Hennala (2012), acknowledge how innovation management theories like co-creation fit different contexts, including the public sector and non-profit organisations, and how the techniques and tools for implementation are similar or the same. Co-creation, therefore, is a valid approach for different types of organisations. This is important as many innovations are developed as networks consisting of public and private organisations (Leminen, 2015; Battisti, 2014).

Despite booming academic interest and the widely acknowledged importance of the user’s role in innovation, co-creation is not a commonly understood, accepted or implemented innovation approach in business, industry or policy (Gamble, Brennan & McAdam, 2016; Gemser & Perks, 2015; Reay & Seddighi, 2012; Bogers et al., 2010). This is surprising in the light of co-creation´s promise. In general, the research suggests that user involvement may generate benefits such as faster development times, better fit for user´s needs, reduced uncertainty and improved acceptability in markets (Gemser & Perks, 2015; Kristensson, Gustafssons & Archer, 2004). In addition, users may generate valuable and unpredictable ideas compared with expert developers and this way provide inspiration to innovation process (Kristensson, Gustafssons & Archer, 2004).

Although the promise of co-creation makes sense and is appealing, the practices are still developing. Most of the practices focus on user communities around certain firms. (Gemser & Perks, 2015). For example, toolkits (von Hippel, 2001), brand communities (Füller, Matzler & Hoppe, 2008) and idea competitions (Piller & Walcher, 2006) are popular concepts in the field of user innovation.The possibilities, for instance new communication technologies, for involving users are emerging, such as social media and soft-GIS (Kahila & Kyttä, 2009).

Where self-organizing is perceived insufficient, policy measures are one way to advance certain approaches. The implementation of policy measures to support the user role in innovation is most notable in Denmark and Finland, where nation innovation systems are actively supported with user-driven innovation. In Finland, for example, a user-driven innovation policy launched in 2011 that incorporated different actions to promote competencies and platforms related to enhancing user involvement in innovation (Timonen & Repo, 2014).

One of the most visible and noteworthy phenomena related to promoting the user role in innovation is the living lab movement. Living labs mainly relate to the use of information and communication technologies in different industries or domains such as energy, media and construction (Schuurman, 2015; Almirall & Wareham, 2012). The European Network of Living Labs was established in 2005 during the Finnish presidency of the EU. The aim was to re-conceptualise or update the innovation process to correspond to the networked reality of the world (Schuurman, 2015; Higgins & Klein, 2011). Nowadays, there are several hundred living labs operating worldwide, mostly in Europe. The coordinating body, the European Network of Living Labs, is expanding with support of the European Commission. Because user involvement in innovation is not a well understood concept, however, measuring the effects of living lab activities is difficult. Although the movement is expanding and gaining new members, nearly 40 percent of living labs are inactive and this number is likely to be underestimation (Schuurman, 2015). Reasons for inactivity, according to Schuurman (2015), are lack of funding and lack of interest. Other reasons can be suggested as well. Research among living labs by Mulvenna and Martin (2011) found out that half of the respondents had difficulties in engaging users and approximately 60% had difficulties in transferring user´s contributions to product- and service developers. Therefore it seems that the organisation of innovating with users requires more attention.

To solve complex societal and scientific challenges, organisations need to move beyond their boundaries and engage in collaborative networks (Reypens et al., 2014) and light of previous discussion, users should be included in these collaborative networks. This study attempts to clarify and improve understandings of the co-creation phenomenon and how it can be organised. This objective resonates with Cooke (2001), who states that interactions should be promoted between actors that have good reasons to interact, such as between firms and universities or research institutes, or between small start-up firms and larger firms.

1.2 Research gap

Despite increasing academic interest and wide acknowledgement of users' importance in innovation (Bogers et al., 2010), user co-creation in innovation has yet to be understood, accepted and implemented en masse (Gamble, Brennan & McAdam, 2015; Gemser & Perks, 2015; Reay & Seddighi, 2012). The user perspective is largely absent in innovation studies, most notably from the economic geography viewpoint (Grabher et al., 2008). Co-creation, understood as a stance between producer and user innovation, is an emerging research field (Gemser & Perks, 2015; Piller & West, 2014; Grapher et al., 2008) that has not gained much attention in innovation studies (Piller & West, 2014). Therefore, this study aims to fill this major gap in the innovation literature. Besides contributing to the overall lack of studies on the subject, specific research gaps will be identified.

First, most research on co-creation to date approaches the concept as a dyadic relationship between user and producer in the context of new product development (Gemser & Perks, 2015), typically focusing on firms' perspectives on how to benefit from co-creation (Piller & West, 2014: Bogers et al., 2010). Few studies examine co-creation from a network (specifically, innovation networks) viewpoint (Gemser & Perks, 2015), a surprising shortcoming considering the nature of innovation is networked and interactive (Garud et al., 2013; Bessant & Tidd, 2007). Based on this, it is obvious that the interrelations between co-creation and innovation networks require clarification.

Second, many recognise the need to study the process of co-creation with users (Greer & Lei, 2012; Barczak, 2012; Weber, Weggeman & Van Aken, 2012). This means asking 'how' questions (Weber et al., 2012). The exchange processes within networks are critically affected by the nature of the knowledge and information being transferred (Fritsch & Kauffeld-Monz, 2008); as such, the need exists to study co-creation as an interaction. Hewing (2013), for example, call for studies of micro-processes that examine collaboration and communication in networked settings. Sörensen, Mattson and Sundbo (2010) call for practically applicable knowledge about interactive innovation processes. These demands indicate that the nature of user knowledge or input requires examination in detail (Ooi & Husted, 2014; Selzer & Mahmoudi, 2013; Bogers et al., 2010).

Third, in the field of co-creation, different innovation intermediaries have emerged (Piller & West, 2014), one of them being living labs (Schuurman, 2015; Leminen, 2015; Almirall & Wareham, 2012). User-involving approaches to innovation have been reported to create new demand on brokers (Parjanen et al., 2011). There is a need to study how living lab networks are facilitated (Leminen, 2015) and for studies to unveil the phenomenological diversity related to innovation activities associated with living labs (Katzy et al., 2012). Although knowledge forms the core of current innovation processes, there is a lack of research on how user knowledge is brokered (e.g. Kallio [2012] calls for research on the different types of knowledge being brokered). This demonstrates the demand for studies on the links between co-creation and brokering.

Fourth, most research to date concentrates on highly specialised and skilled 'elite' users such as lead users, hobbyists and professional users (Raasch et al., 2010; von Hippel, 1988). Little research has focused on 'ordinary' users like citizens (Gemser & Perks, 2015; Voorberg et al., 2015). More research, therefore, is needed if ordinary users as participants in innovation are to be understood (Voorberg et al., 2015).

1.3 Research objectives and question

The main objective of this study is to better understandings about co-creation with users as an innovation form and examine its potential and the ways it can be executed. As the interest lies in the processes that enable co-creation, this study examines the relationships between three innovation-related concepts: co-creation, brokering and innovation networks. Thus, the main research questions is:

How are co-creation, innovation networks and brokering interrelated in the context of innovating with users?

The study will approach this research question by examining the interrelations between co-creation and brokering, networks and brokering and co-creation and networks. This work consists of two parts: the first summarises key theoretical points, the current research design, methodology and results and presents a discussion and conclusions. The empirical evidence reported in this study draws from published articles, which form the second part of the dissertation. Figure 1 shows their relation to the research question.

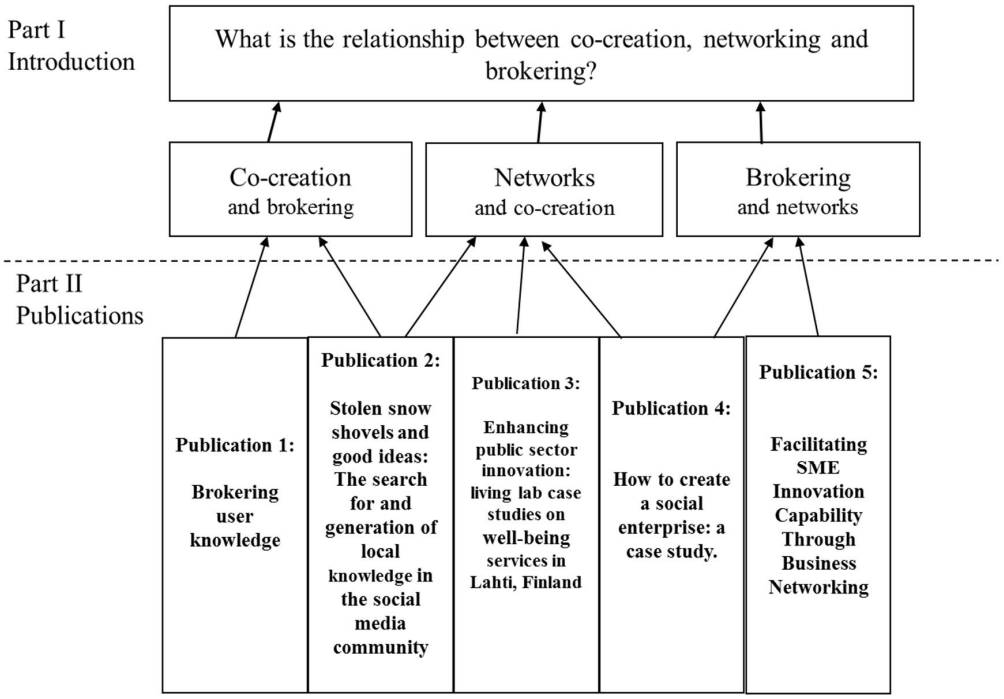

Figure 1. Structure of dissertation.

Table 1 provide an overview of the articles. Publication I maps the empirical territory of the living labs and achieves an overall picture of how co-creation is perceived by regional innovation organisations in Finland. It analyses different brokering strategies of living lab initiatives, thereby contributing to understandings of the interrelation of co-creation and brokering.

Publication II takes a deeper look at the fundamentals of co-creation. This study examines interactions between citizens and developers in a social media group that was introduced as part of a neighbourhood regeneration project. This study contributes to the literature on co-creation and brokering interrelations.

Publication III is a multiple case study that examines the processes and outcomes of cases in a living lab. The study develops a technology sourcing mechanism framework for the user knowledge context and applies it to the living lab cases, ultimately identifying different levels of outcomes. This study contributes to the literature on the interrelation between co-creation and networking.

Publications IV and V both study networking and the function of co-creation in these processes. Publication IV examines the networking process in creating a new business venture. The empirical study in this article examines how a community creates and com-

mercialises a new welfare service for their own purposes and benefits. Publication V focuses on small- and medium-sized enterprise (SME) networks and their ability to participate in innovative processes directed at new value creation. This empirical study examines the emergence of a business network consisting of five companies and how they collectively approach their end-users.

Table 1. Overview of publications in Part II

Publication	Research question	Theoretical perspectives	Empirical context	Research design	Key Findings
Brokering user knowledge	What kind of brokering can be identified from living lab schemes?	User knowledge brokering	Living lab initiatives in Finland	Multiple qualitative case study	The study revealed the lack of direct contact between users and developers.
Stolen snow shovels and good ideas: The search for and generation of local knowledge in the social media community	How can online citizen communities support open innovation practices in the public sector? What kinds of contributions are produced through social media platforms?	Open innovation in public sector Online communities	Suburban development programme in Lahti, Finland	Experimental research setting in which interactions and contributions in Facebook groups dedicated to urban development activities were studied.	The study showed the networked nature of citizen participation. The study emphasize citizens' capacity for meaningful contributions.
Enhancing public sector innovation: living lab case studies on well-being services in Lahti, Finland	What kinds of outcomes can be obtained from living lab – activities focusing on public sector innovativeness?	Living labs Public sector innovation	Living lab cases conducted in Lahti living lab.	Multiple qualitative case study	The study identified four different outcome categories for living lab cases.
How to create a social enterprise: a case study	How can social entrepreneurship be fostered?	Social entrepreneurship, Social enterprises Living labs and user entrepreneurship	Business idea search-process for social enterprise	Qualitative single case study	The study found similarities between the studied social venture process and user entrepreneurship –model. They both emphasized extensive interaction with the user community.
Facilitating SME Innovation Capability Through Business Networking	How can SME´s ability to participate in innovative process geared towards new value creation be supported?	User involvement, open innovation and networks Network formation and brokering	Formation of suburban development network	Action research	New understanding of how SME innovation can be promoted through facilitated network development

1.4 Definitions

Given the heterogeneous terminology in the field, the key concepts used in this study are explained, defined and summarised here.

Co-creation. Co-creation is defined as an interactive social process between co-creators across and embedded within co-creation environments (Ind & Coates, 2012; Roser et al., 2013).

Innovation networks. Innovation networks are defined in this study as loose, temporal constellations that seek to explore a given opportunity.

Brokering. Brokering in this context describes knowledge brokering. This is defined as intermediating between otherwise disconnected pools of ideas (Hargadon, 2002; Verona, Prandelli & Sawhney, 2006).

User knowledge. This study uses the term 'user knowledge' to describe any user generated input to the innovation process.

1.5 Scope and limitations

This study focuses on co-creation with users in a broad-based innovation context within specific scopes, resulting in certain consequences.

The scope of the study focuses on users considered as citizens—crowd or layman—who in the literature are sometimes called ordinary users (Gemser & Perks, 2015). In co-creation-related literature, co-creators can be firms (Oliveira & Hippel, 2011), consumers (Jeppesen & Molin, 2003; Janssen & Dankbaar, 2008), professional users like blue-collar workers in factories, highly skilled specialists (von Hippel, 1986; Buur & Matthews, 2008) or lead users such as dedicated hobbyists (von Hippel, 1986).

Business-to-business (b2b) interactions, relationships and networks are excluded from the research scope. This follows current research trends which tend to separate b2b relationships and business-to-consumer (b2c) relationships (Gemser & Perks, 2015; Greer & Lei, 2012; Bogers et al., 2010; Pynnönen, 2008).

The rationale for focusing on co-creation and user participation is both philosophical and pragmatist. The philosophical rationale refers to people's right to participate in decision making that concerns their lives. The pragmatist rationale sees participation as an instrumental approach to achieve better performance and better outcomes (Parkers, Scully, West & Dawson, 2007). The scope of this study is management, and therefore its focus is on the pragmatist rationale of co-creation. Consequently, democracy, inclusion (and exclusion) and power were left outside the study. Power has been noted as missing from most innovation studies (Nordlund, 2009), a dominant perspective in the public sector

(Arnstein, 1969; Majamaa et al., 2008) and an important part of regional development (Christopherson et al., 2008).

Finally, intellectual property rights and ethics such as individual privacy are not addressed in this study. Intellectual property rights, while an important aspect of innovation (particularly technological innovation), were excluded from the present examination because they were not found to be relevant during the empirical investigations.

2 THEORETICAL BACKGROUND

'It's really hard to design products by focus groups. A lot of times, people don't know what they want until you show it to them' (Steve Jobs).

2.1 User co-creation in innovation

Co-creation is a term with multiple meanings. Co-creation as a term is used in several disciplines, including marketing, innovation management, information systems, design and public management. Roser et al. (2013) define co-creation as an interactive, creative and social process between stakeholders, initiated by a firm at different stages of the value creation process. According Gebauer, Johnson, & Enquist, (2010), co-creation of value includes different activities: transfer of labour (such as self-service), customer emotional engagement, enhancement of customer experience, problem-solving and co-design (Gebauer, Johnson, & Enquist, 2010). Gemser and Perks (2015) and Ind &Coates (2013) conceptualise co-creation to innovation. This means creating new things that are more relevant, quicker to bring to the market and more inventive than innovations by expert-driven research and development activities (Ind & Coates, 2013). In general, the construct of co-creation is still emerging (Ind & Coates, 2013). Terms such as co-creation, participatory design, user involvement and social innovation are used randomly and, in some cases, interchangeably.

According to Gemser and Perks (2015), co-creation can be defined as a process where users consciously and actively engage in an innovation process and take over activities traditionally executed by an organisation, so the user and organisation interact jointly. Roser et al. (2013) adds co-creation environment to their definition, which defines co-creation as a dynamic and interactive social process between co-creators across and embedded within co-creation environments (Roser al., 2013).

Mahr et al. (2014) describe customer co-creation as co-production of knowledge that is valuable for a firm's innovation process. Per this definition, customer co-creation is a communication process between users and innovation teams about innovation-related issues such as ideas and user needs (Mahr et al., 2014). Co-creation differs from traditional marketing research techniques, which are static and controlled so that they do not allow new ideas or unexpected needs or ideas to emerge (Witell et al., 2011; O'Hern & Rindfleisch, 2010).

As knowledge is the central ingredient for innovation, users are considered as knowledge co-creators: they are present and involved in some or all phases of the development process and act as knowledge sources and creators (Magnusson et al., 2003; Grabher et al., 2008). Users create and evaluate ideas and develop services as experts together with professional developers (Edvardsson et al., 2006). The most important characteristic of the user is the ability to express their experiences (Grabher et al., 2008).

Currently, several empirical studies speak for co-creation with users. Studies have shown that co-creation is a suitable choice when market needs are heterogenous and products differentiated (Sánchez-Gónzalez, 2009; von Hippel, 2005; Jeppesen & Molin, 2003). Recent empirical studies indicate that users create more novel ideas than do professionals (Poetz & Schreier, 2012; Nishikawa et al., 2013; Witell et al., 2011; Magnusson et al., 2003). Professionals in these studies were engineers, marketing and design professionals or persons employed to conduct, for example, new product development. A recent study by Mahr, Lievens and Blazevik (2014) found that knowledge co-creation has a positive impact on any success outcome. This was particularly the case in prototype testing. Nishikawa et al. (2013) found that, compared to designer-generated products, user-generated products yield three times higher sales revenues and four times higher gross margins. They also observed that user-generated products were more likely to survive in the market for the whole observation period of the study (three years from the launch of the product).

Despite these encouraging research results and the overall agreement on user importance, scholars warn that active user involvement is not a simple approach (Poetz & Schreier, 2012; Nishikawa et al., 2013) nor an easy approach. Threadless and Muji (Nishikawa et al., 2013) are examples of firms that have actively engaged customers for a long time. Hienerth, Keinz and Lettl (2011) studied the evolution of user-centric business models in three firms (Lego, IBM and Coloplast). They found that their initiatives were protected from financial performance measurement indicators and instead were evaluated via 'softer' measurement instruments such as gains in reputation. The authors identified barriers in the organisations, such as inertia (known as 'not-invented-here') and fear of losing control.

User-oriented approaches have also raised critiques. Customer needs are often unarticulated (De Moor et al., 2008; von Zedtwitz & Gassmann, 2002) and determined by idiosyncratic perspectives. Frosch (1996) suggests that customer inputs for innovation are risky in the sense that they can be myopic, narrow and frequently wrong. Users do not necessarily know their needs, wants or values, and they are not able to articulate needs, preferences and wishes (De Moor et al., 2008). The current understanding is therefore that users are complementary to firms internal activities (Poetz & Schreier, 2012; Nishikawa et al., 2013)

Some efforts to provide models or frameworks for co-creation can be found in the literature. Durugbo and Pawar (2014), for example, offer a mathematical model that builds on involvement strategy and technique selection. For technique selection, they refer to technologies such as social media, mobile phones and webpages for use as co-creation platforms. Their involvement strategy refers to methods of persuasion made to attract stakeholders to perform co-creation. Wong et al. (2014) propose a co-creation framework consisting of four steps: opportunity, community, collaboration and culture. In this framework, opportunity refers to establishing opportunities to participate in co-creation; community refers to the initiation of interactions between different participants; collaboration occurs when problems and challenges can be solved collaboratively; and culture is the result of the previous steps in the organisation.

2.2 User knowledge

Knowledge is one the most important elements of innovation (Bogers et al., 2010; Sammarra & Biggiero, 2008; Bessant & Tidd, 2007). User knowledge stems from their own use of products and focuses on their own needs (Chatterji & Fabrizio, 2012). Knowledge accumulated through extended use can enable users to identify unmet needs and opportunities and generate possible solutions. Based on this experiential knowledge, users can have an enhanced ability to envision various solutions, foresee potential implementation obstacles and rule out inferior alternatives (Chatterji & Fabirizio, 2012). In this way, user knowledge can be divided into problem-based or solution-based knowledge (Ooi & Husted, 2014; Poetz & Schreier, 2012).

In general, knowledge exists in two categories: explicit and tacit. Explicit knowledge is codified and can be expressed by words and numbers, making it shareable by IT systems, for example. Tacit knowledge, in contrast, is produced through recreation and human experiences. Tacit knowledge can also be viewed as intuition, beliefs or values that reside in the human mind, behaviours and perceptions. Tacit knowledge is embedded in routines, processes, values and procedures (Von Krogh et al., 2004).

Ooi and Husted (2016) suggest that the key characteristics of user knowledge are complexity and uncertainty. Complexity comes from users' tacit knowledge, which includes skills, needs, usage experiences and solution-related knowledge. Uncertainty refers to the degree to which user knowledge is available and sufficient (Ooi & Husted, 2016). When customer-desired value and changing preferences are examined, research becomes future oriented. The problem with customer value and future orientation, however, is that they are not exact (Pynnönen, 2008). Kohlbacher (2008) points out that it is often assumed that knowledge is 'out there' and only requires collection; in practice, required knowledge is not simply 'out there', ready to be collected and processed by the firm, but actually needs to be identified and even, to some extent, created.

Tacit knowledge loses valuable nuances as knowledge is codified and transferred. However, the deficiencies of tacit knowledge can be solved methodologically. Explicit knowledge can be shared by language and written documents, whereas the transfer of tacit user knowledge requires face-to-face interactions (Von Krogh et al., 2000). Tacit knowledge (or parts of it) can be communicated through prototyping, drawing, demonstrating and expressing ideas through metaphors and analogies (Leonard & Sensiper, 1998). Tacit knowledge needs spatial proximity to knowledge and innovation agents, as it has to be communicated face-to-face. The level of tacitness also affects whether user inputs are codifiable, observable and transferable (Grant, 1996).

Von Hippel (1994) describes user knowledge as 'sticky', meaning it is difficult to transfer. He reports user knowledge as costly to transfer because it is difficult to codify and easy to lose relevant nuances. Szulanski (1996) proposes nine variables to predict knowledge stickiness. They are: causal ambiguity, unproven knowledge, lack of source

motivation, lack of source credibility, lack of recipient motivation, lack of recipient absorptive capacity, lack of recipient retentive capacity, barren organisational context and the arduous relationship between source and recipient.

Grabher et al. (2008) suggest that the most important user characteristic is the ability to express gained experiences. Conversation provides a natural knowledge capture; given that customers are in their natural environment, informally introducing their perspectives to those of the firm's employees prompts new insights and ideas to emerge (Lundkvist & Yakhlef, 2004). Further, users who do not have a deep understanding of limitations like technology constraints or service production logics can make rather radical ideas—according to research, 'ordinary' users who were not technologically biased generated the most valuable ideas in the mobile service context, while product developers and advanced users in the same context offered more realisable ideas (Kristensson & Magnusson, 2010; Kristensson, Gustafssons & Archer, 2004). Mahr, Lievens and Blazevic (2014) found no evidence in their study that close ties between firms and customers alone inhibits the co-creation of novel knowledge. Rather, this occurs when co-creation takes place through face-to-face channels.

In the case of users, producers and codifiers of knowledge have been the subject of much study, but the recipients of such input have not attracted much interest. The quality and accuracy of codifying knowledge is only a half the issue. Recipients' cognitive abilities, orientation knowledge, interests, motivations, attention, emotions and prejudices all affect how input is taken. The producers and transmitters of knowledge have limited influence on the extent to which their knowledge is accepted or interpreted elsewhere (Meusburger, 2008).

2.3 Innovation networks

Market and technology complexity lead organisations to perform innovation activities in collaborative innovation networks (Reypens, Lievens & Blazevic, 2016). As Bessant and Tidd (2007) explain, innovation is not a solo act but a multiplayer game. No single organisation can possess all the required expertise, resources and knowledge to solve today's complex problems or provide complex product and service systems. As such, networks have become a way to access necessary knowledge (Sammarra & Biggiero, 2008; Brenner, 2007).

Types of networks include communities of practice, spatial clusters, consortiums, R&D alliances, supply chains, innovation ecosystems, clusters and regional innovation networks (Bessant & Tidd, 2007). They differ from each other according to characteristics such as participants, location, intensity and formality. Jepsen et al. (2014) divides collaboration networks in two: exploitation of the existing knowledge base and exploration of new opportunities. Exploitation requires close collaboration with the same network partners, while exploration networks are volatile and network partners change.

In general, innovation networks are loose, wide networks that typically do not require agreements. Innovation networks are often formed voluntarily, have low density and lack hierarchical control (Dhanaraj & Parke, 2006). In these networks, informal communication seems to be important. Brenner (2007) shows that formal cooperation between firms is less important than informal communication in knowledge transfer.

