

Chapter 13

Co-creation in Living Labs

Shea Hagy, Gregory M. Morrison and Peter Elfstrand

Abstract Living Labs are places for open innovation where co-creation is a method for addressing real-life issues through the attribution of knowledge from science and society, the latter being a form of transdisciplinary social learning. In a Living Lab the representatives from business, society and academia, as well as citizens, have different value perceptions and propositions, providing heterogeneity across the stakeholder value spectrum. This provides a rich set of ideas and values for co-creation which can be used for both the operational phase and the integral shaping and creating the design for the physical infrastructure of the Living Lab itself. The use of co-creation workshops are demonstrated for ideation amongst the stakeholders for the HSB Living Lab. This is exemplified in the development of the social washing room which will be prototyped and tested in a fit-for-purpose multifunctional design space.

Keywords Living labs · Co-creation

13.1 Introduction

Living Labs are co-creative by design and definition as the Living Lab concept offers an environment that aims to facilitate co-creation; an interactive platform for collaborative research where users play an active role (Rosado et al. 2014).

S. Hagy (✉)
Building Technology, Chalmers University of Technology,
Gothenburg, Sweden
e-mail: shea.hagy@chalmers.se

G.M. Morrison
Curtin University Sustainability Policy (CUSP) Institute, Curtin University,
Perth, Australia

P. Elfstrand
Tengbom Architecture, Gothenburg, Sweden

The Living Lab is appropriate for co-creation as it is issue-driven and exists within a rich, complex and contested real-world context (Carew and Wickson 2010); that of sustainable living. The theoretical basis for the co-creation methodology is transdisciplinary where the knowledge is generated in patterns across relevant disciplines and discourses. Consequently, the hermeneutic framework for the Living Lab can be defined as the attribution of knowledge from science in an issue-driven process (Max-Neef 2005; Hadorn et al. 2008) and which builds on the early ideas of Jantsch (1970).

While the interpenetration of epistemologies within relevant issues for society is relatively well agreed as characterizing transdisciplinarity (Carew and Wickson 2010), the role of practitioners for the co-creation of knowledge is new (Pohl 2008). The integral thinking process may involve practitioners being active in knowledge production or involve practitioners reacting to research conducted (Mobjörk 2010). The former is a process of social learning where researcher's explicit disciplinary knowledge and practitioners tacit knowledge may be linked to provide new hypotheses for further research or societal action (Baars 2010; Leys and Vanclay 2011).

Transdisciplinary social learning becomes a more stringent methodology in the Living Lab through co-creation. Co-creation is integral thinking between stakeholders to provide value leading to innovation (Franz 2015); this innovation process should provide more relevant products and services which are quicker to market. There are two key challenges in the co-creation process. Firstly, the fundamental difference between the nature of the knowledge resources provided and offered by the stakeholders and secondly, the value perceived in the co-creation outcome by each party (Hughes 2014). For the second challenge the question remains whether the very basis of the triple helix idea (the nexus of academia, business and society), which is increasing innovation through knowledge, is seen as a value for all parties. Value perception and outcome has a heterogeneity across the stakeholder spectrum and may include new research, technology adoption, behavior or practice change, or effect on public policy (Hughes 2014). Hughes (2014) argues that different value perceptions might be addressed by identifying consensus and innovation spaces within the co-creation process.

Current thinking is that involvement of citizens in the co-creation process provides a greater user-centred value and thereby shifts focus from a rational organizational basis to a more novel and creative process (Ind and Coates 2013; Leminen and Westerlund 2012), which is both iterative and reflective (Vicini et al. 2013). However, this also implies a greater emphasis on the social representativeness of the outcomes (Franz 2015). If the user is to gain value and meaning in the co-creation process, a greater emphasis on user adoption of innovation based on preference and needs is required (Mangyoku et al. 2014). By bringing together the transdisciplinary knowledge resources of stakeholders and users in an open co-creation process, it should be possible to provide the Living Lab with societal meaning in a structured innovation space. This high degree of relevance should also reduce the risk of market failure of the innovations developed (Leminen and Westerlund 2012).

13.2 Co-creation

Co-creation is a process that provides an opportunity for on-going interaction between partners, clients, and users, allowing collaboration and fostering innovation (Ind and Coates 2013). A Living Lab facilitates and promotes open innovation systems and initiatives through a co-creative platform for experimentation. Living labs are thus spaces of co-creation, which promote open innovation processes making co-creation an essential element within a Living Lab environment. This article considers the contemporary use of the co-creation process in Living Labs and its relevance for both bringing together academic, business and society around common problems, as well as shaping new concepts for potential prototyping.

13.3 The Theory Behind