Sammarra and Biggiero (2008) studied technological, market and managerial knowledge in innovation networks in the aerospace industry. They found that technological knowledge is the primary type of knowledge exchanged by partners and is exchanged more often than market and managerial knowledge. Market knowledge typically refers to competencies and know-how about customer characteristics, preferences and needs (Sammarra & Biggiero, 2008).

In the field of co-creation, living labs are defined as a specific type of innovation network (Nyström et al., 2014; Leminen & Westerlund, 2012; Dekkers et al., 2003). Living labs have other meanings as well such as knowledge generation platform (Bathelt & Cohendet, 2014) and intermediaries of open innovation (Gascó, 2017, Almirall & Wareham, 2012). Some scholars see living labs as an innovation method (Dell'Era & Landoni, 2014). Leminen (2015) conceptualises living labs as three elements: living labs are networks; they consist of varying user and stakeholder roles; and they generate and pursue different types of innovation, including tangible (e.g. products, systems) and intangible (e.g. knowledge, practices) outcomes.

The living lab was originally an R&D method developed by William Mitchell in the early 1980s at MIT. In the beginning of the 21st century, the living lab phenomenon started in Europe with the idea to promote end-user involvement in innovation, especially in ICT, to close the gap between research and innovation. The European network of Living Labs was established in 2005 during the Finnish presidency of the EU. The aim was to re-conceptualise or update the innovation process to reflect the networked reality of the world (Higgins & Klein, 2011). While the living lab network is growing, the concept has been criticised as a vague, merely catchy idea (Higgins & Klein, 2011).

In the academic literature, the living lab is an emerging theme, and connections between innovation theories and practice (i.e. living labs) have been made. For instance, Schuurman (2015) linked living labs with open and user innovation discussion; living lab typologies have been identified (Leminen, 2015); a variety of methodologies used in living labs have been mapped (Dell'Era & Landoni, 2014; Almirall, 2012; Pallot et al., 2011, Mulders & Stappers, 2009); and some empirical case studies have been reported (Nyström et al., 2014; Ståhlbröst, 2008).

Living labs focus on mediating between different actors capturing and codifying user insights in real-life environments (Almirall & Wareham, 2012). Mulder and Stappers (2009) studied the user involvement methodology in living labs. In the service or product idea generation phase, traditional methods such as focus groups and surveys are common.

Virtual or online versions of these methods also exist. Mulder and Stappers (2009) concluded that the 'living' part of the living lab is missing. With this, they called for closeness to users and emphasis on the fuzzy-front end of the innovation process. Pallot et al. (2008) described in their landscape model the variety of user knowledge sourcing methods in living labs. They divided the landscape into two main approaches: objective research and participative research.

Schuurman (2015) studied living labs and proposed a three-level model to describe them. At the micro level, the living lab concerns user involvement methodologies; at the meso level, it discusses innovation projects; and at the macro level, it concerns public and private people partnerships and knowledge transfer between different organisations. Schuurman linked living labs to open and user innovation research, concluding that living labs embody both research paradigms.

Leminen (2015) sought to understand networks, user and stakeholder roles and outcomes generated in living labs. He found that living lab networks tend to achieve their outcomes without strict coordination and management. Network participants adjust and balance their mutual and individual goals in living lab networks and this ensures the participation in innovation activities.

2.4 **Brokering**

Intermediaries are important actors in innovation networks, yet they are often excluded from research that focuses on the relationships between firms in innovation networks (Winch & Courtney, 2007). The term 'broker' can be used to refer to these intermediaries. A broker is an agent between two or more parties in any part of the innovation process (Howells, 2006; Burt, 2004; Winch & Courtney, 2007). Brokers are important because they facilitate opportunities between otherwise weak ties. Simply put, they build connections between actors who otherwise would not have any connection (Burt, 2004). Contemporary society is full of existing and potential relationships between actors, people and organisations (Broekel & Binder, 2007), and the broker's role is to make those relationships a profitable reality. Brokering may take place within organisations as well as between different actors among regional innovation systems and networks (Parjanen, 2012).

Brokerage occurs when one actor serves as a bridge between two other actors who themselves lack a direct connection. According to Winch and Courtney (2007), there are different types of brokers: brokers who are intentionally set up to perform brokerage, and organisations that act as broker in addition to their principal activity. For networks partners such as innovation network consultancies, trade associations, universities and other science partnerships are important because they act as neutral knowledge brokers (Bessant & Tidd, 2007). Kirkels and Duyesters (2010) found that the most influential brokers were non-profit and science-sector actors with long track records in their respective branches.

Brokers are assigned many tasks, including demand articulation, network composition, innovation process management, foresight and diagnostics, scanning and information processing, knowledge processing and combination, gatekeeping, testing and validation (Howells, 2006; Lente et al., 2003). Agogué et al. (2013) suggest that brokers could be valuable initiators and contributors in explorative networks seeking radical innovations. Parjanen (2012) argues that a brokers' main task is to reduce distances between heterogeneous partners. Distances can be geographical, cognitive, communicative, organisational, functional, cultural, social or temporal. According to Parjanen (2012), these distances inhibit innovation potential, and brokering is the key activity towards unlocking this innovation potential by crossing the distances.

Living labs are said to be innovation intermediaries because their role is to advocate user involvement in innovation processes (Leminen, 2015; Almirall & Wareham, 2012). Gascó (2017) and Van Geenhuizen (2016) both studied brokering in living lab networks. Van Geenhuizen (2016) studied living labs as a broker in the healthcare sector. According to her case study evidence, the critical factors of living labs were 1) adequate user-group selection and involvement, 2) balanced involvement of relevant actors and 3) sufficient and early attention to management and user values. Gascó (2017) studied living labs as public, open innovation intermediaries, finding that living labs connect individual and organisational users, support and facilitate the exchange of ideas and knowledge and provide (for the most part) technological training. The studied cases were public–private partnerships, but the organisations did not collaborate in the actual innovation process. The individual users (i.e. citizens) did participate and this activity was growing, but the role of universities and companies was unclear.

2.5 Summary

Generally, there is consensus in extant literature that innovations are born through collaborations with different stakeholders. Similarly, the importance of users, particularly lead users, as a source of innovation has been acknowledged. However, the role of ordinary users has been more contentious, although certain extant studies support using them. Users are considered to be rather independent, and it seems that current extant research focuses on users´ interactions among themselves.

This study's framework is presented in Figure 2. Technological knowledge is the dominant type of knowledge transferred within networks, and although users' unserved needs may provide innovation opportunities and promote networking, the interplay between innovation networks and users remains unclear. Although different methods and tools exist for involving and studying users, user knowledge remains a challenging topic of study. Garud et al. (2013) explain that innovation processes are complex, and that one source of this complexity is the interactions between innovators, technology and users, typically generating multiple and conflicted input from different actors. Unlike technological knowledge, user knowledge is more versatile and may require specialised

mechanisms for knowledge transfer. As Tidd and Bessant (2007) have expressed, interactions here are about knowledge flow and the ways in which knowledge is linked and exploited to make innovations happen. This may necessitate specialised brokering functions.

Contemporary society is full of existing and potential relationships between people and organisations. Innovation potential exists in these networks, and it is around this potential that brokers work to bring relevant parties together and activate promising links. Users belong to this network of actors in the same way that other participants – such as universities, suppliers and financiers – do. For organisations, co-creation with users means that although end users may exist in their networks, the links require activation.

The question of access to user knowledge also must be considered. Users may exist outside the organisation's operating network and, therefore, cannot be accessed or controlled the way internal resources or existing customers might be controlled. In such cases, networks provide vital access to users. Living-lab networks are one such access point to users, and as such, they are a suitable environment in which to study co-creation.

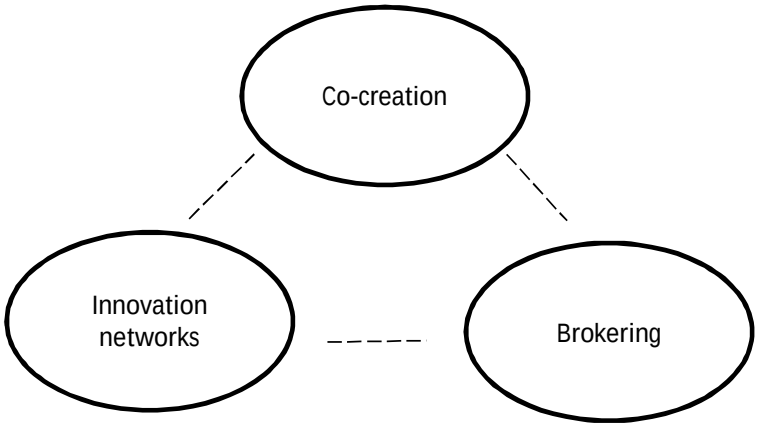

Figure 2. Study framework.

3 RESEARCH STRATEGY

> '*In order to understand something, you have to try to change it*' *(Birkinshaw et al., 2015).*

3.1 Research approach

A research paradigm is, according to Guba and Lincoln (1994), the basic belief system that guides a researcher. At the paradigmatic level, this study builds on constructivism, which aims to understand and reconstruct a studied reality. Its main difference compared to other research paradigms is in ontology. Constructivism assumes that reality is socially and experimentally constructed and includes multiple and even conflicting realities (Guba & Lincoln, 1994). Based on this view, a qualitative approach, experiments and case studies were selected for this study's research strategy.

Experimenting has been suggested as a useful framework when studying complex innovation networks and processes (Sörensen, Mattsson & Sundbo, 2010). Instead of traditional, positivist laboratory experiments, however, Sörensen et al. (2010) see experiments as an approach consisting of a set of methods and data collection techniques. From this view, real-life occurrences (such as the introduction of a new organisational set-up or method) are treated as experiments. The natural experiment enables the investigation of unique experimental set-ups that can only be created by actors in charge of operations. Qualitative natural experiments share some similarities with types of interactive research, such as action research, action learning and reflexive practice, but the experimental approach seeks objectivity (whereas in action research, for example, the researcher actively makes the change).

According to Sörensen et al. (2010), the benefits of adopting an experimental approach in the present context are that it allows the researcher to 1) illustrate how innovation processes can be developed between organisations; 2) procure new and practically applicable knowledge about complex innovation processes; 3) solve real-life problems and lead to innovations; and 4) enable the development and testing of new innovation procedures.

In general, the experimental style has promise in management studies (Birkinshaw et al., 2014), and Gemser and Perks (2015) note that many studies concerning co-creation use an experimental set-up instead of ongoing practice in the real world. In studies of co-creation with users, more traditional experimental set-ups have been used to date, such as the comparative model used by Kristensson et al. (2004) in which two groups, experts and non-experts, generated ideas and then results were evaluated.

In addition to the experimental approach, qualitative research was chosen for the present study. Qualitative research was deemed suitable because the phenomenon under investigation is fairly new and thus knowledge about it is limited. Qualitative methods allow for

the topic, research questions and methods to develop as the research proceeds. The selected qualitative approach also activated the possibility to gain in-depth knowledge from the researcher's direct experience. The research choices made for the present study are presented in Table 2.

Table 2. Research choices.

	Publ. I	Publ. II	Publ. III	Publ. IV	Publ. V
Publication title	Brokering user knowledge	Stolen snow shovels and good ideas: use of social media in sub-urban development	Living lab for enhancing public sector innovativeness: Lahti living lab case	How to create a social enterprise: a case study	Facilitating SME innovation capability through business networking
Context	Living lab initiatives in eight regions in Finland	Suburban development project aimed at developing new ways for citizen participation	Living lab cases conducted in Lahti living lab, Finland.	Business idea development process of four third-sector organisations and their clients	Business network development for SMEs in the field of urban infrastructure
Focus	To study what kind of brokering strategies can be identified from living lab schemes	To study interactions in an open innovation platform	To study living lab projects outcomes	To study the introduction of co-creation as an innovation form	To study the introduction of co-creation as a new tool for business networking
Inter-relation	Co-creation and brokering	Co-creation and brokering Co-creation and networking	Co-creation and brokering Co-creation and networking	Networking and brokering Co-creation and networking	Networking and brokering Co-creation and networking
Research approach	Multiple case study	Experimental Introduction of new platform	Multiple case study	Experimental Introduction of a tool	Experimental Introduction of tool
Level of analysis	Organisation	Interaction	Process	Process	Process

In this study, co-creation was introduced as a new setting for promoting innovation activities. The researcher's role was to introduce co-creation as a tool. This included organising platforms for co-creation and facilitating co-creation events using or mixing different methods. After the introduction and set-up was made, the researcher stepped back and observed the consequences.

For this dissertation, publications were selected for their exhibition of the studied interrelations and how they complemented each other. Publications I and III were based on a multiple case study. In Publication I, the selected cases were participants of a national development network for less-favoured regions in Finland. The participants represented regional innovation organisers such as regional development agencies, universities of applied sciences and universities. All participants were interested in living lab activities.

Publication III examined 14 cases conducted in the Lahti living lab. The cases were selected according to the following criteria: first, the initiative focused on care or another well-being service innovation with an 'owner', whether a public care organisation, a third-sector organisation or a company associated with the public sector. Second, a user knowledge sourcing activity took place. Third, users were ordinary citizens; and fourth, user knowledge sourcing occurred in the early phase of the innovation process.

Three publications, II, IV and V, presented natural qualitative experiments as single cases. Selection of these cases was based on the following criteria: first, the studied setting included ordinary users. Second, the case concerned more than one organisation (i.e. enabled network setting). Third, a new tool or method was introduced. In addition, publications IV and V, empirical setting concerns a network. In publication IV, the studied setting included a network, where the organisations were already familiar with each other. In publication V, the network participants had no prior connections with each other.

As a sum, this study is characterized by deep involvement in real-life occurrences and their observations, which are complemented with multiple case studies. Next, data collection and analysis are explained in detail.

3.2 Data collection and analysis

Experimental approaches can include different methods and data collection techniques (Sörenssen et al., 2010), and as such resemble mixed-method research. In this study, qualitative methods were the main research instruments (as indicated in Table 2 and Table 3). Data collection techniques needed to fit the conditions of real-life, ongoing processes because the data was collected from real R&D projects. Observations and interviews were the main data collection techniques. Company representatives in Publication V wrote blogs and in Publication III used cases from published research articles. Archival data such as research project documentation was also used in publications II, III, IV and V.

Table 3. Data description.

	Publ. I	Publ. II	Publ. III	Publ. IV	Publ. V
Period	Certain situations 09/2010–2/2010	7/2009–11/2010	2007–2012	8/2012–4/2014	1/2009–11/2009
Data	Fourteen structured, recorded and transcribed interviews using a landscape map	Twenty pages of Facebook group discussions Notes and observations from informal conversations with actors, project reports, memos and emails	Project documentation, research articles with case studies, notes, open interviews	Ninety-four pages of project documentation Self-reported blog evaluation report, interviews, field notes and case descriptions Two-hour interviews	Two interviews and 83 minutes reported as blogs Six sheets of self-reported narratives Three network meetings Observations and field notes
Analysis	Qualitative content analysis	Qualitative and quantitative content analysis	Qualitative content analysis	Qualitative content analysis	Qualitative content analysis
Role of the researcher	Empiricist (outside)	Facilitator / observer	Facilitator / observer	Facilitator / observer	Facilitator

Observation and participation

According to Robson (2002), the advantage of observation is its directness. For this it is considered an appropriate technique for studying real life in the real world. Observation revolves around two central elements: pre-structure and the role of the observer. Pre-structuring means that observations can be informal or formal. Informal approaches are when the researcher collects information freely from informants and records it by taking notes. Formal approaches guide which information is gathered and observed, how observations are conducted and the observer only attends previously defined sessions. Formal observation yields higher reliability and validity, but it can lose the complexity and completeness found in the informal approach.

The role of the observer refers to the extent to which the observer participates in group activities. There are two observation extremes: to participate fully and become a part of the group or remain a pure observer with the aim to become as 'wallpaper' (Robson, 2002, p. 314).

The present study (and the included publications) used observation and participation as methods of inquiry. Informal observation was applied, and data was recorded via note-taking. As such, the researcher's direct experience served as an important tool for inquiry. In Publication I, two researchers were involved in the interviews. The author's role was to observe and ask clarifying questions. In Publication II, researchers participated in an online community to facilitate the group. They posted questions and tried to keep conversations alive over the span of a few months. Intentional facilitation was then limited, making the researchers into observers. In publications III, IV and V, researchers participated by facilitating and participating in workshops and meetings held in the studied cases.

Interviews

Interviews are a common data collection technique. In this study, structured interviews and open interviews were used.

Structured interviews were used in Publication I. These interviews resembled a survey, as the answers were close-ended. Living lab landscape dimensions (Pallot et al., 2010) were used as a continuum into which the respondents placed themselves. During the interviews, however, informants were free to discuss and reflect on their choices, thereby providing additional insights for the researcher.

Open or unstructured interviews were used in publications III, IV and V. According to Firmin (2012), open interviews are suitable in five scenarios; namely, when:

- Studying relatively new domains
- The researcher can conduct research in waves or sequences, allowing the researcher to move towards more structured interviews
- The primary goal is depth instead of breadth
- The study concerns ethnographic research involving a lot of shared time with individuals
- The researcher works with articulate people who are given the freedom to contribute more to the studied subject than they would with structured methods.

In publications IV and V, the studied process lasted several months and included meetings and workshops. There were several opportunities for the researcher to interact with primary informants. The process thus enabled situations where it was possible to ask questions and, as the process went on, the interviews were used not only to gain deeper insights

but also to verify observations and conclusions. The events were also discussed retrospectively. The choice of informal interview was pragmatic, as it was more convenient than organising a formal interview setting. The open interviews were recorded as field notes.

Analysis

As is typical with research set in the real world, this study's data collection and analyses experienced some overlap, making them difficult to separate (Robson, 2002). This happened most noticeably in publications IV and V.

The more profound analyses took place after data collection. In all cases, the main analysis strategy was qualitative content analysis (Flick, 2014). The purpose of content analysis is to produce knowledge, new insights and represent facts (Tuomi & Sarajärvi, 2002). According to Flick (2014), qualitative content analysis consists of many different forms, including discourse analysis and thematic analysis. Content analysis is usually carried out either inductively (categorisation based on data) or deductively (categorisation based on prior knowledge).

Analyses in each case were conducted manually. This was convenient as the datasets were reasonable in size and, in some cases, incompatible with the available computational analysis programs (e.g. Facebook data in Publication II). The analysis phases followed the outlines given by Miles and Hubermann (1994). These three phases or streams are data condensation, data display and drawing and verification. Table 4 presents the analysis phases of each publication.

Although each case in this study has its own process, some overarching features are apparent. Most analyses began with the data being read through several times to gain an overall understanding of the content and to identify whether the data should be reduced. A case description was written in chronological order. The research question and framework guided the reduction phase based on extant literature. The selected theoretical framework typically guided the content analysis, e.g., sequences of this framework formed a code. A formal coding procedure was not used because in many cases, conclusions were drawn directly from the research materials (Stake, 1995). Displays and matrices were used to visualise the data. Matrices were used in Publications I and III, and displays drawn from the theoretical framework were used in II, IV and V. In Publication II, data also were analysed quantitatively in that the numbers of participants and input types were tallied from the data.

According to Miles and Hubermann (1994), the verification phase is critical to validity. The meanings drawn from the data must be tested for their confirmability; otherwise, they are merely interesting stories. The principal vehicle of verification in these studies was interactivity, i.e., researchers and key informants discussed and reflected on the conclusions. Finally, all the studies were peer-reviewed and presented at conferences or published in academic journals or books.

Table 4. Principal phases of analysis

Publication		Condensation	Display	Drawing and verifying
I	Brokering user knowledge	Brokering types – framework was used to condense data. Brokering types were codes.	A matrix was developed based on brokering frameworks and each case was placed in the matrix.	The informants reflected on their own landscape during the interview. Categorisation was constantly reviewed against the data and each other.
II	Stolen snow shovels and good ideas: The search for and generation of local knowledge in the social media community	Analysis of one Facebook group. Separation of threads and single inputs Inputs were classified based on their content. Different themes were marked with colours.	Tables to present facts: participant type, input amount and intensity.	Categorisation was constantly reviewed and contrasted against the data and the literature.
III	Enhancing public sector innovation: living lab case studies on well-being services in Lahti, Finland	Case selection based on the criteria	Matrix based on theoretical framework	Discussion and reflection with co-authors and managers
IV	How to create a social enterprise: a case study	Sequences of user entrepreneurship –framework were used as codes	Occurrences placed in correspondence to user entrepreneurship – model	Interaction with key informants and researchers Verification interview with key informants
V	Facilitating SME Innovation Capability through Business Networking	Focal points provided by theoretical framework.	Written case description Tables to summarise key points	Reflections with other participating researchers and key informants throughout the process

3.3 Assessing the quality of the study

Different research frameworks can be used to evaluate and reflect on the quality of research. Given the qualitative nature of this study, evaluative guidance has been sought from Brinberg and McGrath (1985), Guba and Lincoln (1994) and Eriksson and Kovalainen (2008). According to Brinberg and McGrath (1985), research validity must be assessed relative to purposes and circumstances, which differ throughout the research process. They divide research into three stages: pre-study, execution and follow-up. All conceptualise validity differently; namely, as value, correspondence or fit and robustness or generalisation, respectively (Brimberg & McGrath, 1985). Guba and Lincoln (1985) present four different criteria against which the trustworthiness of a qualitative study can be evaluated. These are credibility, transferability, dependability and confirmability.

Credibility is one of the most important factors in establishing the trustworthiness of a given study. Credibility can be evaluated by means of the researcher's familiarity with the topic, the sufficiency of data, how links between observations and categories were made and whether other researchers might draw similar conclusions (Kovalainen & Eriksson, 2008). To begin with researcher familiarity, the present researcher engaged with the topic at hand for several years. The research process started in 2009, and the empirical cases included in the study (publications II, III, IV and V) were conducted as research and development projects with participating organisations and users. The researcher participated in and lived through all the projects, demonstrating the researcher's familiarity with the subject. Concerning the sufficiency of data, this study draws from several empirical settings. Every publication drew from different data and settings, although experiments in publications II and V were included in publication III. The co-creation phenomenon was examined broadly and objectively across Finland (Publication I) in addition to the empirical setting observed in the Lahti living lab.

The credibility of the present study is evidenced by the citations to previous studies and theories. Vignettes and direct quotations from the data are utilised to link data observations, theories and conclusions.

Dependability refers to the overall implementation and documentation of the research process. This study used an uncommon approach—qualitative experimental research—and novel elements such as social media, but relied on well-established data collection and analysis techniques such as interviews, observations and content analysis. Each substudy was reported as thoroughly as possible given the limits of article pages. Study data were documented appropriately and made available to other researchers. The empirical studies were double-blind peer-reviewed and published in different academic publications, adding credibility to the study.

Transferability refers to the extent to which results are applicable in other settings beyond those of the current study's scope. The experimental method adopted in the present study

aims to produce practically applicable knowledge (Sörensen et al., 2010), making transferability a major priority. Transferability was further enhanced by providing clear descriptions of the culture, context, selection and characteristics of participants.

Conformability refers to how well the work's findings represent the results of the experiences and ideas of the informants rather than the characteristics and preferences of the researcher. In this study, the presence of co-authors and the involvement of other researchers in conducting empirical cases and collecting data made the study the work of a research team rather than a single (and therefore susceptible to bias) author. Interaction during the research process was the main instrument for assuring researcher objectivity.

4 RESULTS

The objective of this study was to deepen current understanding of co-creation. The main research question inquired as to the relationship between co-creation, innovation networks and brokering. The question's answer is summarised in Figure 3.

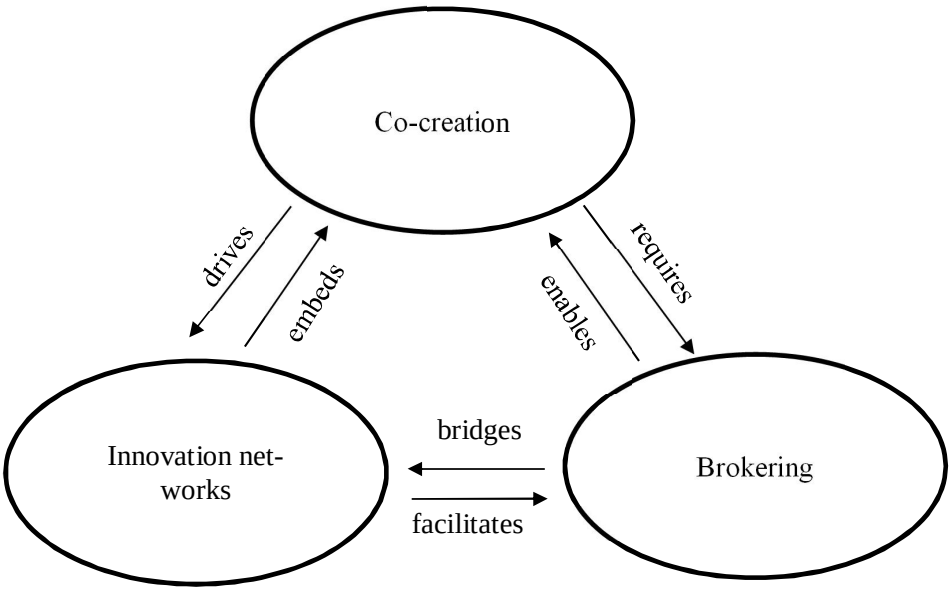

Figure 3. Model of user co-creation.

The model of user co-creation seen here is built around the interrelations between the three concepts: co-creation, innovation networks and innovation brokering. Below, the interrelations are explained in detail based on the empirical findings drawn from the studied publications.

Co-creation and brokering

Co-creation as an innovation strategy may be understood as a process where users consciously and actively engage in an innovation process (Mahr et al., 2014). This process *requires* brokering. Publication I discusses how user involvement is perceived among regional innovation organisers and what kind of brokering strategies can be identified. The results show that most user knowledge in a studied living lab setting is deemed explicit knowledge (e.g. numbers, measurements and digits from user actions). This is consistent with the living lab definition by Almiral and Wareham (2011) but inconsistent

with definitions of co-creation (Roser et al., 2013). Brokering strategies, as a consequence, were found to be adequate for this type of activity and users were rather distant from the developers. Few cases were observed where the user and developer interacted face-to-face, which would meet the co-creation definition of an interactive process (Roser et al., 2013). The study therefore indicates a range of user knowledge included in co-creation. User involvement is seen as a fairly traditional, research-based activity where users are considered an information source.

Brokering *enables* co-creation by establishing and maintaining common co-creation environments. The need to create environment for the co-creation is well acknowledged in previous studies and creating access to users is a vital task. (Gemser & Perks, 2015; Wong et al. 2014; Durugbo & Pawar, 2014). In Publication II, this environment was a social media group; in Publication V, it was a neighbourhood event. In these cases, the main task of the broker was to allow access to users and facilitate interactions between users and organisations. Enabling access and fostering interactions to users are the key functions here, as there may not be existing relationships between users and developers otherwise.

Like Wong et al. (2014) in their model state, initiation of interaction is important. Innovation typically is future oriented (Pynnönen, 2008) and this study it was observed that may be a challenge for interaction. In Publication II, it was observed that issues at hand can be future-oriented and not concrete, which can extend temporal distance between user and developer. This shows particularly well in Publication II, where users reacted to concrete plans and practical issues but not to future-oriented issues. Brokers, therefore, need to possess competencies to reduce temporal distance and facilitate successful interactions between developers and users.

Innovation networks and brokering

Innovation networks cannot be forced, but it is possible to support their emergence and development (Svare & Gausdal, 2015). Brokering *bridges* innovation networks by creating suitable conditions for co-creation and selecting suitable and matching business participants for the network. The common finding from publications IV and V was that the process of organising co-creation with users matters. The overall process, which includes planning and executing co-creation events with users, collects value for the participating organisations as they work together towards co-creation. Publication V showed that these companies saw potential business benefits from interacting not only with other firms but also with their end users. Approaching their mutual end customers jointly was a purposeful process wherein the companies built up their mutual relationships and explored potential business opportunities. In many cases, most notably small organisations benefitted from networks targeting co-creation.

Innovation networks, then, *facilitate* brokering. Publication IV focused on how a community consisting of third-sector organisations and their clients can develop services for itself. The qualitative case study described and analysed the process aimed at creating a

new business venture to tackle a social problem. A series of co-creation workshops were set up as 'fire starters' meant to help the community create, develop and test a new welfare service for their own purposes and benefits. By means of co-creation and participatory methods, business ideas were nurtured from the community and ideas implemented. The actors in this network already had a history of collaboration, but the co-creative process turned the community into an innovation network that produced valuable outcomes (i.e. a new service for themselves).

Co-creation and innovation networks

Innovation networks are typically built around technological knowledge or opportunities rather than market knowledge (Sammarra and Biggiero, 2008). This study, however, suggests that co-creation *drives* the emergence of innovation networks. Possibility to engage with users provides a fertile ground for organisations to seek further collaborative business opportunities with other organisations. Therefore living labs can be more than knowledge generation platforms such as described by Bathelt & Cohendet (2014). This tendency was most evident in Publication V, which discussed the formation of SME networks, and Publication IV, where third-sector organisations established a joint effort to set up a new social enterprise.

Finally, this study suggests that innovation networks are *embedded* in user co-creation. As previous literature shows (e.g. Mahr et al. 2014; Sammarra & Biggiero, 2008), direct contact with users is often the most suitable way to transfer user knowledge. The main finding of Publication III was that living lab cases have different outcomes in categories. The first two categories concern enabling, meaning how access to users is organised. The first category is a window that makes user potential and information visible. These can be online communities, for example, where users interact, discuss and perhaps even generate solutions to problems at hand. In these scenarios, innovating organisations typically do not participate visibly, only observe (as described in Publication II). The second category is access. This refers to online communities, workshops and registers accessible to innovating organisations with the opportunity to interact. The third category, new solutions, refers to the formation of new services or product concepts. This can take place with or without innovating organisations. If organisations participate, they may be more likely to receive more feasible outcomes. The fourth category, new capability, refers to when an organisation gains a new capability and consequently must enact changes in how the organisation operates, such as devising new work descriptions. In Publication IV, innovating organisations wanted to learn how to organise co-creation by themselves, meaning they received a new capability that enabled them to innovate with their users.

Agogué et al. (2013) proposes that in explorative networks, brokers do not merely organise but also contribute to knowledge generation. The role of a broker is to organise co-creation according to real-life principles so the innovating organisation participates in co-creation. As users represent a difficult knowledge source, co-creation requires different capabilities, competencies and techniques than technology developers traditionally pos-

sess. Indeed, understanding users is more learning than measuring; it is more an interpretative process than an analytical one. One of the main tasks of a broker, then, is to determine whether developers will benefit from the presence of users.

5 CONCLUSIONS

5.1 Discussion and theoretical implications

This study's principal theoretical contribution is its novel model for innovating with users, including suggestions about the links between co-creation, brokering and innovation networks. This empirically complemented examination improves understanding of the co-creation processes (Piller and West, 2014; Greer and Lei, 2012; Barczak, 2012; Weber et al., 2012), thereby narrowing the current gap in innovation research.

Co-creation, brokering and innovation networks are separate concepts, but are closely interrelated. In fact, they need to be distinguished so that the value of innovating with users can be understood and enhanced. So far, co-creation has been used to describe any type of user involvement (Gemser & Perks, 2015). Many extant studies concerning co-creation, particularly in living-lab contexts, are rather technology-oriented, and the users' role is merely to provide data. However, co-creation, as a social and interactive process, is a different story. Therefore, this study suggests that to understand and study co-creation fully, a more nuanced view of co-creation is needed. Studies such as de Moor et al. (2008) describe methodologies in terms of how users are studied and how technologies and users interact, but they do not emphasise how knowledge integration with professional innovators takes place. The interaction between users and developers in real-life settings should be the key process in innovating with users.

These results line up with those of earlier studies, e.g., Dahlander and Wallin (2006), which suggested that to benefit from knowledge generated by online user communities, someone from the innovating organisation needs to participate. This study agrees with Battisti (2014) in suggesting that social proximity could be the key factor in living-lab networks. In fact, the absence of innovating organisations might be the reason why transferring user inputs to innovators is so difficult (De Moor et al., 2011; Hennala et al., 2011). Managing proximity between the user and developer could be one solution to these knowledge-transfer problems reported by Mulvenna and Martin (2013) and de Moor et al. (2008).

Extant studies have identified and made visible a range of formal user-involvement methods (Pallot et al., 2010), but these studies are rather silent on the interactions that have taken place between users and developers. As previous research has indicated, face-to-face interactions are an effective way to overcome the issue of 'sticky' user knowledge (von Hippel, 2001), but they require certain brokering strategies and set requirements for professional innovators. Adding a brokering element to studies such as De Moor et al. (2008) would better illuminate the knowledge flows taking place in the living-lab setting.

As for living-lab research, this paints real-life settings in a brighter light. The current living-lab literature approaches real-life settings as disconnected or mainly relating to the

existence of technical infrastructure. However, the present study depicts real-life requirements as fundamental characteristics of value capture in innovation networks that can even enhance user-input validity.

The proposed model links co-creation and innovation networks that previously have been discussed as separate questions (Barczak, 2012). Co-creation to date has been studied as a dyadic relationship between an organisation and a user. This study suggests that it might be beneficial to approach innovations with users as a network. Previous studies have shown how living-lab networks achieve outcomes and collaborations without strict objectives, management or control (Leminen, 2015). It seems that interacting with users or acquiring users' knowledge usually is always beneficial and that participating organisations can benefit from users' inputs independently and/or as a network. This study suggests that the process of acquiring user knowledge can be an important, catalysing phase toward more stable and concrete business networking. Therefore, co-creation with users and living labs can be useful tools in advancing SMEs' networking – particularly networking to create new businesses. This complements the current toolbox, which often centres around technological opportunities and capabilities (Svare & Gausdal, 2015).

The network setting also might help some firms overcome the obstacle of access to users. In some cases, collaboration with public-sector organisations may secure end-users' interest. It seems that people tend to be motivated to participate in public-sector innovation processes (e.g., Hennala, 2012).

The model itself paints a picture in which brokering and networking play crucial roles in innovations with users. The model developed in the present study also might help in assessing and studying the actual value and costs of co-creation. To date, understanding is limited about the costs that accrue from co-creation (Gemser & Perks, 2015). As complementary organisations engage in joint efforts to innovate with users, it is likely to impact the costs of co-creation as well. Given SMEs' well-known resource constraints, and how networking is one way to overcome this obstacle, it is reasonable to assume that innovating with users also may be an operation in which collaboration can be the most viable option.

These findings demonstrate that the empirical studies exhibited as publications in this dissertation add depth to the otherwise shallow pool of empirical studies concerning co-creation (Abbate et al., 2013) and offer practical tools and processes for meeting the demands of Barczak (2012) and Weber et al. (2012).

5.2 Managerial implications

Co-creation has become a popular term in the field of innovation. It is an important approach for both private- and public-sector organisations, but also for the non-profit sector. This study has attempted to demonstrate that co-creation has different meanings, and as such the results of this study may be particularly beneficial when managing different innovation platforms (e.g. living labs and related actors who organise user involvement).

To aid practitioners, the proposed model of this dissertation has been condensed into the following steps:

Confess. It is important to confess your motivation and expectations. If you merely need assurance and acceptance of already-made decisions, this might not be the most fruitful standing point. User knowledge can inspire, challenge and provoke. Like any innovation endeavour, co-creation is a risky business.

Connect. See the bigger picture. Who is interested in and targeting the same users? Innovation networks need to be heterogeneous, but there should be diversity in the network. Attracting users to participate in co-creation may be easier in a network with a specific goal that is meaningful and motivating to users.

Gear up. Co-creation requires an adequate environment, tools, people and partners. There are tens of different formal techniques and tools for user involvement, but make sure that your users are in the environment where they use the product or encounter problems. Whatever the object for development is, visualise it and make it tangible so everyone can understand it.

Get involved. Many innovation teams focus on selecting the right and most capable users. It is equally important to select the right developers (i.e. the ones who actually need and act upon user knowledge). Presence might be the most effective way to benefit from users, so if you want to enjoy the benefits of their innovation, you should dip in. Interaction and real-life experience with users are crucial spaces and places for learning and inspiration that cannot be replaced solely by reporting techniques.

Chew up. Any innovation process will encounter multiple, contradicting inputs. One source of this complexity is that users and user knowledge can be very contradictory. The knowledge might not be useful directly as it is; it has to be 'chewed up', or processed and interpreted by many different people.

5.3 **Limitations**

Like any research, this study had some unavoidable limitations. Any qualitative research faces concerns with generalisability. Sörensen et al. (2010) maintain that the practical knowledge and similar actions that experimental research produces can be equally beneficial in other locations; however, some concerns still merit consideration.

First among these concerns are the cultural conditions in which the empirical studies were carried out. All the publications were conducted in Finland, and except for Publication I, within one region. As such, the underlying context of the study is that of Finnish innovation systems, its actors, relationships and culture. However, it is more likely that in countries with similar cultural conditions, innovation systems and structures take on similar

roles to those observed in Finland when organising co-creation between users and professionals.

Second, the fact that a university operated as a broker in the experiments may have played a role in their success. As user motivations for engaging were not the focus of the study, this aspect remains unclear. This may limit the applicability of the results in circumstances in which only commercial actors are present. Further research is needed to determine whether the broker's status and reputation affect users' motivation to engage in co-creation.

The third limitation concerns the role of the researcher. Although the selected research approach sought objectivity, human researchers still participated in events, thereby opening the results to bias and error. This was carefully taken into account during the research process, particularly in analysis phase, but should be monitored nonetheless.

5.4 Further research

Studies on co-creation offer several interesting research avenues as the research is in very early stage. The model developed in this study provides a framework to study innovation with users.

First, Gemser and Perks (2015) suggest comparing product and service development; building on this, comparisons between public- and private-sector organisational co-creation could be also interesting. Most notably for public-sector innovation, co-creation could be a ground-breaking approach given the special and varied roles of citizens. When private companies and public-sector organisations engage in inter-organisational relationships to provide services to citizens, the two disciplines meet. As the public sector has a rich history of public participation and democracy, users (i.e. citizens) are likely to have different motives for co-creation than consumers. This setting offers an intriguing opportunity to develop the co-creation concept. Further comparative studies might illuminate this matter.

Second, as living labs have existed for over a decade and the body of related research has grown, it would be interesting to study the effects of living labs on regional development, competitiveness and policies. The present study offers building blocks for studying the effects of co-creation in a large-scale, quantitative manner, as has been called for by Gemser and Perks (2015). Following this, studying living labs as part of regional innovation systems and regional development might prove very interesting, as living labs are fundamentally a policy instrument. How do living labs relate to regional development? Do they contribute to exogenous development strategies or do they focus on the endogenous side of regional development? Have the initiatives been successful?

Thirdly, innovating with users is a recent phenomenon in academic circles. However, it would be interesting to study those informal practices that take place in organisations, whether public organisations or firms. This resonates with the ideas of Piller and West

(2014) and Lichtenthaler (2011), the co-creation phenomenon could be researched at the individual level in organisations. Doing so might illuminate how personnel responsible for product or service development actually practice user involvement in their work and what role informal co-creation activities play in the innovation process.

To conclude, many living labs exist and many have died, but the phenomenon of the importance of users continues to grow. As digitalisation makes its way into society at large, new ways to involve users become increasingly possible. So far, we have only seen a glimpse.

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Publication I

Konsti-Laakso, S.
Brokering user knowledge

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Brokering user knowledge

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***Abstract*—Knowledge brokering is a key activity in innovation networks such as living labs. Previous research has acknowledged the multiple roles and tasks of intermediaries and brokers in managing living labs but has not paid attention to the nature of knowledge flow and the distance between the actors that are brokered. This study empirically examines how user knowledge is brokered in living labs as well as the living lab schemes among regional innovation organisers in Finland. Results show that user knowledge is mostly considered explicit knowledge and that users and developers meet rarely in a real-life environment. Brokering distances between stakeholders may be a useful approach in conducting living lab activities.**

Keywords—knowledge brokering, living lab, user knowledge

I. INTRODUCTION

The current understanding on innovation and value generation highlights the role of users or customers as a source of vital knowledge for innovation and innovators [1] [2]. Living labs are advocates of open innovation, and current research defines a living lab as an intermediary that focuses on the mediation between users and organisations capturing and codifying user insights in real-life environments [3] [4] [5]. Two elements are central for living labs: real-life test and experimentation environment and users who are aware that they are involved in the innovation process [6].

The intermediary roles, tasks and activities of living labs have not been widely studied. Some activities and tasks [7], as well as roles [8], of living lab projects have been identified. Research has emphasised the importance of understanding what kind of knowledge is being brokered and how [9]. As the main idea of living labs is to bring users and their knowledge into innovation processes, this study examines how users' inputs, or user knowledge as called in this paper, are brokered. Thus far, little research has examined the type of knowledge being transferred or brokered in living labs. Therefore, this study aims at narrowing this gap. The main research question is as follows: what kind of brokering can be identified from living lab schemes?

This question is examined empirically among regional innovation organisers [9] in Finland. These organisers play a central role in designing new initiatives to foster economic and social development in less-favoured regions in Finland. Therefore, this work contributes to the study on living labs being considered as a regional innovation platform [5].

This paper is organised as follows. First, the literature review presents the current understanding about user knowledge and knowledge brokering. Next, the methodology and the empirical study, in which 14 regional innovation actors were interviewed from eight regions in Finland, are presented. Finally, the discussion and conclusion are given.

II. LITERATURE REVIEW

A. User knowledge

Users are an important stakeholder group in living labs. Typically, users' inputs can be problem-based knowledge (ideas, needs and complaints) and solution-related knowledge, such as prototypes or modifications to existing products [11]. Many different kinds of tools and procedures are used to capture this knowledge [5] [6].

User knowledge in the literature is commonly characterised as tacit [11] and sticky [12]. Knowledge stickiness refers to the difficulty in transferring user knowledge. User knowledge is costly to transfer because codifying it is difficult, and it can lose relevant nuances [12]. Further research has proposed nine variables that are hypothesised to predict knowledge stickiness: causal ambiguity, unproven knowledge, lack of motivation of the source, lack of credibility of the source, lack of motivation of the recipient, lack of absorptive capacity of the recipient, lack of retentive capacity of the recipient, barren organisational context and difficult relationship between source and recipient [13].

Tacit knowledge comprises the skills, ideas and experiences that people possess, but it is not codified and may not necessarily be easily expressed. Explicit knowledge can be shared by language and written documents, whereas the transfer of tacit user knowledge requires other means, such as face-to-face interaction [14]. Tacit knowledge, or parts of it, can be communicated through prototyping, drawing, demonstrating and expressing ideas through metaphors and analogies [15]. The direct interaction between users and the actual product and service developer is considered important because it reduces bias and 'sticky' information [12] [15].

The most important characteristic of users is their ability to express the experiences they have gained [15]. Conversation provides a natural knowledge capture; new insights and ideas emerge as customers are in their natural environment, informally cross-fertilising their perspective with that of firms' employees [17].

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User knowledge can also be explicit. It can come in the form of structured knowledge, such as digits, clicks per website and measurements yielded from the usage situation.

B. Knowledge brokering in innovation networks

Knowledge brokering is one function of intermediation [8]. A knowledge broker can be defined as an organisation or body that acts as an agent or broker in any aspect of the innovation process between two or more parties [18] [19] [20]. A knowledge broker enables the flow of resources, such as flow of knowledge, from where they are to where they are scarce [18]. According to [20], brokers come in two different types: brokers that are intentionally established to perform brokerage and organizations that act as brokers aside from their principal activity. Research has suggested that the most influential brokers are non-profit and science sector actors that have a long track record in their branch [21].

According to [22], the main function of a knowledge broker is to reduce distances. Distances can be geographical, cognitive, communicative, organisational, functional, cultural, social and temporal. Accordingly, [23] and [21] identified five different types of brokerage (Fig 1). These different types describe brokerage behaviour as the facilitation of information flows. In Fig 1, the open points represent the broker, the black spots are the utilisers (e.g. firms) and the grey dots are the users. The circle indicates the group boundaries. Therefore, the broker operates depending on the different configurations in a network.

In the case of user knowledge and living labs, the boundaries represent the distance of the user and the utiliser of the user-generated knowledge. The utilizer here means the actor, such as a firm, that actually innovates. The boundary also represents the real-life environment, which has been found to be important [17]. The broker (white dot) in these types is positioned differently. By definition, the living lab codifies user knowledge [5], thus positioning itself as a gatekeeper or representative of a user group among the knowledge utilisers. However, research indicates that a living lab does not simply function to benefit from user knowledge. Firms need to assign their own employees to operate in online communities to gain access to valuable developments and contributions made in the community [24]. Therefore, the presence of a user knowledge utiliser in the actual community is considered an important mechanism for transferring the user-generated knowledge. Studies considering user involvement, the role of face-to-face interaction and conversations have been emphasised [15].

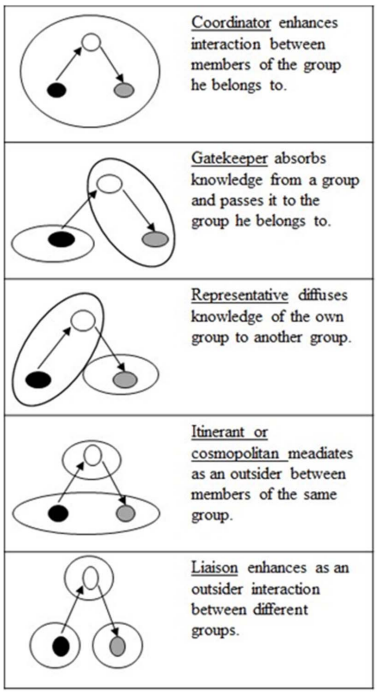

Figure 1. Brokerage types (adopted from [21]).

III. RESEARCH APPROACH

This study was conducted by using a qualitative multiple-case study setting. Data for this study were collected between 2010 and 2011 in Finland. The sample was formed from eight regions belonging to the 'Innovation and Knowledge Network' in Finland. This network was a regional development instrument targeting the less-favoured regions in Finland. In total, 14 interviews were conducted in eight regions. The participating organisations represented the different members of innovation systems: three regionally located university units, three universities of applied sciences, six regional development agencies and one company. These actors can be called regional innovation organisers that play a central role in designing new initiatives to foster economic and social development [5].

To avoid the different meanings and overall 'buzz' about the living lab, structured interviews were used to collect the data. The living lab domain landscape [25] was used as a visual artefact in the interview situation. The set of questions (Table 1) asked aimed to assess the current or the desired positions of the informant along each dimension. The answers were placed on the landscape map, and the informants were asked to self-assess the positions along the four dimensions. The results were discussed with the informant to confirm the accuracy of the map.

The interviews varied at 5–15 minutes. They were recorded and then scripted, resulting in 31 pages of text.

The data were analysed using the manual content analysis technique. The brokerage framework presented in Fig. 1 [23] was utilised to identify the brokering type. In this analysis, only the interview transcripts were found useful. The data were read through several times. Accordingly, the differences in 'spirit' of how the respondents talked about and described user involvement were identified. Tables and matrices were used to reduce and refine the data.

IV. FINDINGS

The analysis initially focused on identifying the types of living lab initiatives according to their functions, as reported in [26]. Four different types or representations were identified, and they were categorised as usability testbed, B2B testbed, undercover testbed and co-creation. These categories are called living lab types. The number of cases and a typical example in each category varying from two to five are indicated in Table 1.

Most of the initiatives build on certain physical environments that can be used for innovation purposes. The results indicate a rather test-bed-oriented thinking among regional innovation organisers, consistent with the classification presented by [27]. The categories also differ according to the phase of the innovation process, type of user input and whether the user was a professional [business-to-business (B2B)] or an 'ordinary' one, such as a citizen, a consumer or a patient.

In the undercover testbed, the users may not even know that they are participating in living lab activities. The reason is that the context of testing is the environment where the user acts, such as mobile service or infrastructure and buildings, and the data can be collected with sensors and automatic measurements. The undercover testbed is not compatible with some of the current living lab definitions emphasising the awareness of users (e.g. [6]), but it is a crucial part of the innovation process. Previous studies have found it to be important for innovation activities [28]. User involvement is indirect, and the main mode of user knowledge is measurable digits. Verbal feedback or interviews are a side product or an additional supplement of user involvement if they are considered. When matching living lab types to the respondents' organisations, regional development agencies focus explicitly on either undercover testbeds or usability testbeds.

Co-creation differs considerably from various testbed approaches. The users of the co-creation living lab participate in the ideation and further development of the solution. Therefore, users are viewed as creators instead of sources of knowledge. Compared with testbeds, living labs are more involved with user groups and social innovations. Moreover, there seems to be more interest in adaptability. Collaboration with users is unstructured: instead of relying on user databases, the participants find that ad-hoc, formal contracts are not made, and users decide by themselves in which projects they want to participate.

Table 1. Living lab types (modified from [26]).

Name	No of cases	Typical example
Co-creation living lab	2	Compared with testbeds, co-creation is more involved with user groups and focuses on social innovations. Moreover, there seems to be more interest in adaptability. Collaboration with users is unstructured and users are recruited ad-hoc –basis. Type of brokerage: Coordination
Usability testbed	5	A company provides a product or a prototype to the living lab to be tested in a real environment. The living lab has access to users, often in the form of a database, and recruits suitable users by using formal contracts. Then, the living lab conducts the usability test according to a predefined plan and reports the results to the company. Type of brokerage: Representative, Gatekeeper, Liaison
Undercover testbed	3	A living lab is an environment where the user acts, such as mobile service or infrastructure and buildings, and data can be collected with sensors and automatic measurements. The living lab is the real environment where the testing takes place. Type of brokerage: Itinerant, Liaison
B2B testbed	2	A prototype of a large-scale technological system is installed and tested in a real-life environment. Occasionally, individual professional users give feedback. Type of brokerage: Itinerant, Collaboration

Brokering types also vary, and a framework is presented in Fig. 2. The coordinator type of brokerage (or efforts towards such a situation) places all three participants (user, developer and broker) in the same space, and a free flow of knowledge and feedback is enabled by all stakeholders in the same space, interacting and reflecting (i.e. learning). University actors particularly showed this tendency in this dataset. These situations were identified implicitly only in two cases, but there were clear indications and intentions that this would be the desired direction.

The liaison type of brokering takes place in cases in which users (e.g. ageing people) test products in their homes. The broker asks for feedback and passes it on to a firm in the form of a report, for example. The liaison type was common in universities of applied sciences.

The itinerant type of brokerage was identified from both universities and regional development organisations. These actors actually did not see that they have a role to play in fostering interaction between users and producers. Either there

Broker type	Example vignettes from the data	Description
Coordinator 	"We did technical changes, then tested and measured changes in a real ship and the captain gave instant feedback how it felt.."	All stakeholders are present in the event, free flow of knowledge between all parties.
Representative 	"User comes to our premises to test solutions and we then pass on the feedback to companies"	Permanent facility or environment, where users can try products. Brokers role is to cofidy user feedback and report it to companies. Interaction takes place between broker and user.
Liaison 	"Aging people live at their homes, test the products there and give feedback. We deliver a report for a company"	Users test or use products in their own environment and broker collects and delivers the results onwards to the utiliser.
Gatekeeper 	" Users use facilities and maybe give some verbal feedback. " " Technology provides the measurement how many visitors received the message and for how many the message can be delivered"	Users participate by generating usage. Users may not be aware that they are involved in living lab activities. Large-scale testing facilities where the focus is on technology reliability issues. Interaction takes place mainly between broker and firm.
Itinerant / Cosmopolitan 	"This has been made in industry for years, asked from those who actually use the machinery" "People like us (software and system developers) have received feedback like it does not go like that but like this.. software and system developers are rarely professionals in nursing, and they should not be, so collaboration like this is screamingly important"	Emphasizes no need for knowledge brokering between user and developer as there is already direct connection between user and developer. Broker promotes this activity as good practices for others.

F

was no need (as the firms were considered to interact with their customers or end-users anyway) or the phase of the innovation was perceived to be too early for user involvement. Some barriers concerning the interaction with users emerged, mainly whether users' inputs are actually reliable, as indicated in the following excerpts:

'...if it is possible to have an active user group, then it can be useful. As they do not contribute any decent feedback, not in any way…(..)'

'...it is a challenge to get information through interviews. It is difficult, and not even large companies have succeeded in that. One example is the Coca-Cola study about Vanilla Coke. They asked people if they would like to have Vanilla Coke, and the people answered yes. However, when the product was introduced into the market, it could not take the share of Cherry Coke or even normal Coke. If they had only asked if they preferred Vanilla Coke to the cherry and the traditional variants…'

These aspect could be the reasons why [29] determined that more than half of the respondents found particularly the co-creation dimension difficult or very difficult in living labs. The results also indicated that a living lab could be perceived as rather difficult to conduct in certain industrial contexts, as intermediaries do not see a role for them in close B2B relationships. However, those who were sceptical about user involvement in the industrial context pointed out that, for example, user involvement would be beneficial in public service development.

In brokering, the representative types were particularly associated with regional development organisations. In these cases, a technological infrastructure, such as broadband with users, could be utilised in innovation processes. The living lab type of activity was considered a means to attract investments and international companies to the region. Thus, the respondents also took a stance as a representative and not as a gatekeeper.

As [25] indicated, the brokerage types are not exclusive but can co-exist. This finding was also noted particularly among actors that focused on method development, such as universities and universities of applied sciences.

V. CONCLUSIONS

This study examined how regional innovation organisers perceived user involvement in innovation and, based on this, identified the different brokering types. The results showed that most of the studied regional innovation organisers perceived user knowledge as explicit knowledge, that is, structured measurements that can be codified and easily transferred.

The findings are consistent with those of [27] but contradict the current discussion on co-creation emphasising the social process, awareness and users' equal and multiple roles in the innovation process [6]. As previous research has identified face-to-face interactions to be an effective way to overcome the stickiness of user knowledge [12] [14] [15], the real-life setting can be beneficial for innovators as well. Real-life settings can be seen as a fundamental characteristic for value capture in innovation networks if it minimises the physical distance between the user and the developer. In some cases, the absence of innovating organisations may be the reason for the difficulty in transferring user inputs to the innovators [2].

This study revealed that direct user involvement is considered challenging, consistent with [29]. Users were perceived as an untrustworthy source of innovation-related knowledge. The scepticism of non-professional users as productive participants and in the quality of their inputs has been raised in studies on public sector development (e.g. [30]). However, little research has been conducted in the field of open innovation, for example.

The key contribution of this study is that it provides a framework for living labs based on different user knowledge brokering types in a living lab setting. The study may help to piece together scattered living lab activities in many domains. The limitations of this study are as follows. First, the global generalisability of the results is limited. However, the sample size in the Finnish context can be considered at least fair. Second, the data gathered have some issues. The chosen interview style and the resultant dataset leave many important and interesting questions without answers. Nevertheless, despite the limitations, this study offers important building blocks for future research on living labs, open innovation and user co-creation.

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Publication II

Konsti-Laakso, S.,
Stolen snow shovels and good ideas: The search for and generation of local knowledge in the social media community.

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Stolen snow shovels and good ideas: The search for and generation of local knowledge in the social media community

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Open innovation

ABSTRACT

This study seeks to address two research questions. First, how can citizen online communities support open innovation practices in the public sector? Second, what kinds of contributions are produced through social media platforms? These questions are examined through an experimental research setting and by analyzing interactions and contributions made in a neighborhood development–oriented Facebook group. This study contributes to the field of open innovation in the public sector by highlighting the networked nature of citizen participation and emphasizing citizens' capacity for meaningful contributions.

1. Introduction

Open innovation emphasizes the conscious effort by firms to incorporate ideas, knowledge and innovations created outside firm boundaries into innovation processes within firms or to send internally-developed ideas or innovations outside the firm for commercial exploitation (Seltzer & Mahmoudi, 2013; Chesbrough & Bogers, 2014). Similarly in the public sector context, private firms, non-profit organizations and citizens are seen as valuable partners in renewal of government administration (Gil-Garcia, 2012) and their knowledge and creativity are sought after in public sector innovation (Nam, 2012; Thapa, Niehaves, Seidel, & Plattfaut, 2015).

In research concerning open innovation in the public sector and, particularly, citizen engagement, crowdsourcing (Brabham & Daren, 2009) or citizen-sourcing (Nam, 2012) and social media seem to be the dominant points of discussion. In terms of reaching outside organizational boundaries for ideas and knowledge, online communities are often associated with open innovation in the private sector (Dahlander & Wallin, 2006; West & Lakhani, 2008). Community can be defined as the voluntary association of actors, typically lacking common organizational affiliation but united by a shared instrumental goal, such as creating, adapting, adopting or disseminating innovation (West & Lakhani, 2008). Online communities have received scarce attention in research concerning open innovation in the public sector. This study examines interaction in open innovation platforms between citizens and public authorities in the early phases of the public sector innovation process. There exists very little empirical research that examines the interaction between citizens and local government in open innovation platforms related to the co-design of public services (Hofmann, Beverungen, Räckers, & Becker, 2013) or knowledge co-production (Nam, 2012) at the local or municipal level (Lev-on & Steinfeld, 2015).

Therefore, it is worthwhile to examine in detail what happens in an open collaborative platform dedicated to public innovation activities. This study seeks to address two research questions. First, how can citizen online communities support open innovation practices in the public sector? Second, what kinds of contributions are produced through social media platforms? These questions were examined in an experimental research setting (Sørensen, Mattsson & Sundbo, 2010) in which Facebook groups dedicated to urban development activities were established. This study contributes to the growing need to understand online communities' and stakeholders' roles, behavior and contributions (Bonsón, Royo, & Ratkai, 2015; Koch, Hutter, Decarli, Hilgers & Füller, 2013) at the local governmental level and encourage local administrators to fully benefit from the contemporary opportunities provided by new communication technologies.

This paper is organized as follows: First, the literature review focuses mainly on empirical studies concerning online communities in public sector open innovation. The empirical section then describes the methodology and empirical setting. The discussion and conclusion summarize the main contributions of this study.

2. Literature review

2.1. Online communities

Community can be defined as the voluntary association of actors, typically lacking common organizational affiliation but united by a shared instrumental goal, such as creating, adapting, adopting or disseminating innovation (West & Lakhani, 2008). Typically in the private

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sector, online communities of end-users are particularly important as their contribution to organization and its innovation activities lies in end-user insight into how products and services are used (Dahlander & Wallin, 2006; West & Lakhani, 2008). Nambisan and Baron (2010) distinguish two types of valuable contributions made by community members: peer support and knowledge contributions to organizations. Although online communities produce valuable information, for organizations, it may be difficult to obtain that information and support community members in creating valuable information and solutions. Dahlander and Wallin (2006) found that, in order to benefit from such communities, there needs to be a "man on the inside" of the community.

Online communities differ from approaches like crowdsourcing, which can be defined as "an open call to participate in a task online" (Brabham & Daren, 2009). Crowdsourcing aims at tapping into the large pool of professional knowledge and requires a clear problem definition. The answer is out there and, by means of new online tools, can be found. Therefore crowdsourcing or citizen-sourcing aims at sourcing professional or semi-professional knowledge and innovative ideas (Nam, 2012) and, therefore, "a certain form of intellectual elitism" (Hilgers & Ihl, 2010, p. 73) is present in this approach. Crowdsourcing has been used, for example, in governmental policy-making, finding new solutions and planning public services (Lee, Hwang, & Choi, 2012; Mergel & Desouza, 2013; Martins, de Souza Bermejo & Villas Boas de Souza, 2015).

The crowd- or citizen-sourcing process involves three basic components: individuals (the crowd), an organization looking to benefit from the crowd's inputs and an online platform through which the communication occurs (Nam, 2012). These components also apply to online communities as they involve a set of interested individuals, have a common goal or purpose and utilize information technology.

2.2. The crowd—citizens as co-producers

In the public sector, citizens' participation, knowledge and creativity are increasingly sought after. Citizens are a very heterogeneous group in terms of their capabilities, but, as Thapa et al. (2015) summarize, the benefit of involving citizens as co-creators is based on the citizens' intimate knowledge of local affairs. Bonsón et al. (2015) found that citizens reacted most to issues that are local and close to their lives, such as public transportation, housing and town planning. In these issues, citizens have the best knowledge. Local knowledge is information about specific characteristics, circumstances, events and relationships and understandings about their meanings in their local contexts or settings (Corburn, 2003). Citizens' inputs consist of experiential information, which is based on personal, culture-dependent experiences (Faehnle & Tyrväinen, 2013). Therefore, local knowledge differs from professional ways of knowing. Typically, public authorities such as planners expect visions and general directions, but citizens expect specific action-oriented results (Shipley & Utz, 2012). Dynamics of public engagement emerge from the different ways of knowing. Citizens can be out of touch with political and financial realities and long-term considerations for communities or resources, whereas public authorities can be out of touch with communities and local knowledge (Innes & Booher, 2004).

Koch, Hutter, Decarli, Hilgers, and Fuller (2013) identified six different user roles of contributors in online communities. These were motivators, attention attractors, idea generators, communicators, masters and passive users. These users differed according to their roles in their communication and commenting behavior as well as in terms of submitted ideas. Koch et al. also found that 85% of community members were passive but still rather important in gaining a critical mass, which is an important factor for community success. Similar findings were made by Dahlander and Wallin (2006), who observed that actual contributions were made by few members.

Afzalan and Evans-Cowley (2015) and Afzalan and Muller (2014) investigated the usefulness of citizen-initiated online communities for local planning processes. The studies found that only a small portion of the information related to detailed planning issues of interest to planners. They found that members contributed four types of posts: those asking for help, informing other members regarding activities, expressing personal experiences and expressions and selling, buying or renting.

2.3. The organization as co-producer

According to Linders (2012), design is one of the phases where information technologies (IT)-facilitated co-production takes place. The design phase is seen as important because many strategic decisions are made in that phase (Nam, 2012), but co-design is not a common way of working (Hofmann et al., 2013). Research has revealed that public authorities perceive that the expertise of citizens is limited in terms of the problems at hand. According to several studies, such as those of Thapa et al. (2015) and Magno and Cassia (2015), municipal administrators do not rely on citizens' involvement as the latter are perceived as not having the necessary knowledge, administrative problems are too complex and citizens know too little about the specifics. An overall averse attitude, organizational and administrative culture, lack of incentives and lack of evidence about benefits have also been identified as barriers (Voorberg, Bekkers & Tummers, 2015; Magno & Cassia, 2015; Hennala, Konsti-Laakso, & Harmaakorpi, 2012).

Linders (2012) suggests three types of relationship that takes place in virtual world: government to citizen (G2C), citizen to government (C2G) and citizen to citizen (C2C). C2G deals with consultation and ideation, through which citizens can share their opinions with government. G2C informs and educates citizens so that they can make informed decisions. C2C concerns self-organization and peer-to-peer–support.

According to Mergel (2013), public authority communication strategies for social media can be described in the following typology. First, representation strategy uses social networks to push information to the public. Second, engagement or pull strategy involves some comments and links to additional material. The interaction is still rather low and random, although some interaction exists. Networking strategy is interactive and extensive concerning commenting and information sharing. According to Mergel (2013), by using social media instruments, government can seek transparency, participation and collaboration. At the highest level of collaboration, citizens create their own content and also engage in offline actions.

2.4. The platform—interaction in social networking sites

One acknowledged problem of citizen engagement is how citizens are lured into spending their time and contributing to the public good (Seltzer & Mahmoudi, 2013) as users' motivations in private sector innovation enhancement relates to enjoyment, self-efficacy and pecuniary interests. In this sense, different online tools and, particularly, social media as a widely adopted technology in society, have been seen as a promising way to engage citizens (Criado, Sandoval & Almazan, 2013).

For online communities, social networking sites such as Facebook are important as they enable community building around a certain topic and offer the possibility of generating different kinds of content, such as text-based content and photographs. For citizen engagement, different metrics for social media have also been developed. Bonsón et al. (2015) found that the most popular way for citizens to interact is through likes. Lev-On and Steinfeld (2015) found that in municipalities Facebook-sites, public authorities were the most active participants. Users rarely shared other users' posts, while authorities' posts were often shared. Commenting seems to be the most unpopular. Bonsón et al. (2015) also found that, overall, the majority of posts concern marketing-oriented topics such as sports and other leisure-related events.

According to Afzalan and Muller (2014), social media played a complex role in the interaction between authorities and citizens. It supported both valid dialogue and consensus building but generated

distortions. The forum they studied provided opportunities for the participant to evaluate the validity of claims, clarify intentions and track discussions. The lack of visual cues was found to be a particularly important obstacle. Hofmann et al. (2013) and Mossberger, Wu, and Crawford (2013) conclude that social networking sites require different competencies and the facilitation of public dialogue. As information provided through social media is often qualitative and unstructured, special skills are needed in order to interpret this information (Afzalan & Muller, 2014).

In sum, public authorities use different strategies in for example social media. It seems that citizen engagement in innovation activities tends to be a one-way flow of ideas and/or solutions from crowd to government. Interaction seems to be taking place between participating citizens themselves and lacking multi-stakeholder dialogue (Mossberger et al., 2013). Yet the key activity in tapping the wisdom of citizens is interaction. The social networking sites, such as Facebook, enable dialogue and interaction. In order to understand how citizen online communities can support open innovation practices, identification of different stakeholders, their activities in online communities and level of interaction between different stakeholders form basis for the study, as illustrated in Fig. 1.

3. Empirical study

3.1. Background

This empirical study is based on a two-and-a-half-year research project that aimed at studying and developing methods to engage residents in the renewal of suburban areas. The project was part of the Finnish suburban development program from 2008 to 2012, funded and coordinated by the Ministry of Environment and The Housing Finance and Development Centre of Finland.

Alongside the research project, a development project was operated by the city. This project aimed at developing suburban mall facilities from the viewpoint of town planning and land use. These two projects had a joint steering group, which was officially designated by the city. The projects also jointly focused on three neighbourhoods, called here X, Y and Z.

The neighbourhoods previously had a formal residential organization, but it was no longer active. In order to gain access to the neighbourhoods and its people and social networks, a Facebook group was established. Facebook was chosen for the following reasons. First, communities or groups, which focused on the particular neighbourhood, already existed, indicating potential, and, second, Facebook allowed several types of information (such as text, pictures and video) to be used.

The research project focused on developing new methods of citizen participation, and, therefore, the Facebook groups were established for the three neighbourhoods but at different times. As a result, all these groups gained members, but two did not provide any citizen-generated content or interaction between the different stakeholders. Therefore, this study focuses mainly on one neighbourhood group (X).

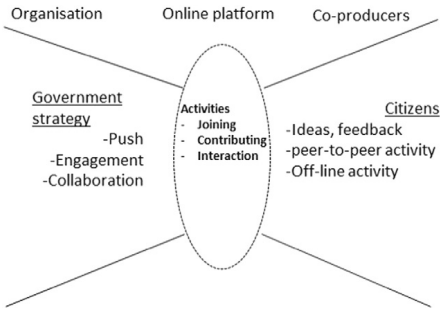

Fig. 1. Elements of citizen online communities.

The group was named (freely translated from Finnish) "Even better X." The group under deeper investigation in this study was established in August 2009 by university researchers. The description of the group indicated that it was development-oriented and included a research element. The researchers were present in the group with profile names that indicated their researcher status. The researchers' role was to facilitate the group by introducing topics and asking questions. Different stakeholders, such as steering group members and residents, were invited to participate. The group was open to everyone, and it was possible to follow the group activity without joining the group or even being a member of Facebook.

3.2. Methodology and data

Sørensen et al. (2010) propose that qualitative experiments can cast light on open innovation processes including different actors. This approach differs from survey and case study settings by having a clear focus on practical problem solving and focusing on the consequences of specific actions. The study presented here can be categorized as a qualitative field experiment as online platforms focusing on neighbourhood development were established, facilitated and observed by researchers.

The period under investigation covers 16 months from the beginning of the project and extends to the time at which the first decisions concerning the mall facility were published and first steps towards the official planning process taken. Therefore, this time period can be considered as an early involvement or unofficial planning stage. The primary data of this study consist of 20 pages of Facebook discussions. In addition, secondary data were utilized. These data included researchers' notes and observations made during the project from meetings, informal conversations with actors, project reports, memos and emails. Secondary data provided additional insight and explanations.

Due to the reasonable size of the data set, the analysis was made by hand and followed a conventional content analysis technique (Hsieh & Shannon, 2005). At the beginning of the analysis, the primary data were read through several times in order to gain an overall understanding of the data. Then, the analysis was focused to identify and categorize the main elements of online communities: Participants and quantity of interaction between the participants (West & Lakhani, 2008). Secondary data were important at this point as they provided information about the relationships between different participants. The resulting qualitative content categories emerged from the data as the data were handled, and, therefore, analysis was based on the direct interpretation of research materials more than formal coding procedure (Stake, 1995).

4. Findings

4.1. Description of the group activity

A total of 154 members joined the group. Three different groups of stakeholders were identified. The developers are those individuals who were working for the development project or part of the steering committee. Five members were identified as belonging to this group based on their posts or profiles. Researchers facilitated the group. The rest of the members were categorized as citizens.

From these 154 members, 26% (41 individuals) made at least one contribution to the discussions as indicated in Table 1. Thus, the vast majority of people who joined did not contribute any content. In comparison, in Afzalan and Muller's (2014) study, 13% of forum members participated in discussion. This is found to be typical behavior in online communities as previous studies indicated and is called "lurking." This means that people are present in the group but do not contribute (Nonnecke, Andrews, & Preece, 2006).

Table 1
Description member type, activity and number of postings.

	Citizens	Developers	Researchers	Total (N)
Number of participants	144	5	5	154
Of which contributed	22% (32)	83% (4)	100% (5)	41
Once	11% (16)	0% (0)	40% (2)	18
2–5 times	9% (13)	40%(2)	0% (0)	15
More than 5 times	2% (3)	40% (2)	60% (3)	8
Wall postings total number	126	64	44	234

Therefore, the activity of citizens relies on a few active individuals, who post most of the contributions. In addition, among those few, one individual posted 47% of all citizen comments and, therefore, dominated the group. This individual also attempted to generate meetings and more traditional activity. This led to frustration as the others did not participated in face-to-face meetings.

In total, 234 individual posts were made during the period under investigation. Nearly all inputs were verbal and textual, although Facebook also allowed photographs and video. As the intensity of the interaction between groups is examined, it can be seen that most of the citizen input was made at the very beginning of the project. Those posting reflected acceptance that something was going to be done in order to develop the neighbourhood. Fig. 2 also shows how the facilitation by the researchers was conducted during the first half of the studied period and developer activity rises towards the end of the period and starts to better match the interaction. This was also the phase when the official planning process started and initial ideas were made public.

4.2. Participant contributions

4.2.1. Developers

From the developers' side, three persons contributed but two did so actively. The first one was the project worker of the city's development project, the second was a consultant commissioned by the city to map the green area development needs and the third was a third sector service provider, who was part of the steering committee. Her posts were mainly in promotion of their events in the neighbourhood.

The project worker appeared in discussions two months after the group was established. In her first post, she manifested the position of the projects and explained how the process will proceed:

"There is a project going on, where mall-areas in X, Y and Z are examined. Now, I am exploring basic information about the mall facilities and I am mapping the surrounding areas. Based on this, the mall area development actions will be considered next year. After actions have been chosen and executed, they will be evaluated. This project concerns mainly the mall area, not the whole X area. The university's and city's projects are separate. This group is hosted by the university, not by the city."

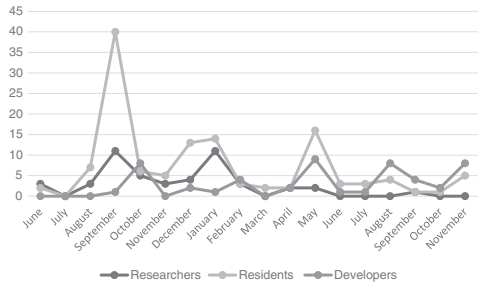

Fig. 2. Intensity of posting.

During the project, the project worker wrote about difficulties that she has in operating social media because she always has to ask the project leader what information can be published. In the Facebook arena, most of the information shared was through links to another source, such as a project blog or news articles. In other words, information that was publicly available elsewhere. From the meetings between the city and university and the steering committee meetings, it was clear that the goal of the mall area development was to pursue market-oriented planning. This was not openly manifested in the group, although market-oriented planning is a common way of working in the Nordic countries (Majamaa, Kuronen, Heywood, & Kostiainen, 2008). As such, the online community was an additional extension to traditional participation as at the end of the period, a traditional public meeting was held by the City. The main outcomes of this meeting were shared in the group by the project worker and invitation was made to comment the results.

The project worker posted 49 times during the investigation. Nineteen of those were openings, and 30 were comments, likes or answers to questions. Only six openings (12%) gained a response from another group member, particularly from citizens. What was common to these posts was that they concerned or indicated concrete actions taking place, such as the improvement of green areas. The actual actions prompted reactions, whereas posts concerning the future plans or planning-related information, such as the master plan, geographical history or feedback requests about meetings, did not gain any reaction whatsoever. This is in line with the findings of Shipley and Utz (2012), who highlighted the difference between stakeholder expectations: public authorities expect visions and general directions, but citizens expect specific action-oriented results.

The project worker also operated as a knowledge broker (Howells, 2006) as most of the questions from citizens did not concern land use directly but, for example, public services, such as a day-care center. The project worker, therefore, needed to find out from other administrative units of the city about their plans to maintain services in the neighbourhood in order to respond to these questions.

The second person contributing actively in this category was a consultant, who was contracted to map the development needs of green areas. The consultant posted 12 times. The consultant was commissioned to make visible improvements, mainly to tackle resident expectations of action-oriented results and to collect residents' opinions about the green areas.

4.2.2. Residents

The residents' group contributed the vast majority of posts, 126 in total. When the first posts from individuals are examined, it is found that 50% were posted to the Facebook wall. They were statement-type entries with suggestions such as "I have lived here 20 years. Finally something is going to be done. Fence around the pond so that kids do not fall into the water," or simply direct request like "Could we have a bench at the park?" In general, the inputs were written in a tone that welcomes change and were positive.

4.2.3. Ideas

At the beginning of the group activity, researchers asked for ideas and insight into how the neighbourhood could be developed. Therefore, it is natural that, when the content of the discussion is analyzed, the first category to appear is that of ideas. The two others are citizen activity and local knowledge.

One individual presented an idea about bus timetables as there are no timetables at the bus shelters. The idea was presented as follows:

"Somehow that defacing must be controlled. It is impossible to read bus timetables at the bus shelter. Youngsters have smeared the Plexiglas on top of the timetables so that you cannot read them. What is the consequence if a non-local waits for the bus and breaks the smudged Plexiglas on top of the timetable? Just because he/she has waited for the bus for half an hour and does not have a timetable booklet with him/her? An

initiative concerning an SMS-based timetable service for the local bus company could be made. One sends a message [reading] "timetable line 21" to a certain number and receives an SMS containing timetables for the next hour or so."

This idea was later introduced to the transport technology expert, who evaluated the idea as very possible and technically feasible. Another example of residents' capability to generate ideas and concrete solutions was a concrete plan and measurements for a skateboard park: "15 cm high box, which is app. 2 m long and 1,3 wide. Ramp, which is 2,5 m long and max. 0,8 m high. Quarter arc, app. 2 m high and 1,7 wide. Rail, which is 25 cm high and 1,8 long."

These ideas indicate the potential of crowdsourcing (Seltzer & Mahmoudi, 2013) and concrete solutions at the level of urban development. Although urban planning –issues often can cause even conflicting ideas, viewpoints and interests between stakeholders, in this group there were no visible conflicts between stakeholders. Instead, the issue of power and legitimacy emerged. This skateboard park idea was copied to the discussion section for further development. The facilitator (researcher) did not make any reference to whose idea and measurements these originally were. This gained a response from one member as follows. "In designing skateboard places, it is especially important to use famous Living Lab principles. Collaboration with users from the beginning, and so the park will remain in good condition. That's why I would forget the researchers' measurements."

This implies that, to some extent, crowdsourcing at the neighbourhood level might be sensitive to *whose* ideas are legitimate to present in this online community. For facilitation, this is an important lesson.

Another observation concerning the idea generation phase is that members posted their insights on the wall, but these posts were not commented on, liked or otherwise developed. In other words, the thread was not continued. This tendency is similar to one reported by Hennala et al. (2012), by which most of the contributions were single events at the beginning of the idea generation process.

4.2.4. Local knowledge and citizen activity

This category includes posts concerning security issues, such as traffic behavior and vandalism, and photographs of bad winter maintenance of streets were shared. This local knowledge of such issues as vandalism and teenagers' behavior in the neighbourhood also triggered colourful conversations between residents.

Some posts brought to general awareness residents' own activities, such as jumble sales and neighbourhood events. This was all informal resident activity and revealed local neighbourhood traditions. The informal activity resulted in a neighbourhood day organized by local people. The developers and researchers were also invited to participate, and this opportunity was utilized. Therefore, this group enabled developers to participate in citizen-led initiatives. Moreover, one member arranged face-to-face meetings. However, they were not very successful.

5. Discussion and implications

This study aimed at shedding light on two research questions. First, it was asked how online communities can support open innovation practices in the public sector. Online platforms were created in order to support the urban development process with an idea that an online community can be seen as a knowledge network or issue network (Mergel, 2013) between different actors around the subject at hand. In the case of citizen engagement, the act of joining this kind of community is an act of participation, as suggested by Mergel (2013). But citizens were not the only ones who joined this community. This case indicates how participation was no longer a dyadic relationship with local government and citizens. There was a new interface between private sector and people and some of the interaction with citizen took place through this relationship. Consultant, who was responsible for green area development, interacted directly and rather successfully with citizens. As public-private partnerships are common and also government shows tendency to networked structures (Gil-Garcia, 2012) this also implies that engagement can be and in this case apparently was outsourced to a third party, a private actor. This dimension is little discussed in the literature, and the interface between private people is quite new in urban planning although a rather common way of working in urban development in Nordic countries (Falleth, Hanssen, & Saglie, 2010; Majamaa et al., 2008). This interface is highly relevant for open innovation in the governmental sector in general.

Therefore this study disagrees with Linders (2012), who omitted the government-to-government interface from the presented typology. In light of open innovation and, particularly, online communities focusing on engaging citizens to knowledge co-production, this interface plays a role in open innovation as well as other forms of IT-based collaboration scenarios (Gil-Garcia, 2012). Transparency is rarely addressed in the private sector but an important aspect of open innovation in the public sector. As governmental organizations tend to be large and include multiple actors, the key issue in this open innovation platform was brokerage: to distribute information from various sectors and various actors for citizens. Thus this study raises brokerage as a key competency for public authorities when dealing with a collaborative approach and online communities.

As the empirical study indicated, little information was offered to citizens by authorities during the design-phase, although idea plans were generated by a hired consultant. This consultant made no visible entry into the group, but his conclusions where shared with the community by the project worker. Therefore, this online community supported transparency but did not necessarily provide residents with direct ways to participate and contribute in the concrete plans that were made.

The second research question addresses citizen contributions. Citizens generated ideas and even solutions, highlighting the innovative potential of online communities and grass-roots citizen sourcing in general. The generated inputs were correct and concerned the issues taking place in the neighbourhood. Therefore, the quality of the inputs can be considered good. However, the case study highlights the practical challenge of encouraging people to contribute and interact (Bonsón et al., 2015; Hennala et al., 2012). As such, it solved the initial problem of not having a contact point to the neighbourhood i.e. the lack of a formal resident organization, by using citizen-sourcing -approach. The online community provided access to the neighbourhood for local authorities, in this case planners and consultants responsible for local knowledge collection and action-oriented results. Although the interaction between citizens and developers was minimal, the group operated as an information channel in both ways creating awareness. As such, information sharing and awareness are an essential part of the planning process and therefore cannot be underestimated. The findings from the case indicate that the social media group operated as a window to the neighbourhood, bringing awareness to citizen activity, concerns and problems.

In this case, it can be interpreted and concluded that there was a "silent acceptance" of the future developments. Therefore, this result supports Evans-Cowley and Griffin (2011) and Zavattaro and Sementelli's (2015) notion that the tone of the text could predict how the process evolves and planners can sense the public's reactions. Social media supports the process by creating awareness of the changes that will take place and perhaps, makes them easier to accept.

This study indicates the potential that exists in purposefully-created online communities or issue networks (Mergel, 2013). Although most of the groups did not succeed in terms of interaction, all groups attracted participants and one was later established from the bottom up for a neighbourhood outside the projects scope. The reasons why the two other group did not generate interaction can only be speculated. One reason might be the importance or criticality of the mall facility and its services for the neighbourhood. The group X was the only one where the mall facility can be seen critical for the availability of services such as

a grocery store. In other neighbourhoods, there were other commercial establishments in relatively easy distance.

This study also has practical contributions. For supporting the uptake of open innovation practices, it is important to understand how online communities behave and what can be expected. The categorization of contributions helps public authorities piece together the unstructured data that online communities produce and master the role of knowledge broker between agencies.

6. Conclusion and limitations

This study sheds light on micro processes and communication in open innovation practices, which are highly called for in research on open innovation (Hewing, 2013, p. 4) but also in need to provide qualitative insight into user-generated content in open innovation platforms in the public sector context (Koch et al., 2013). This study contributes by providing results and additional insight into how the online community can support open innovation in the public sector and what types of contribution the community generates.

This study has some limitations. The generalizability of the results places limitations on the study as a qualitative field experiment is context-sensitive and it is based on one community only. However, this study offers knowledge to other actors, although some procedures cannot be blindly followed (Sørensen et al., 2010). The study data set some limitations as Facebook did not at the time of the study offer detailed statistics concerning views, clicks, shares or members, for example. Therefore, a lot of interesting data have been missed. Despite the limitations, this study offers insight and building blocks for further research on online communities as an open innovation practice in the public sector context. Moreover, this study encourages public authorities to engage in open innovation activities, such as open platforms and social media. It is at least worth a try as part of public engagement activities.

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Publication III

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Living lab case studies on well-being services in Lahti, Finland.

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Enhancing public sector innovation: living lab case studies on well-being services in Lahti, Finland

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Abstract

Living labs are advocated as a promising approach to realize innovation. This chapter examines the application of the living lab approach to enhance the renewal of public well-being services for citizens in a regional context. Public sector innovation is often social in nature and is focused on non-technological innovations such as service, process or organisational innovations. Through multiple case studies, a cross-section of 14 living lab initiatives is provided and their outcomes are analysed. Four different outcome categories are identified for living lab activities: access, windows, new solutions and new capabilities. This study deepens the understanding of the outcomes that can accrue specifically for utilisers, and therefore provides new insights and tools for researchers and practitioners. Furthermore, it contributes to the growing body of living lab research and improves the understanding of regional living lab activities and key conditions for their success.

Keywords: Living lab, outcomes, public sector, public sector innovation, well-being, social and health care, living environments

Introduction

The public sector, which includes cities, municipalities, and governments, is an important player in innovation (Tidd et al. 2005; Bloch and Bugge 2013). Public sector innovation is a key contributor to national growth and citizens' welfare (Windrum 2008). However, until the 1980s, the public sector's role in innovation was considered limited to providing suitable conditions for private sector innovation (Sørensen 2012). This rather narrow view, in which innovation was considered restricted to manufacturing or knowledge-intensive services only, has gradually expanded as the conditions of the public sector have become better understood (Langergaard and Hansen 2013).

Citizens (as users) are no longer passive recipients but have instead become important sources of knowledge and creativity for both public and private sector innovation (von Hippel 2005). Living labs are entities that facilitate user engagement at different stages of the innovation process (Almirall et al. 2012). They are closely connected to the development of information and communications technology (ICT) (Almirall and Wareham 2011). Nonetheless, user engagement is also relevant to other forms of innovation such as in services, processes, ways of working and other non-technological forms (Edwards-Schacter

et al. 2012). In this chapter, living labs are studied in the regional context. Although living labs can be strategic and even permanent initiatives and concrete spaces in regions, in this study, living lab action is largely embodied in temporary network settings in which innovating organisations and users interact in various ways to improve existing solutions or create new ones.

Regarding the potential of living labs, they are considered an interesting and emerging approach for public sector innovation (Gascó 2016), for example, in sustainable urban and healthcare transitions (e.g. Schliwa 2013; van Geenhuizen 2014, 2015). Although more studies are focusing on living labs (Nyström et al. 2014; Katzy et al. 2012), little is known about how they promote public sector innovation and about the possible outcomes of living lab activities for organisations (Gascó 2016; Leminen and Westerlund 2012). This chapter aims to clarify these points. The main question at hand is as follows: What kinds of outcomes can be obtained from living lab activities related to public well-being services? In this chapter, 'public well-being services' refers to public services that relate to well-being in a wider sense, and they are understood to cover not only social and health care services but also other public services – technical and environmental services that are responsible for maintaining and developing urban living environments and mobility, thus affecting citizens' daily life and well-being in many ways. Later in the chapter, 'care services' is used to refer to both social and health care services that are intertwined in many ways in the Finnish comprehensive public service system.

The above question was answered through a qualitative case study. By analysing 14 initiatives conducted in the Lahti Living Lab (Finland), a member of the European Network of Living Labs (ENOLL), four different outcome categories were identified. This chapter contributes to current discussions about living labs by providing a cross-section of living lab activities and their outcomes in the public well-being sector.

The chapter is organized as follows. First, a review of literature pertaining to public sector innovation and living labs is presented. Second, transition and innovativeness in public well-being services, especially social and health care, are discussed. Third, the Lahti Living Lab, cases and methodological issues are described in the empirical section. Finally, the findings, discussion and conclusions are presented.

Living labs

Living labs have been defined in many ways in the literature; for instance, as innovation intermediaries (Gascó 2016; Katzy et al. 2012; Almirall and Wareham 2011) of open innovation networks in which users, companies, academia, government and technological centres are engaged (Almirall and Wareham 2011). Katzy et al. (2012) characterised living labs appropriately as 'innovation intermediaries that coordinate network partners for the execution of innovation processes with engagement of end-users for which they provide the technical and organisational infrastructure'. Much attention, especially in early research studies on living labs, has been focused on the roles and motivations of users (e.g. Nyström et al. 2014) and on making sense of living labs as phenomena in innovation enhancing methodology (e.g. Almirall et al. 2012; Mulvenna et al. 2010; Dutillieul et al. 2010).

Indeed, users are the core component of living labs. Almirall, Lee and Wareham (2012) noted that the main characteristics of living labs are (a) involving users as equal co-creators of

innovation outcomes and (b) experimentation in real-world settings. According to Dutillieul et al. (2010), the benefits of involving users in living labs depends on two mechanisms: ideation and evaluation. Nyström et al. (2014) identified up to 17 roles that network stakeholders can adopt or create in living lab settings. Most of these were user roles. Although the benefits of user involvement have long been acknowledged, users' importance still needs to be emphasized and advocated. Studies in the public sector indicate that public sector organisations do not always see the value of involving, for example, service users (Magno and Cassia 2015; Hennala et al. 2012). Magno and Cassia (2015) studied public administrators' engagement in service co-creation with citizens in Italy and found that factors such as perceived lack of competencies and experience among citizens, perceived biases in citizens' perceptions and lack of resources were hindering factors for learning about citizens.

Previous studies have suggested that innovation produces outcomes specific to both living labs management and stakeholders. In Leminen and Westerlund's study (2012), specifically utilisers are mentioned as important receivers of outcomes such as prototypes, tested service concepts, new knowledge, tools and competencies. However, earlier research indicated that utilisers tend to join innovation networks with quite light expectations (Leminen and Westerlund 2012). Specific expectations may not even exist (Leminen and Westerlund 2012), or they may relate to general networking and new business opportunity generation (Konsti-Laakso et al. 2012), which can be rather intangible outcomes that are difficult to observe and value (Gascó 2016).

In general, organisations set up different cooperative practices to build capabilities that exist outside their boundaries. Leonard-Barton (1995) suggested that organisations reach different kinds of outcomes by engaging in different cooperative practices such as observing, licensing and mergers. The outcomes of these practices are windows, access, new products and new capabilities (Leonard-Barton 1995). Fig. 1 shows this framework. Despite the linear-looking path of the practices in Figure 1, they can exist irrespective of each other in the organisations – or simultaneously and in cyclic moves. Certain practices may be absent, and a temporal dimension is not included. The practices are thus single actions that do not automatically lead to the next. For instance, if a company is interested in a certain technology or competence, it can choose just one action. The levels shown in this figure are closely related to the organisations' commitment levels.

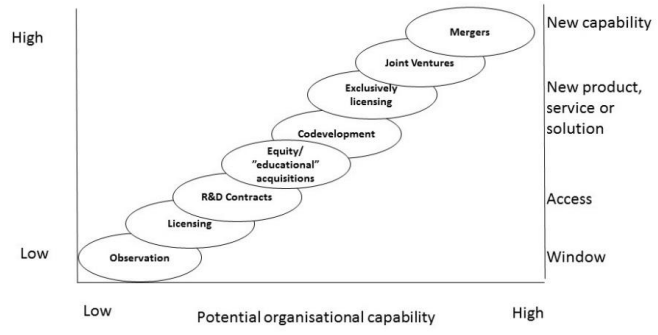

Fig. 1. Mechanisms for sourcing technology (Leonard-Barton 1995).

Leonard-Barton (1995) developed this framework in the context of organisations' technological capabilities and business relationships with other organisations. In general, capability refers to human capital and knowledge; these are also essential for public sector innovations such as service, process or social innovations. Given that living labs are multi-stakeholder networks that engage end users, the question is about sourcing users' knowledge and know-how.

About public sector innovation

Public sector institutions are often considered conservative, bureaucratic and inflexible in renewing their functions and reacting to changes in the outside world (Bloch and Bugge 2013). The hierarchical organisational culture in the public sector is often considered incompatible with innovation (see e.g. Borins 2001; Vigoda-Gadot et al. 2008). However, the public sector is far more dynamic and innovative than its reputation suggests (Sørensen and Torfing 2012), and there is a growing awareness that innovation does indeed occur in the public sector (Bloch and Bugge 2013). For instance, the special characteristics of public sector innovation are related to the nature of innovation types, triggers and processes (see Pekkarinen et al. 2006), and these should be considered when assessing innovation activities in the public sector.

First, a misunderstanding about public sector innovation is related to the most dominant, Schumpeterian definition of innovation in which innovations are considered technical or technological renewals related to products, services or production methods and are situated in a market context (Langergaard and Hansen 2013). Public sector innovations are not typically products or technologies—even though public sector organisations played a significant role in the development of the Internet, for instance (see Windrum 2008)—but rather service, process, organisational, marketing, positioning, rhetorical, conceptual, administrative, governance and social innovations (e.g. Afuah 1998; Tidd et al. 2005; Hartley 2006; Hartley and Skelcher 2008). In recent years, many reforms related to digitalisation and organisational restructuring have been adopted in the public sector (see e.g. Sørensen and Torfing 2012). In addition, very significant societal-level innovations have been initiated in the public sector, like the library system and municipal day care system in the Nordic countries. Context-specific concepts and definitions for innovation are therefore needed to understand public sector innovation (see e.g. Langergaard and Hansen 2013).

Second, the triggers for innovation in the public sector are related to the diverse aims of the public sector, where market competition is not the primary driving force (Hartley 2006). In particular, the municipal sector is tasked with organising services that reinforce citizens' well-being. The triggers for innovation are not only based on profitability but also citizens' well-being, and therefore, public sector innovation must often engage in balancing these two seemingly disparate concepts. Third, innovation processes are much fuzzier in the public sector than in the private sector owing to democracy and different measures for successful innovation. The reasons for this are the vague distribution of initiatives in the decision-making process and the multi-dimensionality of the customer base in the public sector, which results in a variety of interests in innovation processes. The ongoing tendency for networking, in which the public sector outsources its services to private sector operators, also affects innovation activities. In addition, money is not the only indicator in decision-making; there

are also several indicators concerning, for example, legislation and citizens' well-being (Pekkarinen et al. 2006).

Innovations in well-being services, especially care services

The issues discussed above also apply to social and health care as well as development of living environments as important parts of the public sector that contribute to citizens' well-being. The publicly stated long-term objectives of the Finnish social and health policy have been to achieve the best possible level of health for all citizens and to reduce disparities in the level of health of different social groups (Häkkinen 2005; Palosuo et al. 2013). However, the most robust indicators of health, namely, mortality and life expectancy, indicate that inequalities have increased (Palosuo et al. 2013).

Finnish social and health care services have so far been the responsibility of the public sector, mainly municipalities; however, social and health care are now being largely reformed. In the future, the new structure for social and health care services will be based on autonomous areas larger than a municipality. These areas will be responsible for arranging all public social and health care services (Ministry of Social Affairs and Health 2016). The public sector's role will also change, as the reform will lead to increased operations by private and third sector care providers.

In Finland, the structure of social and health care services will be reformed by 2019. The present government's policy approaches are aimed at reducing health and well-being gaps, safeguarding the equal provision of social and health care services throughout the country and creating preconditions for reducing the sustainability gap, for example, to manage costs. The existing multisource financing of social and health care services will be simplified, and customers will be given more freedom of choice in services. Responsibility for providing public care services will be assigned to autonomous regions that are larger than municipalities (Ministry of Social Affairs and Health 2016).

Furthermore, the issue of well-being is now increasingly considered not only one of the health (medical) and social care sector but also as one of multi-sectoral collaboration, especially for preventive health care. Citizens' well-being is increasingly understood to require interactions with other sectors and fields such as city planning, construction, cultural services, travelling and recreational activities. By considering these factors and perceiving well-being in a wider sense than only the care services produced in care facilities, in our analysis, we have also included other public services like technical and environmental services for maintaining and developing urban living environments and mobility, which affect citizens' daily life and well-being in many ways. The Finnish care system is discussed in the next section by using the perspective of transitions.

Seen from the perspective of socio-technical systems, demographic ageing is a major landscape change that is exerting pressure on the regime shift in well-being, especially through care services. Finland is the most rapidly ageing country in Europe. At the same time, Finland has followed the Nordic welfare state model of a high level of public services. Landscape pressures are caused by ageing itself and related economic pressures as well as by

European integration and related pressures on the Nordic welfare state model. Digitalisation, technological development and increasing environmental consciousness are among the macro-level changes (see, e.g. Bugge et al. 2015) that also contribute to the transition and act as triggers for innovative technologies and practices.

Socio-technical transition in care services

The change in the Finnish care system may be seen from the perspective of socio-technical transitions (e.g. Geels 2002; Geels and Schot 2007). By adopting the multi-level perspective on transitions (MLP), transitions can be seen as co-evolutionary processes on three interrelated conceptual levels: socio-technical landscape, socio-technical regime and bottom-level niches. The multi-level perspective argues that transitions occur through interactions between processes on these three levels: niche innovations build up internal momentum, changes at the landscape level exert pressure on the regime and destabilisation of the regime creates windows of opportunity for niche innovations (Geels and Schot 2007).

The regime of care consists of the preferences of people related to the products and services they use and consume, and the response of the market and public sector structures to these wishes and requirements. It also consists of the industry, infrastructures and service structures producing these products and services as well as the products (of both high and low technology) and services themselves. The micro-level of MLP is formed by niches where radical novelties emerge. These radical innovations are born either in response to landscape changes or in a bottom-up fashion. Examples of niches in care include, for instance, service robots, various types of monitoring, technology for self-diagnosis and novel service configurations or care work practices such as empowering and activating methods for the customers, with promising examples having remarkably decreased the need for long-time inpatient care and the use of medication (see Finne-Soveri et al. 2014). Other niches in care focus on people's well-being more generally, such as green care; however, these are hardly provided by the public sector. The step from preventive care and general focus on people's well-being to city planning and development of living environments and mobility services is short in principle, yet often long in practice.

In recent decades, Finnish care innovations were often related to the development of infrastructure, for instance, dental care for all or children's health care and related guidance centres. However, nowadays, (niche) innovations in the sector are usually based on somewhat different types, triggers and processes. Triggers come from the above-mentioned factors and from new kinds of customer/user involvement that also affect processes. An example may be novel combinations of technology and services, indicated by robotics that has moved toward care. These developments are closely linked to new personalization technologies that increasingly enable customer/user co-creation to become a major source of innovation. Owing to the versatility of robots, new robot-enabled care services may take a variety of currently unforeseen characteristics. Niche innovations require adaptation, and in the case of robotics, adaptation is required from care professionals and customers, so acceptability and ethical questions must be focused on. Moreover, novel technologies are still often in progress when implemented, and they are not integrated with other technologies, the service system and work practices. Technologies are often developed separately without thinking deeply about the functions and aims of their use (see Pekkarinen et al. 2016). On the other hand,

environmental pressures at the landscape level play a major role in people's well-being, whether directly or indirectly; however, these issues are usually dealt with by different authorities in silos.

In the following sections, we analyse living lab case studies through Leonard-Barton's categories (1995). The cases studied in this chapter represent citizens' well-being more generally, and they are related to the ongoing Finnish societal transition. They thus include cases from both care and from technical and environmental services; in some cases, these are intertwined.

Lahti Living Lab Case Studies

Background

The Lahti region is in southern Finland and is located approximately 100 km from Helsinki, the capital. This region comprises 12 municipalities, and its functional and geographical centre is the city of Lahti. The region has a population of roughly 200 000, of which around 118 000 live in Lahti.

The Lahti region is highly industrialised, with a particular focus on the wood and metal industries. This region previously lacked the resources needed to produce science-based innovations, and therefore, new kinds of development tools and new socioeconomic arrangements were needed to create new paths for regional development (Harmaakorpi 2006). Living labs and the application of user-driven innovation can be considered one of these paths. The living lab idea was introduced to regional actors by an officer of the European Commission. The Lahti Living Lab was established in 2006 by the Lappeenranta University of Technology (LUT), Lahti, and it joined the European Network of Living Labs in the second wave of expansion in early 2007. The Lahti Living Lab focuses on non-technological and practice-based innovations (Melkas and Harmaakorpi 2012) and concentrates especially on the enhancement of public sector innovation.

From the outset, the idea was to spread the living lab concept to other actors in the regional innovation system, such as the University of Applied Sciences, the local science and business park and regional units of other universities. Many of these actors adopted this approach. For example, the Lahti University of Applied Sciences conducted a Future Lab project where students of design could be engaged with user-centred design projects. In addition, a local regional development organisation (Lahti Region Development Ladec) hosted a user register called 'Lahen D' which creates an important channel to recruit users to different innovation processes; for example, it is available to local companies. In this sense, living lab activities can be considered a regional tool to support regional economic development.

Methodology

This study was based on living lab activities that have been conducted at Lahti Living Lab since 2007 under different research and development projects funded mainly by European regional funds. During the lifetime of the Lahti Living Lab, over 20 user knowledge sourcing case studies have been reported, and these can be identified from among its projects. For this study, case studies related to care (primarily) and other well-being services were selected

based on the following criteria: (1) the initiative focused on the enhancement of care or other well-being service innovation and had an "owner", whether a public care organisation, a third-sector organisation or a company associated with the public sector; (2) users were citizens acting from that position; (3) a user knowledge sourcing activity took place; and (4) user knowledge sourcing occurred in the early phase of the innovation process. There were 14 initiatives or projects that fulfilled the criteria and these were included in this study. Table 1 presents details of the individual case studies.

The Lahti initiatives cover a large sphere of activities as compared to many other living labs in Finland that have often been project-based with a relatively narrow focus related to one industry or theme. Lahti Living Lab has been understood in the region as "a philosophy" for collaborating with and engaging very different types of users from the idea generation phase onwards, rather than a designed test environment for existing product prototypes, for instance. The ten-year history of Lahti Living Lab is long among the Finnish Living Labs, making it well-known. Living lab activities have been approached in Lahti with different sectors and by developing people and organizations rather than technologies.

The data sources of this study included project reports, research articles and research notes. Also, project managers served as the primary informants through interviews. The data were analysed using content analysis techniques and guidance by the Leonard-Barton framework (Fig. 1). First, the outcomes of each case study were identified from the data. Then, the outcomes were thematically divided into framework categories, and this setting was displayed, discussed and agreed upon with the project managers.

Table 1. Case studies

Case name	Description	Year	References	Participants
Robot use in elderly care	Introducing a service robot in public elderly care services in care homes and a geriatric rehabilitation hospital. Finding appropriate ways to use it and orient personnel to its use.	2016	Melkas et al. (2016)	Case management: ~10 persons Users: ~100 persons
Smart home pilot	Ageing 'in place', enabling elderly persons to live at home for as long as possible. Addressing housing needs and technology testing were combined. Development of smart homes for use during short-term housing periods related to, for instance, end of hospitalisation, holidays of caring relatives and assessment of living and housing conditions.	2007–2008	Melkas (2013)	Case management: ~10 Users: ~30
Development of home care for elderly people	Public home care services were developed using simulation techniques with care workers and by collecting and using customer and employee narratives through improvisation theatre in a session with customers and employees.	2013–2014	Mäkimattila et al. (2017)	Case management: ~15 Users: ~20
Hotel service pilot	Improving service chains by introducing a new cross-sectoral service type for temporary housing needs. Development of an intermediary housing service, namely, a novel hotel service concept (i) for persons who had been hospitalised and no longer needed hospital care but were not able to cope at	2007–2008	Melkas, Uotila and Kallio (2010)	Case management: ~10 Users: ~25

	home yet or (ii) for elderly persons whose home had to be renovated.			
EIdeation	A group of seniors, students and experts generated ideas for a new elderly care facility.	2007	Hennala et al. (2011); Parjanen et al. (2012)	Case management: ~5 Users: ~50
Toothtroll	Started from a question regarding the reason teenagers miss dentist appointments. Through customer and employee narratives and research-based theatre, mouth and dental health care organisations changed their ways of working.	2008–2010	Hennala (2014).	Case management: ~50 Users: ~250
mStick and hStick	mStick: To assess the impacts and usability of mStick (reminiscence stick) in elderly care. mStick is a biographical memory storage device in which personal documents like family photographs, texts and audio and video clips are stored in a digital form. hStick: To assess the impacts and usability of hStick (health stick). hStick is used for storing health-related data needed in the case of emergencies or for self-care, especially in health promotion.	2010–2014	Salminen and Konsti-Laakso (2010); Pekkarinen et al. (2013)	Case management: ~20 Users: ~100
Social enterprise	To provide employment for mental and addiction rehabilitees, business ideas for social enterprises were developed by the rehabilitees.	2012	Konsti-Laakso et al. (2016)	Case management: ~5 Users: ~50
Outpatient care service process renewal	Improvement in the functionality of outpatient care via telephone counselling, public health centres and emergency departments.	2010	Hennala et al. (2012)	Case management: 2 Users: ~10
Supplier network	Five companies (suppliers of public sector organisations) explored possibilities for the inclusion of users in the companies' innovation activities.	2010	Konsti-Laakso, Pihkala and Krause (2012)	Case management: 8 Users: ~50
Dream bus routes	By using a geographic information system (GIS), citizens were asked to draw a bus line that would make their lives easier and even make them use public transport.	2011	Konsti-Laakso (2012)	Case management: 5 Users: ~360
Cyclists' Lahti	By using a GIS, citizens were asked to explain what it was like to be a cyclist in Lahti.	2012	-	Case management: 3 Users: ~100
Suburban development	Citizens of particular suburbs were asked to join a Facebook group dedicated to the development of their suburbs.	2010	Konsti-Laakso (2017)	Case management: 2 Users: ~140
Own act	How to activate citizens to improve their consideration of environmental issues. A community was established for people who are interested in environmental issues.	2009	-	Case management: 2 Users: ~70

Analysis and results

The analysis confirmed that the Leonard-Barton framework (1995) fits the context in which user knowledge is sourced. The first category, windows, provides a view into the user's world and samples of user potential. Access, on the other hand, provides opportunities to understand users in depth. The new solutions category provides knowledge 'bleedthrough', in which new products, services and concepts are generated and tested. New capabilities means

that organisations have adopted new core capabilities and are learning. In the following section, these categories are discussed in more detail.

Windows

Window-type activities provide examples of user potential. The windows category provides opportunities to observe or ask what is going on in the user's world. Social media, such as online discussions, are windows through which organisations can observe users without necessarily participating in the discussions. Typical examples of this are open online communities where customers or future customers discuss issues pertinent to the environment or service in question. In the Lahti Living Lab, these communities were purposefully created, but they were also borne as a result of projects. During the case study activities, to some extent, the communities were supported and even hosted.

With regard to user involvement, at the beginning of the living lab activities, it was purposefully decided not to establish a user register or database but to find users on an ad-hoc basis. Users were thus sought through formal organisations such as schools, adult education centres and associations. However, as time went by and case studies were conducted, several communities emerged as organic outcomes of the living lab activities. In many cases, different spaces or facilities open to the public such as those studied by Gascó (2016) could fall into this category because through them, utilisers could see the potential (ideas, prototypes, etc.) that ordinary citizens could produce.

These communities supported and enhanced users'/citizens' own activities. With respect to citizen participation, in particular, the citizens' own activities in their own environments and daily lives were considered valuable, genuine participation. These groups were also available and willing to participate in the living lab development or innovation processes, which is considered important for living lab activities.

The windows category is important in a public sector context. For example, a social media group may exhibit citizens' own activities, which is an important part of citizenship. This creates new social practices which are significant, particularly in a public sector context (Edwards-Schachter et al. 2012). Thus, these communities were available for further innovation activities, and in this way, they contributed and created infrastructure for living lab activities.

Access

Access-type activities provide a deeper understanding of a user's world and purposefully and formally collect user knowledge. In the access category, user knowledge is sourced through different kinds of mechanisms and then codified. Access can be taken very literally: for example, it can be a workshop with users or discussions facilitated in a virtual space.

Such initiatives are typically conducted via surveys or other types of knowledge sourcing. The collected knowledge is codified, such as in the case studies 'hotel service pilot' and 'smart home pilot'. Furthermore, in case studies such as 'development of home care' and 'robot use in elderly care', the users and developers met and interacted face-to-face.

Despite access to user knowledge, there were also some instances in which the user knowledge was not utilised. In such cases, the managers had seen the potential and value of user engagement, but the user knowledge was overlooked at the operational level.

One such example where utiliser commitment failed is the ‘Eldeation’ case study. Senior citizens, gerontology experts and students of design generated ideas together in a web-based system. Although a huge amount of ideas and even solutions were offered, the utiliser (in this case, the social housing organisation) did not participate in the exercise as expected. However, the ideas were later utilised and refined in the design of a new building that was built for elderly people. So, the results were not rejected but there was a time lag in utilisation.

New solutions

Leonard-Barton (1995) called this level ‘new product or service’. However, in this chapter, this category was labelled ‘new solutions’. This category includes activities that have generated outcomes, such as new products, new services, new ways of working or new business. Overall, this category shows similar outcomes as identified as Leminen and Westerlund (2012). They are more tangible in nature.

In the Lahti Living Lab, ‘mStick and hStick’ was a truly user-led innovation initiative. The idea was to use an ordinary USB-memory stick to operate as a storage device for health-related information that could be used in, for example, emergency situations (hStick), or for storing personal memories that could be used to enhance patient–nurse interaction in nursing homes (mStick) (Pekkarinen et al. 2013). The idea originated from one active citizen who developed this idea with his friends. Over the course of four years, the idea was developed further and tested with local social and health care organisations. News of the mStick concept spread particularly quickly, and it is now used widely.

In our sample of projects, the utilisers creating new solutions and services were not public sector organisations but firms and associations. These organisations identified citizens as their end-users (Brookes and Wiggan 2009). In this case, the users had a significant role in applying the basic idea of storing health and life events, and creating a rich spectrum of solutions based on their needs, restrictions and everyday contexts (see Pekkarinen et al. 2013). Without the living lab and end-users as developers, probably the solution would not have been created or at least it would have been much simpler.

In the ‘social enterprise’ case study, mental and substance-abuse rehabilitees created business ideas so that a new social enterprise could be established and jobs could be offered to rehabilitees. As an outcome, over 100 business ideas were created. As one of the results, a new service that employs mental health rehabilitees, was created and piloted, and several mental health rehabilitees were actually employed.

New capabilities

The fourth category is the addition of new capabilities to developing organisations. The acquisition of a new capability was achieved in the ‘Toothtroll’ case study, in which the organisation conducted a two-year project to improve teenagers’ dental health care. The organisation was developed on the basis of user-created knowledge that was made available to it. This resulted in, for example, changes to some employees’ job descriptions, development of new partnerships with private actors and creation of new service innovations.

As a specific approach, service users' experiences and voices were relayed throughout the organisation using organisational theatre (Pässilä et al. 2011).

In the new capabilities category, in particular, the utiliser commits a great amount of resources, especially time, to development work. In the 'Toothtroll' case study, a development team was responsible for the development of the project. This team has since replicated the process to other customer segments, including elderly care. The 'Toothtroll' results have gained national-level interest as innovative, unique practices of involving users (see also Hennala 2014). It appears safe to say that without the living lab activities, the extensive process and its results would not have been created.

The 'social enterprise' initiative also had characteristics typical of the new capabilities category. The utilisers (four non-governmental organisations) formed a dedicated team called the pre-board. They wanted to learn how to better utilise the human capital of their clients and service users (rehabilitees) and how to, for example, host idea generation workshops by themselves.

Key conditions for living lab performance

The cases and their outcomes were quite different, but certain key conditions for successful living lab activities were recognised as follows. The various stakeholders were mainly truly committed to the activities and recognised their own roles. The regional innovation system has supported activities, by providing infrastructure (social, in particular) for the living lab. Lahti Living Lab has identified its focus and constructed cumulative competences in its areas of expertise over the years. Many people have been engaged in the living lab management. They have also been aware of living lab challenges and differences as compared to normal development activities. Furthermore, Lahti Living Lab has functioned as an active member of the larger living lab movement and thus benefited from exchange of knowledge, competences and collaboration opportunities.

Processes for implementing cases have been streamlined, and there are good connections to different kinds of users and utilisers, or at least an interface to them. With some users and utilisers, collaboration has continued for a long time, making accumulation of knowledge possible on their needs. Cases have taught people about development processes but also about collaboration. The extent and degree of participation in the cases differed among the stakeholders, which may affect success, according to earlier studies in other fields (Cavaye 1995). In addition, it is worth noting that the practical implementation of ideas that have been generated, by the utilisers, may take place quite a lot later and may thus fall beyond the timeline of a quick evaluation. Besides, in general, the key conditions which enhance the performance of the living lab are likely to depend fairly much on the specific characteristics of the living lab in question, causing difficulty in generalisation.

Among the cases, there was one failure, the 'Outpatient' case. The researchers, as living lab operators, were left with the user knowledge in their hands. The user knowledge was rejected at the operational level. The researchers were not invited to meetings, although the top level managers had instructed invitations to be made, indicating that sometimes, user knowledge can be seen as a threat. Even in this case, the information on the sequence of events was made

visible, which may lead to changes in attitudes later on. This development highlights the importance of long-term living lab activities, in which there is space for different phases.

Discussion and conclusions

This study aimed to determine the types of outcomes that can be obtained from living lab activities focusing on innovation and transition in public well-being services. After analysing 14 living lab case studies by applying Leonard-Barton's framework (1995), four different outcome categories for utilisers were identified: windows, access, new solutions and new capabilities. These categories represent the outcomes of living lab case studies.

The results of this study show that innovation activities in well-being services can appear as either new solutions or innovative processes for gathering user information and finding new capabilities. At a practical level, the results provide tangible insights into how living lab activities can be utilised to enhance innovativeness in well-being services and the kinds of outcomes they can produce. This examination of living lab activities in the well-being context also provides valuable glimpses into the participation of various groups of citizens/customers, especially vulnerable groups like rehabilitees and elderly people.

Living lab approach shows high potential in public well-being services, where innovation often emerges in very practical contexts and which often lacks funding mechanisms and systematic organisation to carry innovations forward (e.g. Pekkarinen 2006). To move the innovation culture into a more positive direction in well-being services requires seeing innovation not as an external activity but as part of the normal work of every employee (Pekkarinen et al. 2006; Melkas et al. 2016). Another important issue for living lab contribution is maintaining multi-stakeholder collaboration for the benefit of citizens' well-being during and after the major care sector reform.

Indeed, the reform of care services might have adverse impacts on public well-being services more generally if well-being as perceived in a wider sense is not addressed carefully. Multi-sectoral collaboration has been highlighted as a useful new approach in recent years, often with the help of living lab activities; however, changes in attitudes are usually relatively slow. The care service reform changes the basic logic in many ways, leading to the risk of disregarding the collaboration with other types of public services and possibly resulting in more fragmented multi-sectoral care services. If the care sector is developed alone and ends up struggling with its internal collaboration, external collaboration with, for instance, technical and environmental services, may receive less focus. To achieve sustainable and holistic well-being of citizens, an ecosystem of well-being should be developed with different types of stakeholders. Parts of the Lahti Living Lab would provide good examples in such an ecosystem.

In particular, living labs focusing on care services may play a specific role in enhancing the societal transition in Finland. Living labs provide the basic infrastructure, access to funding mechanisms as well as organisation and support for leadership to conduct innovation activities that the care sector typically lacks. Through living lab activities, employees may start to see innovation as part of their normal work, and managers could obtain new skills in supporting change. Through living lab activities, landscape-level changes could be discussed in an analytical, yet practically oriented way, and regime changes may be addressed in the

form of organisational or process innovation needs. Niche innovations such as service robotics or remote care services may be made familiar through living lab activities, enabling users to find relevant uses and ways to incorporate the niches into daily life in an effective way, thus helping technology in care to become a reality in line with the ongoing transition. Increasingly, niche innovations combining various public services for the benefit of people's well-being more generally should be facilitated through living lab activities.

In practice and as a managerial implication of this study, the framework outlined in this chapter can help living lab operators illustrate the potential for utilisers, such as companies and public sector organisations, and the possible outcome scenarios. The case studies have indicated that it does indeed take some time to convince them of the living lab approach and its potential. The framework in this chapter can also be used to highlight the role the utilisers can play. This is important as there are indications that user involvement still needs to be promoted and highlighted (Magno and Cassia 2015; Hennala et al. 2012). Indeed, as our case studies indicate, through the living lab approach, significant and meaningful results can be obtained. Key conditions for those were also identified.

The analysis is qualitative in nature, so there are limitations concerning the generalisation of the results. However, the results contribute to emerging discourse about living labs by providing a framework for discussing possible outcomes for utilisers, including an emphasis on the commitment required from these organisations. A future research topic is to study the ideas presented here in a quantitative study with a larger sample and to validate the causality between commitment and outcomes. More research is needed to understand why and how some organisations are able to transform user knowledge into new capabilities and how this process can be supported. More research is also needed to understand living labs' role and contribution to societal transitions in terms of combining themes, services and stakeholders and providing interpretations of landscape and regime level changes for niche innovators and users.

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Publication IV

Konsti-Laakso, S., and Rinkinen, S.
How to create a social enterprise: A case study.

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How to create a social enterprise: a case study

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Abstract

Social entrepreneurship and social enterprises are considered as promising approaches to many current problems in society. This article takes process perspective and analyses how social venture aiming to create a social enterprise was carried out. Our study raises interesting insights of entrepreneurial processes that are guided by innovative communities instead of individual entrepreneurs. We discovered that the social vesture process was similar to user entrepreneurship –model that emphasizes extensive interaction with user community. Therefore policy initiatives such as living labs could be potential instruments for fostering social entrepreneurship.

Keywords: Social entrepreneurship, user entrepreneurship**,** living lab

Introduction

Social entrepreneurship can be seen as alternative approach to sustainable economic development that emphasizes entrepreneurial behaviours and practices within the context of social rather than personal gain (Kraus, Filser, O´Dwyer & Shaw 2014; Chell, Nicolopoulou & Karatas-Özkan,2010; Shaw & de Bruin 2013). Social entrepreneurship and its outcomes social enterprises are expected to be a source of new and innovative solutions to the persistent problems of society and to produce social innovations at the local or community levels.

Social entrepreneurship and social enterprises have not been extensively researched and little is known, how for example, social entrepreneurship can be supported by means of innovation policy instruments. Living labs are among those few practical concepts have been suggested to support and stimulate social entrepreneurship (Lundström & Zhou 2011) and as form of open innovation highly important for new venture creation (Eftekhari & Bogers 2015; Chesbrough & Bogers 2014). Living labs can be defined as intermediaries of open innovation (Almirall & Wareham 2012) and their role for social innovation has been acknowledged (Edwards-Schachter, Matti & Alcántara, 2012; Battisti 2014) Therefore this study aims at increasing understanding on how social entrepreneurship can be fostered?

In this study we take a process perspective on social venture and empirically study a process that was carried out in order to establish a social enterprise and this way, solve a social problem concerning employment of disadvantaged persons.

Social entrepreneurship and social enterprises

The central driver for social entrepreneurship is the social problem being addressed in an innovative and entrepreneurial way (Chell et al. 2010). Current academic discussion however has not been able to create single definition for social entrepreneurship (Kraus et al. 2014; Seelos 2014).

Social enterprise can be seen as outcome of social entrepreneurship (Maír & Marti 2006). They are seen as something new and distinct from classical for-profit

business and traditional non-profit activity, combining elements of the social purpose, the market orientation, and financial performance standards of business (Young 2008; Galera & Borgaza 2009). Social enterprises combine business logic and social goals and usually tackle the wicked problems of our society such as environmental problems, injustice, poverty and social exclusion, that traditional private, public, voluntary or community mechanisms have not been able to solve (Shaw & Carter 2007). As such, social enterprise formation can be seen as innovation. (Kirkman 2012).

Korsgaard (2011) suggested that social entrepreneurship is a process of mobilisation and transformation. Mobilisation means involvement of new actors and that consequently transforms the venture. Phillips, Lee, Ghobadian, O'Regan, and James (2015) suggested that social innovation systems are sub-sets of individual and independent actors, but by means of collective learning solve and address social issues.

Although social entrepreneurship exists in traditional, profit maximizing organisations, social entrepreneurship and social enterprises are considered as possible solution to non-profit organisations financial and operating problems and therefore highly relevant approach for non-profit sector. Hull and Lio (2006) studied differences between non-profits and for-profit organisations regard to innovation and found out that non-profits particularly focus on process innovation instead of product innovations because process innovations may yield immediate results beneficial to the organization's cause, making it less risky and less expensive.

Living Labs as innovation policy tool

Policy-wise more and more focus has been targeted to the public or crowd as a group of actors that influence every national innovation system and as a key part of promoting knowledge-based economy. The need for Quadruple Helix cooperation between university, industry, government and public instead of the traditional Triple Helix cooperation (university-industry-government) has been brought out in several publications (see, e.g. Markkula, 2014; MacGregor, Marques-Gou & Simon-Villar. 2010; Lindberg, Lindgren & Packendorff 2014) and is also strongly promoted by EU through the Smart Specialisation concept (Foray, Gobbard, Beldarrain, Landabaso, McCann, Morgan, Nauwelaers, & Ortega-Argilés 2012).

Living lab can be considered as an example of quadruple helix – cooperation. Living lab is an innovation approach that emphasize user involvement to innovation process (Schuurman 2015; Dekkers 2011; Bergvall-Kåreborn & Ståhlbröst 2009). Almirall & Wareham (2012) describe typical Living lab as a collaborative project engaging companies, academia, government and technological centres, in which users are involved in several stages of innovation process. They also argue that Living labs are "intermediaries of open innovation", that focus on mediation between different actors capturing and codifying users insights in real-life environments.

Schuurman (2015) has identified Living labs as potential concept for entrepreneurship. The connection between entrepreneurship and user-involving activities is yet rather unexplored. However, there are some examples in empirical cases that imply that user-led innovation could have some impact to entrepreneurship. Hienerth, Keinz and Lettl (2011) found in their study that for example Lego fostered entrepreneurship-academia for its innovative users, whose inputs Lego was utilizing in its innovation activities. Another hint can be found from crowdsourcing initiatives that are defined as problem solving with bounty. A study conducted around T-shirt company Threddless, the users' motivation to send their designs to Threddless, was occasional freelancer work and even change a hobby to full-time employment (Brabham 2010). Autio, Dahlander, and Frederiksen (2013) studied user entrepreneurship in online

communities. They found out that the individual's exposure to technological information increases the likelihood that he or she will recognize "third-person opportunities" whereas exposure to information about user needs exhibits significant influence on first-person opportunity beliefs. They found proof for earlier studies that opportunity evaluation and entrepreneurial action are regulated by different external stimuli. Therefore, it seems that user related information plays very important role for fostering entrepreneurship.

Shah and Tripsas (2007) described the process of user entrepreneurs, where user entrepreneurs developed and validated solutions (or prototypes) with communities prior to commercial opportunity and firm formation (See figure 1). Shah and Tripsas (2007) model describes information inputs as ovals and actions taken by entrepreneur by a rectangle.

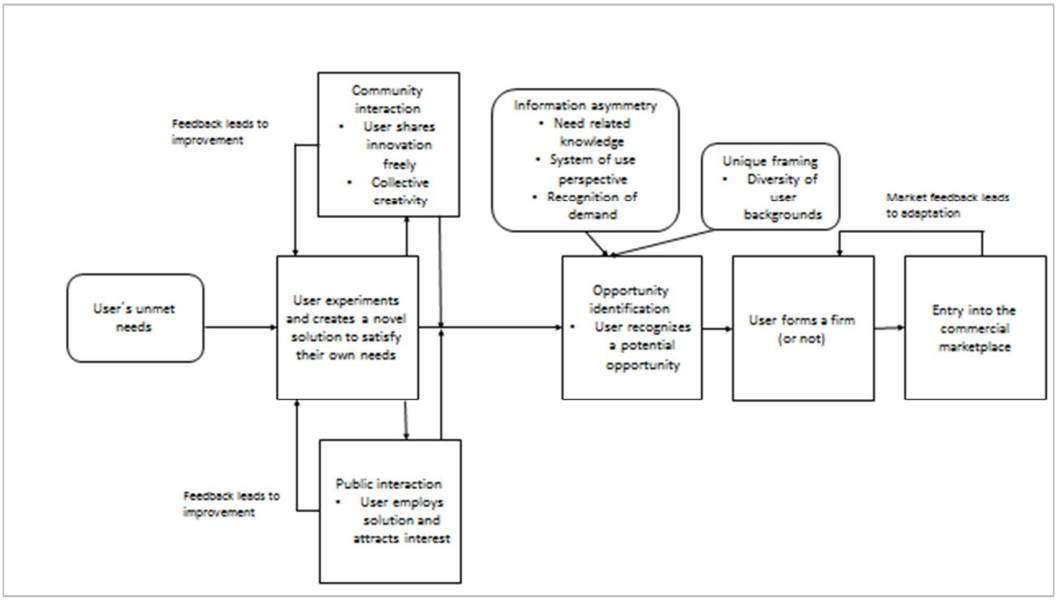

Figure 1. End-user entrepreneurial process model (Shah and Tripsas 2007)

Shah and Tripsas (2007) also set four propositions for conditions when user entrepreneurship is more likely to dominate classic sources of entrepreneurship. First, when user provides enjoyment opposed to solely economic benefit. Second, when users have relatively low opportunity costs. Third, when industry is small scale, niche with high variety of demand and peripheral. And finally fourth, when market is turbulent, product is new, there are high levels of uncertainty and evolving user needs.

The user entrepreneurship models takes in to account interaction among different actors that Korsgaard (2011) identified important for social entrepreneurship. User involvement is emphasized by Svensson and Bengtsson (2010), who showed through their two case studies that people with social problems can innovate new social services for themselves. They concluded that the superior knowledge about the problems and solutions possessed by users could explain the varying frequencies between service types (such as banking services, surgical instruments or social services) of user generated innovations. They also found that legitimacy played significant role in this process. Internal legitimacy within the group helps to diffuse the social venture and

make it attractive to potential users of its services. External legitimacy of the venture is dependent of project leaders and organisations. (Svensson & Bengtsson 2010).

CASE STUDY

Methodology

A qualitative single case study methodology was selected to report the studied process and its results. Yin (2009) defines a case study as an empirical inquiry that investigates a phenomenon within its real-life context. The main reason for using the case study approach is the desire to understand particularly complex phenomena either by learning something about the case itself or by using the case to achieve a more general understanding (Stake, 1995; Yin, 2009). Within management studies, the case study approach has traditionally been used, especially when there has been a need for new theory development (see e.g. Eisenhardt, 1989).

The research project started when the first author of this paper was contacted and asked, if researchers could provide expertise concerning participatory business idea generation. Data was therefore collected from a real-life process between autumn 2012- spring 2014. Data consisted researchers observations from pre-board meetings and idea generation workshops and they were recorded as a field notes. Besides these events, there were frequent informal interaction with key informants, namely the pre-board members. Through this interaction updates about recent events were received, researchers observations were discussed and validated. These were also recorded as field notes. Blog texts, project presentations and evaluation report produced by informants were included to data. The quantitative description of data is presented in table 2.

Table 2. Data description

Data type	Number	Length
Project presentations	2	44 pages
Blog texts	3	5 pages
Evaluation report	1	17 pages
Interviews	1	2 hours
Field notes	6	23 pages
Case description	1	5 pages

Technically, the analysis was made manually. Typical to qualitative research, analysis and data collection overlapped. The analysis did not base on formal coding procedure but on more direct interpretation of research materials (Stake, 1995). Analysis started so that case description was constructed based on chronological process presented in figure 3. After the first case description was written, the usefulness of the user entrepreneurship –theory was noticed and lead us to investigate the corresponded phases. After this, two hour open interview with the process leader and participated researchers was conducted in order to validate results.

The first author of this paper participated in the data collection and made the analysis. In order to avoid researcher bias, there were constant interaction between other

participated three researchers so that meaning-making, interpretations and subjectivity (Mabry 2008 p. 222) could be handled.

FINDINGS

Case description

Foundation A is a non-profit organization operating in Southern Finland. It produces services such as housing and rehabilitation services to mental health and substance abuse rehabilitees. A newly recruited employee of Foundation A decided to start a process that would lead to the establishment of a social enterprise. The reason for doing so was the fact that work is considered an important aspect of rehabilitation and a step towards "normal life". However, the general working life in Finland is considered rather rigid and on-off: either you are capable of working fulltime or not at all. There are no suitable working conditions or opportunities for rehabilitees who are able and willing to work but in terms of their current capabilities. The following quote from the projects blog illustrates well the problem that was to be tackled:

"Comparing the objectives of "Bee of social economy" and yesterday's TV-programme titled "Who would hire a person, who is partly fit to work?, can be said that our venture is so right and justified! Or what do you say, pre-board members, about the next quotes from the programme: "Finnish labor market suffers from on/off- problem", "I think it is a shame, if a person can´t utilize all his cards in his hand". The interview of Finnish labor minister Lauri Ihalainen is also very interesting and encouraging. Or what do you say about his comment that employing by social cause has bigger influence of national economy than raising a retirement age" (Source: Blog text, freely translated from Finnish)

The primary focus of social enterprise was to fit capabilities of its employees and secondary focus is to be financially viable, preferably without any financial support from government. This idea was presented for three other non-profit organisations operating with the rehabilitees. They agreed gladly with the idea and formed so called "pre-board", that would be the steering group of the process.

The community of rehabilitees possess different competencies and skills, "from a grave digger to a lawyer". For the new venture, the business plan had not been drafted, the legal form of venture was not decided nor were there any concrete business ideas for the activity. In order to generate the business ideas and to find the potential from the whole community, it was decided that an idea generation workshops would be implemented in collaboration between the community and researchers/facilitators. The process was called 'Bee of communal economy' and it is illustrated in figure 2. Business ideas would be collected through co-creation and co-learning to find out about what services and products the social enterprise could offer.

The idea generation sessions were planned and facilitated by a researcher. The starting point of the idea generation was the capabilities and skills of individuals in the community, instead of the market opportunities or any other outside trigger. The facilitation focused on finding participants' strengths and to acknowledge meaningful experiences of work. The philosophies of improvisational theatre as well as playfulness and meditation awareness were used as methods of creation in the workshops.
Four workshops were organized in each of these four organisations. Workshop participants, i.e., rehabilitees, their relatives and social workers, were mainly from these

four partner organizations. Workshops were open and targeted at anyone interested. Altogether about 140 people participated in the workshops – about 120 rehabilitees and 20 social workers.

More than 100 business ideas were created in four open idea generation workshops. After the idea generation workshops, two business idea concepts were selected by the pre-board for further development. The first idea concerned a new social service and the second idea was built around ICT-services. The latter one however did not reach enough interest and enthusiasm among the community nor resources so that the development work would have continued. The social service idea was in the other hand developed further, because there was interest in the community and the idea served the community so well. In order to develop the concept further, a new development team was recruited from the rehabilitees.

The social service concept was piloted together with local public mental healthcare unit. The pilot was also evaluated and results were very positive and encouraging showing that there were clear benefits for all stakeholders: the patients, the local mental healthcare unit and the employed rehabilitees. Currently, the service is ready to be commercialized and negotiations ongoing. The development process concerns two distinct business opportunities and neither of these is enough for the establishment of a new firm as such. In terms of institutionalization, there are two alternatives: The first one would be joining a local cooperative and thus the process would not lead to the emergence of a new organization. The second alternative would be to run the service as part of the focal organization. In this case, the company would be created and it would be strongly supported by the Foundation A.

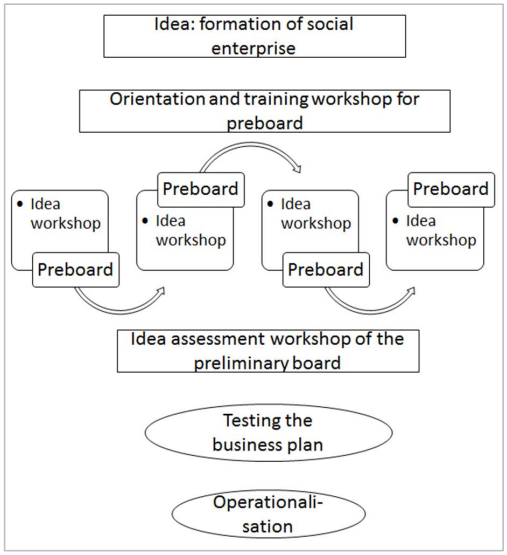

Figure 2. Case as innovation process.

Analysis

Entrepreneurial processes almost always have a central person or a group pushing the process forward. In this case the entrepreneurial person was a new employee within a foundation A. After initializing the process by inviting the other non-profit

organisations, the community of service users were invited to take over the process in terms of identifying the business ideas and developing the business concept for the emerging organization. The community in this case consisted the rehabilitees and non-profit organisations. The rehabilitees had two roles in this process. First, they were considered as potential employees of the future firm. Second, they were seen as potential customers or end-users of the future firm. The whole process is illustrated in figure 3 according to the user entrepreneur model of Shah & Tripsas (2007). In their model, the starting point is an unmet user need and the focal actor is a single user. In this case, the starting point was a generally acknowledged social problem that touched particularly the community at hand. In the figure, rounded rectangle presents actions where community played significant role. Rectangles are actions, where the pre-board is playing the leading role. Triangle illustrates phase, where a development team (recruited among the rehabilitees community) lead the venture. Circle presents the initial need.

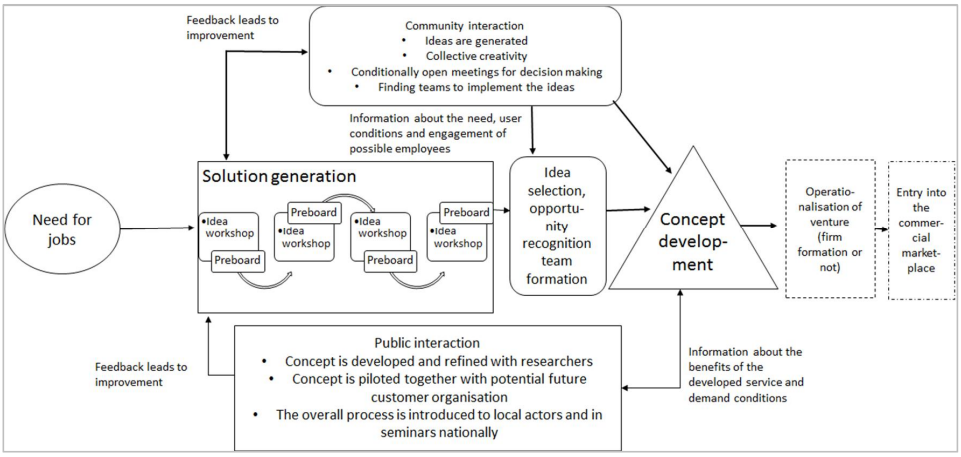

Figure 3. Case process according to user entrepreneurship model (adapted from Shah & Tripsas 2007)

Solution generation, selection, and opportunity recognition

The solution was a social enterprise that would provide employment for the rehabilitees. In this point, the employee identified that they could just establish a new firm and then, develop a set of services and products to sell. This path would have required financial capital and decisions about the firm structure and ownership before the actual business ideas were invented. This would have required a lot of resources and it would have taken the focus off from the community and the actual problem.

For the involvement of community, “the bee of communal economy” -initiative was launched as joint activity of the four non-profit organisations and a research unit, that hosts Lahti Living Lab.

In order to manage and steer the process, the so-called pre-board was established. The necessary ecosystem (cf. Moore, 1993) or social innovation system (Phillips et al. 2015) around the solution (i.e. social enterprise) started to take shape. This corresponds to idea of mobilisation (Korsgaard 2011). Before the actual idea generation workshops, the pre-board members had their own orientation workshop, so they could learn how to manage these type of collaborative idea generation workshops

themselves. The learning and activation of community by idea generation workshops provided those important benefits for non-profit organisations that process innovation generates (Hull & Lio 2006).

Pre-board made and agreed on the rules that were openly communicated to everyone involved. All the pre-board meetings were public and anyone could join. However, in order to secure decision making effectivity, outside-board participants had only right to comment in the pre-board meetings. The pre-board adopted the role of the leader for the entrepreneurial process. The important task was the selection of potential ideas, which took place in the open pre-board meetings. Pre-board were responsible for the opportunity recognition and that activity took place constantly during the idea generation phase. Viability of idea or opportunity was constructed from pieces: whether the ideas fit for previously determined "good idea criteria" and if there was found enough potential people to develop the concept further. These enthusiastic and entrepreneurial people had to be found from among the rehabilitees – not from the organisations and among their employees.

Community interaction

Besides the open pre-board meetings, the idea generation phase consisted four public workshops (see figure 3). In workshops, all emerging or existing ideas for business were collected. If someone came to workshop with an idea, it was written to a post-it note and placed to a "wall of ideas". Otherwise, ideas were generated in the workshops. Method-wise, the idea generation process followed user co-creation and participatory design domains in Living lab methodology landscape (Pallot et al. 2011) and relied strongly on socio-emotional intelligence. Social and emotional intelligence refers to the competencies linked to self-awareness, self-management and social awareness. The methodological starting point was to focus on participants own strengths and meaningful experiences of work. By doing so, the diversity and heterogeneity of participants backgrounds and skills could brought to use (Shah and Tripsas 2007; Autio et al. 2013). Thus, the potential employees were guided and supported to generate first-person opportunities (Autio et al. 2013) instead of scanning outside opportunities or possibilities for someone else.

Concept development

Two ideas proceeded to concept development phase but only one proceeded further and caused entrepreneurial action during the time period under investigation. The idea that survived was very much tied to the community members' own experiences as patients and rehabilitees and thus, improved the current services. This corresponds to Autio et al. (2013) as their study suggests that use information is important to stimulate entrepreneurial action. Therefore, it was no surprise that this idea prompted entrepreneurial action among individuals from the community. A team of four people was found among the community of rehabilitees and they developed the concept further. This also meant shift in management of the process. The team took over and the initiator together with the pre-board stepped aside. This event presents transformation where the project became more focused.

Public interaction

As distinction to Shah & Tripsas (2007) model, there were different kind of public interaction models. Through the public interaction, the venture process was introduced for local authorities and for local entrepreneurial community: Science- and Business

Park, City council and Centre for Economic development, transport and the environment (TE), to name but a few. This was done in order to raise awareness about the social problem and about the social enterprises in general. The feedback received was mainly positive although one authority doubted the concept of social enterprise saying "These ventures usually are not viable…" These interactions however brought the process to the awareness of local entrepreneurial environment (Audretsch and Keilbach 2004) and gained acceptance locally.

In concept development phase, the selected team utilized business model canvas (Osterwalder and Pigneur, 2009) in order to shape the offering. The team chose to visit one of the researchers, who had a strong background in business but had been absent from the idea generation workshop phase, to test their ideas and to have feedback about the planned venture.

Public exposure took place as the service was introduced and piloted together with a potential paying customer, the local mental health service unit (open ward). This unit was very familiar for the rehabilitees and there were strong ties between the open ward and non-profit organisations. Social capital was the main instrument here (Mueller 2006) and collaboration in order to organize the service pilot was easy to arrange. This pilot committed the potential customer (the public social- and health services) to the process and demonstrated the positive impact of the service in practice. There was also an impact investigation study and report made which supported the overall positive impact of the new service.

Discussion

Theoretical implications

This study contributes for one´s part to the development of understanding about social venture creation and social entrepreneurship on several ways: First, it suggests that social entrepreneurship process operate and have similar characteristics as user entrepreneurship model suggested by Shah and Tripsas (2007) that emphasizes extensive interaction with user community and local business environment prior to formal firm formation. This supports and deepens Korsgaards view (2011) that suggested that social entrepreneurship is a process of mobilisation and transformation. Through mobilisation of community the process as such created social value that is important for non-profit organisations engagement in innovation. This corresponds with earlier studies by Hull and Lio (2006) and Verschuere et al. (2014) who suggested that non-profit organisations are more likely to engage in innovation processes that directly benefits the social mission.

We built our analysis on the model by Shah and Tripsas (2007) who formulated four propositions for conditions when user entrepreneurship is more likely to dominate classic sources of entrepreneurship. They suggested, that user entrepreneurship is likely to dominate when user provides enjoyment opposed to solely economic benefit and when users have relatively low opportunity costs. In our case the user community engaged in the venturing process from the perspective of creating a new service for themselves. The process itself generated value as it provided meaningful employment for rehabilitees, activated the community and provided co-learning, and therefore generated process innovation benefits (Hull and Lio 2006). The basic idea is about lowering the risks of idea generation and selection through user engagement is central.

Thus, being able to pilot the developed concept themselves, the user entrepreneurship model clearly dominates.

User entrepreneurship is likely to dominate in cases where industry is small scale, niche with high variety of demand and peripheral (Shah and Tripsas, 2007). In our case we find support for this proposition, as the lack of available service concepts was evident in the early stages of the process and social enterprises are not a mainstream and often tackle local issues.

For living lab research, this study provides empirical evidence on how new innovation approaches such as living labs can foster social entrepreneurship. This study raises the question if user communities could be more than idea generators and evaluators (cf. Dutilleul et al. 2010) for existing innovators and user companies. Particularly, if user community interacts with each other, not just individual user with innovator organisation, exposure to use knowledge can take place (Autio et al. 2013). Basing on the findings in our case study, we suggest that living lab-approach may secure the value creation process of the new venture, and in that sense could actually provide a competitive advantage for entrant businesses, as proposed by Eftekhari & Bogers (2015).

Practical implications

The case presented here has practical implications by illustrating the possible routes for supporting business ventures stemming from user communities and/or third-sector organisation or civil society. The case and particularly user entrepreneur framework could also offer practical method for start-up venture quality improvements, for example in those hundreds of living lab settings around the globe.

Limitations and further research

This study obviously bears some limitations but in the other hand, offers several interesting avenues for further research. First, the methodology of this study places limitations to generalizations of this study. In other countries, the definitions and roles of social enterprises, for example, are different and findings as such are not easily transferred. Also the rigid working life may stem from the national circumstances and in that sense be nation-specific problem. However, this study could be continued by for example developing hypothesis and testing, whether this model applies to process of social enterprise creation in third sector in general. The need for studying processes instead of actors is still highly relevant (Phillips et al. 2015).

Second, this study leaves cost and financial related questions outside the scope. It is acknowledged that in this case, the rehabilitees participated in voluntary bases. The terms of financial social security might cause some obstacles and therefore cause a major personal risk for participation in entrepreneurial ventures. Moreover, the social and economical value that is generated along the social entrepreneurship process needs to be studied in detail. We think that more research should be undertaken to uncover the potential, role and impact of open innovation approaches, especially living lab-approach to the social entrepreneurship.

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Publication V

Konsti-Laakso, S., Pihkala, T., and Kraus, S.
Facilitating SME Innovation Capability through Business Networking

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Facilitating SME Innovation Capability through Business Networking

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Innovation processes can be regarded as complex, dynamic, and a result of cumulative dynamic interaction and learning processes involving many actors. In this setting, private small- and medium-sized businesses (SMEs) can be considered a key factor – as generators of new ideas, as entrepreneurs carrying out new ventures, and as partners for other local actors. This study focuses on the SME networks and their ability to participate in innovative processes directed at new value creation. We present a case study of the development of a young innovation network. Our focus in the case study is on the SME's ability to carry out innovation and new value creation in a network. The key contribution of the study centers on the new understanding of the way SME innovation could be promoted through facilitated network development.

Introduction

Innovation is seen as a way to survive among continually growing competition (McGrath et al., 1996). Innovation activities are increasingly targeted at companies' ability to create more value. To enable the best possible value creation, innovations are now often produced in networks that combine different knowledge and assets (Jørgensen & Ulhøi, 2010). Innovation processes can be regarded as complex, dynamic, and a result of cumulative dynamic interaction and learning processes involving many actors (Bessant & Tidd, 2007). In this setting, private small businesses can be considered a key factor as the generators of new ideas, as entrepreneurs carrying out new ventures, or even as partners for other local actors.

In innovation research, small- and medium-sized enterprises (SMEs) have long been recognized as important actors in creating, applying and introducing innovations, especially within local economies (Curran & Blackburn, 1994). It has been claimed that over 60 per cent of all innovations in the 20th century were developed by small firms (e.g., Barrow, 1993). On the other hand, it could be argued that, although many small firms may well be innovative, they often do not have the commercial strength or professionalism required to successfully turn innovations into inventions (Rothwell, 1986; Noteboom, 1991). This means that SMEs must not only be able to develop their internal development activities, they also have to be able to strengthen their abilities to collaborate with other companies as well as with customers (e.g., Bougrain & Haudeville, 2002).

This study focuses on SME networks and their ability to participate in innovative processes that are directed at new value creation. It seems that for SMEs in particular, the development of their innovative capability is crucial. Furthermore, in the context of SME development, the role of external network facilitators is likely to be important as well.

Prerequisites for Innovation in SMEs

The research on SME innovation has largely centered on the difficulties and barriers small businesses face in bringing new solutions to the market (Grabher, 1993; McAdam, McConvery & Armstrong, 2004). The research on innovation barriers has been closely linked with studies on the measures to foster innovation at

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the local, regional and national levels (Cooke, 2001; Asheim & Coenen, 2006). The role of innovation systems and networks are crucial in forming the infrastructure supporting innovativeness. Van de Ven (1993) discussed the role of infrastructure in creating entrepreneurship. He claimed that in many innovative cases, the infrastructure has developed to a point where the needs and methods for facilitating innovation already exist, and that the entrepreneur is only offered the chance to take advantage of the benefits of exploiting an opportunity. In essence, the quality of a specific infrastructure may function as an important factor in the innovation process. However, the research on the differences between innovative and non-innovative small businesses has suggested that differences in innovativeness stem mainly from the organizational characteristics of the companies rather than the external circumstances (e.g., McAdam, McConvery & Armstrong, 2004; Forsman & Rantanen, 2011).

The organization's ability to innovate comprises two intertwined aspects: innovation capability and the ability to participate in innovation networks. Interest in innovation capability has grown steadily for the past few years (e.g., Lawson & Samson, 2001; Tidd, Bessant & Pavitt, 2001; Bougrain & Haudeville, 2002; Koivisto, 2005). Despite this wide interest, researchers have still not come up with a simple definition of the innovation capability phenomenon, although some unanimity has been reached. The research into innovation capability builds on earlier theoretical developments in its concepts such as absorptive capacity (Cohen & Levinthal, 1990) and personal creativity (De Bono, 1973). It has been suggested that an organization's ability to transform knowledge into new products, services and systems that create benefit for the company and its stakeholders is a fundamental condition for innovation capability. Bougrain and Haudeville (2002) related innovation capability to human resources and concluded that before SMEs can tap into knowledge outside the company, they should develop their internal capacities by recruiting skilled staff. Most scholars agree that innovation capability consists of several distinct elements that are mostly concerned with the internal characteristics of organizations. These elements include (e.g., Cohen & Levinthal, 1990; Kianto, 2008):

- absorptive capacity and external knowledge,
- organizational structures and culture,
- leadership and communication,
- individual creativity and innovativeness,
- organizational learning culture.

While organizations' innovation capability can be regarded as a necessary requisite for new value creation, it is not sufficient in and of itself. The ability of organizations to participate in innovation networks has been identified as a central ingredient for business innovation for three reasons:

1. it is vital for the development of innovation capability to involve other organizations in the process (Jørgensen & Ulhøi, 2010),
2. it is necessary to include outsiders to help promote the development of R&D ideas (Tidd, Bessant & Pavitt, 2001; Chesbrough, 2003; Snow et al., 2011),
3. for the implementation of innovations, other organizations need to be involved (Tidd, Bessant & Pavitt, 2001; Prahalad & Ramaswamy, 2004).

Networks appear essential for innovation. Therefore SMEs' ability to enter into and benefit from network relationships can be regarded as a prerequisite for innovation.

User Involvement in the Value Creation Process

Traditionally, the concept of value refers to the monetary evaluation of a good. However, in the context of innovation and business development, this concept has been widened to better cover the different benefits and perspectives that goods can offer. The value of the product or service is ultimately assessed by the customer. Priem (2007) suggests that the value creation process at the organizational level includes all activities that provide a greater benefit for the customer than the customer currently possesses. As the customer plays this important role, one of the current tendencies in innovation has been the *co-creative approach* (Prahalad & Ramaswamy, 2004; Grabher, Ibert & Flohr, 2008). Co-creation refers to customer or user involvement in the innovation process. User involvement in innovation is seen as benefitting the innovation process in many positive ways. Co-creation also highlights the interactive knowledge generation process between the user and producer.

Innovation practices that seek to involve users in the innovation process have been given many different names, but the goal is mostly the same: to uncover needs and use knowledge about how customers act, experience and think. In user-driven innovation, the customer/user is the developer of the product or service (von Hippel, 2005). The benefits of customer or user involvement are widely recognized in the literature (Alam, 2002; Magnusson, 2003; von

Hippel, 2005). Alam (2002) found that user involvement shortened the cycle time of new service development processes. User involvement has mostly been studied in ICT-based service development. Users can offer valuable input, especially in service development (Magnusson, 2003). User information can be utilized in all stages of product and service development, but it is especially important within the idea generation and testing phases. Obtaining access to users is considered difficult and demands resources.

Value Networks and Open Innovation

Research on business networks and inter-firm co-operation has shifted its focus more to the innovation and value creation of networks (Stabell & Fjeldstad, 1998), instead of simply studying the networked manufacturing-oriented value chains (e.g., Piore & Sabel, 1984) or person-related social networks (e.g., Hansen, 1995). Indeed, value chain is a useful concept in production-based industries, but it fails to capture the value creation logic of, for example, banks and insurance companies (Stabell & Fjeldstad, 1998). Similarly, value chain is not suitable to describe the context where companies search innovative solutions.

Value network is a useful concept to describe networks that aim at innovation. It is important to define value in order to understand the value network as a concept. The concept of value includes more than just traditional financial value. According to Allee (2000), value can be understood as knowledge, intangible assets such as an image or brand, and transactions. Where innovations are concerned, knowledge can be considered as an important currency of value.

The definition of Vanhaverbeke and Cloodt (2006) states that value networks can be described as inter-organizational networks linking together firms with different assets and competencies, and that attempt to respond to new market opportunities A value network can be seen as a context for open innovation (Chesbrough, 2003). Open innovation recognizes that knowledge outside the organization is valuable and highly beneficial. The current shift from closed to open innovation activities means that the organizational value network offers many potential partners for innovation. Christensen (1997) has argued that a value network is the context where an organization identifies and responds to customer needs, solves problems, procures input, reacts to competitors and strives for profit.

In this paper we follow the ideas of Chesbrough (2003) and Christensen (1997) and define the value network as the network of opportunities where an organization identifies several actors or potential partners. Here, the relationships are allowed to be loose or even non-existent. In the value network some relationships evolve into business networks which eventually create new business models, which can be defined as the core logic of financial value creation.

Along with the evolution of the open innovation concept, the understanding of the involvement of outside specialists and experts in companies' R&D operations has been described as co-operation. It turns out that network relationships are rather open-ended, dynamic and opportunity seeking (Peppard & Rylander, 2006). In practice, this means that organizations are participating in various local, national and international networks. The duration of the relationships may range from weeks to years, depending on the needs of the participants as well as the respective circumstances. The companies evaluate their partners and their participation in the networks on the basis of ability to add value of the partners and networks (Kothandaraman & Wilson, 2001). For example, although the definitions of the value network are company- or organization-dominated, a value network includes the customer as a network member. Customers are a close and natural group of stakeholders that can be approached in order to acquire knowledge to support R&D.

From the perspective of small businesses that often have limited resources, value networks open up interesting possibilities. Instead of mere value chain co-operation, value networks provide new approaches to horizontal co-operation and an opportunity to use the core competencies of small businesses in a wider context. While access to traditional value chain networks has been predominantly difficult for the smallest businesses, in value networks the access is largely dependent on the entrepreneur's personal contacts and social relationships.

It has been suggested that networks are located between markets and hierarchies (Williamson, 1981; Thorelli, 1986) and thus optimized in terms of transaction costs and governance costs. Value networks refer to loose network structures and low asset specificity. According to Williamson (1981: 558), 'if assets are nonspecific, markets enjoy advantages in both production cost and governance cost respects . . . As assets become more specific, however, the aggregation benefits of markets in the first two respects are reduced and exchange takes on a progressively

stronger bilateral character.' Especially in the early stages of formation, value networks offer interesting opportunities for businesses in terms of business transactions.

The Formation of Value Networks

There is surprisingly little research evidence regarding the formation of SME value networks. Basically, the formation of value networks has been seen as similar to the formation of any SME network. For example, Blankenburg-Holm, Eriksson and Johansson (1999) suggested that the evolution of a network includes four stages before the network starts to create value. The stage of value creation is preceded by the initial business connection, mutual commitment and mutual dependence. It could be argued that the process is dominated by an entrepreneurial person's networking activities all the way through until the stage of mutual dependence that involves the intertwined business processes of the co-operating businesses.

The role of the entrepreneur in the early stages of the network formation has been correctly emphasized in the literature. Hite and Hesterley (2001) suggested that the formation of a network is usually based on the entrepreneur's social network. They argue that firm networks evolve from identity-based, path-dependent networks to more calculative, intentional networks during the early growth of the firm. Together with this development, the network based on the entrepreneur's social relationships changes into a more strategic network. At the same time, this evolution represents the shift in the strategic context of the firm. The end result of this evolution is that the network becomes more manageable. With this being the case, the network structure is also bound to become more static and organized. The stability of a network can be regarded as prerequisite for value extraction. However, in addition to providing stability, this phase can pose a potential threat to organizations' innovation capability, as the organization's ability to explore new approaches grows smaller.

Earlier literature suggests that the formation process of the emergent network can be largely facilitated by external support (Howells, 2006). Facilitation can be external, and is also referred to as brokerage (Burt, 2002), intermediation (Howells, 2006) or bridgers (Bessant & Rush, 1995). Harland and Knight (2001) identified six network management roles among supply networks: network structuring agent, co-ordinator, advisor, information broker, relationship broker and innovation sponsor. Knowledge brokers are those entities (organizations or individuals) that facilitate the operations between the knowledge source and knowledge needs. Network facilitation supports, for example, objective setting and mutual learning (Harding, 2002). Facilitators' main tasks are to shorten the distances (e.g., cognitive, social, communicative) between the network participants (Parjanen, Harmaakorpi & Frantsi, 1996) (see Table 1).

This facilitation enables SME networks to grow beyond their social networks. However, external facilitators cannot generate the initial reason for SMEs to commit into network development. To go deeper into network development and to build insight into the eventual opportunities for new value creation, the participating companies need to share a joint understanding or a shared vision (Blankenburg-Holm, Eriksson & Johansson, 1999). Through this, each of the companies can position themselves in the network and align their time and money investments with the forecast results. While the birth of the vision seems central to the development of a value network, it is likely that the outside facilitator cannot provide the vision itself, but can instead merely support its formation. Therefore it is likely in the first stages of SME network formation that the network participants focus on creating a vision or commitment about future joint action.

For SMEs, innovation would be extremely challenging without networking partners. It could be argued that, to enable innovation, SMEs are increasingly responsive to possibilities to engage in value networking relationships (Gruenberg-Bochard & Kreis-Hoyer, 2009; Jørgensen & Ulhøi, 2010). In the opportunity networks, SMEs find themselves in loose relationships without immediate large investment needs, but nevertheless with access to build understanding of the capabilities of other businesses and companies. It seems that SMEs do not necessarily need major business incentives to engage in networking. Instead, the mere possibility to join open innovation activities is sufficient motivation for individual SMEs. It is likely that SMEs lack the necessary contacts for independent network formation, and that they benefit from external network facilitation. As suggested by Kothandaraman and Wilson (2001), in value networks the companies evaluate their network partners in terms of the partners' ability or potential to deliver value to the network or to the company itself. While value networks are opportunity-driven and (especially in their early phases) do not necessarily require large investments, the participating companies are likely to constantly reconsider their participation in the network. With this in mind, the companies evaluate the value

Table 1. Distances in Innovation Networks

Distance	Source	Innovation potential
1. Geographic	Physical distance between actors	Geographic proximity does not automatically lead to innovations, although it may, for instance, facilitate social proximity.
2. Cognitive	Differences in ways of thinking and knowledge bases	A certain degree of cognitive distance enables the creation of new innovations.
3. Communicative	Differences in concepts and professional languages	When making a new idea understandable, concepts from other fields or sciences, for instance, may be utilized.
4. Organizational	Differences in ways of co-ordinating the knowledge possessed by organizations and individuals	An organization should have both strong and weak links in its network.
5. Functional	Differences in expertise in different industries or clusters	It is useful to obtain novel information from outside one's own field of operations as well. In such cases, the information often needs to be adapted to the field of operations in question.
6. Cultural	Differences in (organizational) cultures, values, etc.	The challenge is to get people who work in different organizational cultures to collaborate.
7. Social	Social relationships and the amount of trust included in them	Innovations require interaction among different kinds of actors. Trust helps in the creation of radical ideas.
8. Temporal	Differences in ability to imagine possible, potential futures	The challenge is to acquire and assimilate future-oriented knowledge so that it can be exploited in a proactive manner.

Adapted from Harmaakorpi, Tura and Artima (2006) and Parjanen, Melkas and Uotila (2011).

creation potential of the network and its participants. After joint actions, each organization evaluates its benefits and decides whether to continue in the network. This constant evaluation is one reason for the dynamic nature of the value networks.

Empirical Setting and Methodology

Study Context: Living Lab Project for Suburban Development

Although the concept of the Living Lab was originally introduced at the Massachusetts Institute of Technology in the US, it has recently attracted growing attention, particularly in many European countries. The Living Lab approach is an R&D concept which aims to create innovations in a multi-contextual, real-world setting. Living Labs are user-centered, open innovation ecosystems, often operating in a territorial context (city, region, etc.), and integrating concurrent research and innovation processes within a public-private-people partnership (Bilgram, Brem & Voigt, 2008). Living Labs can be thought of as user-centric environments for open innovation (Chesbrough, 2003; Schaffers et al., 2007; Schumacher & Feurstein, 2008; Magadley & Birdi, 2009). The Living Lab setting involves users, facilitators, utilizers and enablers. Living Labs could be seen as a supplement to traditional cluster and regional innovation policy and as a new kind of intermediary

organization which supports the involvement of users in R&D&I activities (Almirall & Wareham, 2008).

In the development of suburbs, residents are one of the key stakeholder groups because they possess valuable information about their daily environment. This information is important for other stakeholders within the network. It is of particular importance to companies developing and producing products or services related to the living environment. There is, however, a gap between residents and companies: companies do not know how to benefit from user activity, how to involve customers or how to use this valuable source of knowledge and ideas. In this case, the individual 'customer' is the resident of a particular suburban area. Residents can also be seen as citizens who play an essential role in public services. In the private sector, the customer pays the service provider in order to receive a certain service. However, in the public sector, the role of the customer is not that simple. In Scandinavia, public services are largely financed by taxpayers. On the one hand, the customer pays for the service in the form of taxes, and on the other, the customer is always the owner and supervisor as well (Anttiroiko et al., 2003).

The City of Lahti has adopted the Living Lab approach to promote user involvement in innovation activities. The Lahti Living Lab enhances awareness of user-driven innovation as it seeks to create answers to the question of how private and public organizations could profit from users as equal contributors to R&D activities. Lahti Living Lab creates methods especially for companies/organizations to achieve active user involvement. The project aims at promoting user involvement in innovation activities and developing methods and tools for organizations. While the user is often seen as an object of innovation activities, in a Living Lab, he/she is considered an active participant in the innovation process.

Action Research

The aim of this paper is to study the role of value networks in supporting SMEs' efforts at value creation and innovation. This study represents action research with the research activities taking place in a context that has largely been facilitated and provided by the researchers, and where the study objects initiate, respond to and develop their activities. This in turn will develop the topic and its context further.

Action research can be defined as an interactive inquiry process (Reason & Bradbury, 2008). It is a twofold methodological approach that consists of two projects: the action project where action or intervention is generated, and the research project that intends to create knowledge about that action (Coughlan & Coghlan, 2002; Reason & Bradbury, 2008). In an organizational setting, the kind of emergent co-operation between researchers and the organization is a constitutive part of the action research approach. Considering the real-life setting in our case, the action research framework provided a methodological background for our study.

Within the action research setting, we apply the case study methodology to report the development process studied and its results. Yin (2009) defines a case study as an empirical inquiry that investigates a phenomenon within its real-life context. The main reason for using the case study approach is the desire to understand particularly complex phenomena either by learning something about the case itself or by using the case to achieve a more general understanding (Stake, 1995; Yin, 2009). Gibbert, Ruigrok and Wicki (2008) argue that case studies are considered the most appropriate tools in critical, early phases of new management theory development, especially when key variables and their relationships are being explored. Within management studies, the case study approach has traditionally been used, especially when there has been a need for new theory development (see, e.g., Eisenhardt, 1989). Typically, action research is founded on a longitudinal approach to the phenomenon as it builds on the study of the dynamic relationship between the process, content and context (Pettigrew & Whipp, 1991). Action research as well as case studies place limitations on the generalization of research results.

The case presented is an illustration of the first phases of network formation stimulated by the Living Lab. The network formation process and data collection took place between January and November 2009. For action research, the data typically includes researcher notes, observations from three network meetings, interviews and notes from the field activities performed by the company network and researchers. The observations were made focusing on how company representatives discussed each others' motives and how they combined their articulated ideas with the interests of other people. The observations were made by one researcher and afterwards were discussed and validated with two other researchers involved in the same event. The data also included six sheets of self-reported data in the form of blog narratives written by the four company participants. In addition, two interviews, lasting between 30 and 55

minutes were carried out with the project manager and one company manager. The interviews were conducted by the same researcher who did the observations.

The data was analysed using manual content analysis. The process data were used to build an illustration of the network formation process of the case in order to provide a wider perspective of the focal points of the analysis. From the theory, and following the framework of Blankenburg-Holm, Eriksson and Johansson (1999), the phases of network formation were identified and the characteristics of these phases were drawn from the data. For this paper, the topics of interest identified in the analysis included elements such as an initial interest to join, acts of commitment, pledges and resource allocation. More specifically, the data analysed in this paper concerned the following: how and when the network reached the phases of business connection, mutual commitment, mutual dependence and value creation.

As with any methodological tool, the case study approach has its limitations. The case studies we applied are unable to build statistical generalization on the issues studied, and therefore are best applicable in exploratory or pilot studies. Furthermore, the case study as an in-depth approach strongly reflects the researcher's personal preferences, which is likely to cause researcher-based bias in the data collection, analysis and interpretations. To minimize this bias, discussions on the network formation, the participants, the data and its analysis have continually occurred within the research group. In addition to this, action research is by nature a methodology that assumes the researcher to affect the studied object and often even change it purposefully. This leads to loss of objectivity and generalizability of the research results. However, action research is well suitable for studies that aim to understand development processes and especially when studying the role of the facilitator of such processes.

The Case: The Suburban Development Network

The Lahti Living Lab project started in the autumn of 2008 with the goal of promoting user involvement in all kinds of innovation activities. Soon after the project website was launched, the project manager was contacted by a small local firm (Company A). Company A employs only four people, and was established over 15 years ago. It designs and manufactures different outdoor products – most importantly bicycle stands and bus stop shelters. The company wanted to know more about user involvement in product and service development.

> We have purposefully tried to uplift the image of cycling by developing the products and services by networking already at the beginning with the stakeholders of cycling. (CEO of Company A)

The initial motivation of Company A was to steer their product image in a more customer-oriented direction. After a few meetings, it was agreed that more companies involved in the field of 'living environment' should be included, and that the focus should be on 'user involvement in suburban development'. Although Company A did not name any particular companies, it did define some interesting lines of business. After this, the Living Lab project manager kept Company A informed about the progress and status of the negotiations with potential network partners. At this stage, the Living lab project manager worked as the network facilitator (Bessant & Rush, 1995; Burt, 2002) and helped the company to connect to other companies that otherwise could have been operationally or cognitively too distant for the company (Parjanen, Harmaakorpi & Frantsi, 1996).

As a result, Companies B and C were asked to join the project. Company B is a 'one woman' firm which provides garden planning services. It was identified by the project manager purely on the basis of its line of business and the company's website. It could be argued that at this stage the cognitive distance was at its peak, as the selection of the business to the network was based only on the line of business. The knowledge brokerage emphasized the opportunity of maximizing new knowledge sources, even in light of the possibility of making wrong choices (Bessant & Rush, 1995). Company C is a large enterprise. It was established by five local municipalities, which are also clients of Company C. The company provides maintenance services for parks, streets, etc. The CEO of Company C belonged to the project manager's personal network. In that sense, the network facilitator lent his own social connections to support the development needs of the SME. Through this, the SME was able to connect to new companies beyond its own social network (Parjanen, Harmaakorpi & Frantsi, 1996).

After this, Company C proposed that Company D be invited. Company D is a multinational company and the largest of this group. It operates in several business areas, but in this case, its town planning work was the focus for the project. Company E operates in the media and communication business.

This company was asked to join the project, as it was felt that the media could play an important role in the success of user involvement.

The construction of the network was an open process, meaning that the participating companies knew which companies were asked to join. In the network formation process, the maximization of the opportunity value of the value network was evident. As suggested by Howells (2006), the emergence of the network was significantly facilitated. Subsequently, there is a diverse array of businesses in the network, and it could be argued that it would have been practically impossible for this kind of network setting to emerge without external interventions. Some basic characteristics of the participating companies are summarized in Table 2.

The first network meeting took place in May 2009. The participants were asked beforehand to think about and present their motivations and expectations for the project. The results are summarized in Table 3. The two smallest companies (A and B) saw this as an important business network opportunity, whereas the rest of the companies (C, D and E) mainly saw this project as developing something new for their internal development purposes. In addition, Company C used the occasion to encourage company A in its R&D activities. The participating companies engaged in networking with relatively low incentives, although every participant did mention their expectations from the co-operation as having some type of value (cf. Jørgensen & Ulhøi, 2010). In the meeting,

Table 2. Participating Companies in the Network

	Number of employees	Main product or service	Contact origin
Company A	4	Outdoor products such as bicycle stands	Contacted by project manager (PM)
Company B	1	Garden planning and building	Contacted by PM, previously unknown
Company C	230	Maintenance of parks, streets, etc.	Contacted by PM, company known from previous projects
Company D	Several thousand	Town planning, traffic planning	Suggested by Company C, contacted by PM
Company E (local)	14	Media and communication	Contacted by PM, no previous joint projects

Table 3. Motivations and Expectations of the Network Participants

	Motivation	Expectation of outcome
Company A	Enhancing R&D from being proactive to reactive	Financial interest → New business, networking in general
Company B	Networking, bringing in specific expertise for suburb development	Concrete benefits from network
Company C	Better use of taxpayers' money	New concept to take care of the local environment
Company D	New ways to involve residents and social interaction in development projects	New methods
Company E	'We don't know why we are here but we know that we have to be involved.'	New concept, new channels for users and service providers

there was a great deal of discussion about the suburban area and some current problems such as parking for scooters. One scooter had recently been stolen while the owner was in a supermarket. Company C brought up this problem with Company A: 'You should do something about this problem.'

The local media network company, Company E, was very different from the other participants in the group. For Company E, the motivation to participate was 'looking for something that does not exist yet'. The company representative explained that 'in the current changing media world, traditional TV and radio are losing importance. They need to be reinvented, and the media needs to find new ways to reach people'. The project manager wanted to invite this company to the project because he envisioned that companies D and E would have something in common. In the area of town planning, the media could be the channel to reach the residents in the planning phase.

The first joint meeting allowed initial business contacts (Blankenburg-Holm, Eriksson & Johansson, 1999). At this stage, the 'entrepreneurs' communicated about their companies, their motivations, expectations, and even their willingness to engage in future projects. During the first meeting, it became evident that in spite of the differences between the companies, the participants could identify mutual interests, and would be willing to move ahead to discuss joint activities. The participating companies showed interest in knowing more about each other's business. In addition, they were especially keen on knowing more about the ways to get suburban residents involved in their development activities. The participants in the emergent network worked together intensively during this initial connection stage (Blankenburg-Holm, Eriksson & Johansson, 1999) to better understand the inherent capacities of the partners.

The second facilitated meeting took place in August 2009. After the initial business contact, the participants now knew who the participants were, and were aware of each other's primary interests in the network. The second meeting was dominated by the issue of deciding on the joint activities (cf. Blankenburg-Holm, Eriksson & Johansson, 1999). At this stage, the challenge was twofold: identifying activities that could keep the network participants working together towards a joint target, and including the residents in the activity. During the meeting the companies together decided to organize a walking tour through the local suburban area. The idea was to take one or two walking tours with local residents along predetermined routes. The company representatives would lead the tours, and they were asked to prepare questions to the residents. As the network facilitator, the Living Lab project would organize and promote the event. A local bakery volunteered to sponsor the walking tour with complimentary baked goods to secure the residents' interest in the development of the suburb. Consequently, the network actually grew with another company.

In the meantime, after the second meeting, the companies took a step further as they committed themselves to the project with formal agreements and project admission fees. Up until this point, the companies had had no direct financial relations with each other. The network quickly moved from the initial commitment stage to value creation – the value creation stage started with the first joint action. After performing the action as a network, they identified business opportunities for their individual purposes (Kothandaraman & Wilson, 2001). However, not all of the individual purposes were purely business related. For example, Company D presented their perspective on the value of producing common good:

> I hope that due to the activity of the citizens and this project, the safety will be enhanced. If a speed bump is wanted, the citizens need to make a suggestion to the city. After that the situation will be a follow-up study on driving speeds and the possibilities to place speed bumps will be evaluated. (Company D)

In the next meeting after the first joint action, Company A suggested another joint action, for which they started to discuss and allocate resources, and even talked about financial compensations for the smallest company. This new joint action was about donating new bicycle stands to the local school that had helped in organizing the event for citizens. The companies immediately identified their place and role in this new area, and the Living Lab actors were asked to facilitate this action.

The network formation characteristics are illustrated in Table 4. The company network proceeded on to joint value creation while keeping in mind the common interest of user knowledge. After the first joint action, the company network decided on the next joint activity and found roles and tasks for every company. The next action went beyond the formal project goals, so they were now creating mutual dependence without formal commitment to facilitation.

Table 4. Network Formation Characteristics

Business connection	Mutual commitment	Mutual dependence	Value creation
Participating in the kick-off meeting	Confirming vision of joint activity after decision making	Formal agreement to join the project and payment of admission fee	Identified business opportunities based on joint activity
Expression of interest towards the subject and joint action possibility at hand	Awareness of each other's primary interests in the co-operation	Task allocation and resource (time and effort) distribution to joint activity	Identified opportunities for the next joint action based on network's resources
Expressing motivations			Sharing findings and knowledge

Discussion

Innovation can be seen as a challenging task of carrying out ideas and methods and turning them into practice. Traditionally, the implementation of ideas has been seen as more challenging than the creation or collection of ideas (Noteboom, 1991). For SMEs, the lack of expertise, lack of specialization, the resources for development, and the lack of internal innovation capability have been seen as the main barriers to innovation. Participation in innovation networks has been offered as a solution for increasing SMEs' abilities to transform their new ideas into practice (Jørgensen & Ulhøi, 2010).

To secure their survival and success, SMEs face the need to participate in innovation networks. In this paper, we have suggested that SMEs would be willing to participate in innovation networks just because it is possible. Based on the case analysis, our findings concur with this thinking – SMEs see entering these non-promissory networks as easy. These collaborative emergent organizations (Katz & Gartner, 1998; Snow et al., 2011) are largely social constructs rather than vehicles for production. Most networks are based on collaboration in production – that is, participation in these networks often requires large investments to enable compatibility with the network partners' operations. These investments can at the same time lead the SMEs into a strategic trap, where the transitional costs become too high for the SME to abandon the relationship. Open innovation networks do not automatically imply production co-operation, although they do provide the participants with access or a window to examine new opportunities. As such, the open nature of the networks lowers the threshold for SMEs to enter without major investments or resources. At the same time, these networks differ from the traditional commitment-based relationships that build their value creation expectations upon the longevity of the collaboration.

Vanhaverbeke and Cloodt (2006) defined value networks as inter-organizational networks linking together firms with different assets and competencies, and that aim to respond to new market opportunities. In the formation process of a new value network, the participants' shared understanding of the new market opportunities becomes a decisive element. In this paper, we formulated this aspect as the proposition, suggesting that the companies entering the network should create a vision or commitment about future joint action. In the networking case, the first two meetings between the companies centred on getting acquainted with each other and the decisions about joint actions. In these meetings, each company's initial motivations were discussed and recognized. It was evident, however, that these motivations would not be sufficient to keep the network together without a shared motivation to co-operate. After agreement on the first joint targets, the implementation proved to be surprisingly easy, and was followed by the next suggestions for joint targets. Along with the joint action, the commitment of the participating companies started to grow, and thus supported the companies including themselves in the implementation of the second joint idea. In the joint action operations, it was very clear to all participants that the action taken would not have been possible without the co-operation. This is in line with the conclusion of Snow et al. (2011) who state that the pace of the

evolution of networks depends on the clarification of participants' purposes and processes.

Kothandaraman and Wilson (2001) suggested that a partner's selection within value networks is a central element determining the network's ability to create new value for the participants. In this paper we developed this idea further and suggested that, when following joint actions, each organization evaluates its benefits and decides whether to continue in the network. Thus the evaluation would not only concern the role of the partners in the network, but the company itself as a network participant as well. In our network case, the companies' approach to their participation was very visible – the growing commitment was directed towards the network instead of the co-operating partners, and in this way each company needed to evaluate the actual and expected value creation from their own individual viewpoints. The first joint action could be seen as a test for the companies that they could use in determining their interest in participation. After the first joint action they involved themselves in new joint action based on opportunities identified in the first action. It appears that the development of the innovation network proceeds in action steps leading to subsequent joint agreements and growing commitment. The value created during the process should, however, be understood as a wider concept that encompasses other elements than just financial value (Allee, 2000).

Implications

We have presented a case study of the development of a young innovation network. Our focus in the case study has been on the SME's ability to carry out innovation and new value creation in a network. The key contribution of the study centres on the new understanding of the way SME innovation could be promoted through facilitated network development. It seems that value networks provide a low-threshold approach to introducing SMEs into new collaborative relationships. These relationships then work as innovation platforms where the companies can agree on joint targets, action and commitment in future co-operations. In this way SME networking opens up possibilities to build new business offerings.

The case presented here has practical implications by illustrating the possible routes for facilitating SME innovation networks. The facilitator's main role was in the business connection phase. Following the decision making on the joint vision, the facilitator operated mainly as a sponsor or co-ordinator. The cultivation and enabling of business networking has been on the agenda of regional policy makers for quite some time, and it now seems that the open innovation ideology could be a useful 'tool' for building company networks. Customer involvement also needs to be kept in mind; it too can be seen as a strong combining force for networking.

Our case also provides new knowledge on the SME logic of joining innovation networks and participating in them. User involvement is an important and interesting topic for companies. Participation in the innovation network can be a start for companies to adopt user-driven development in their R&D activities. The challenges are to develop and test methods for user involvement that serve SME network goals.

It is important to note that, due to the methodological nature of our study, any generalization on the basis of the results is inherently limited. However, this study offers a fruitful ground for further studies conducted with methods that allow statistical generalization. Interesting questions include the issue of commitment accumulation during the joint network activities, and the role of the broker in this process. Studies focusing on transaction costs related to knowledge searching and value networking are also needed. The utilization of user knowledge in SME innovation represents another important topic that future research needs to address.

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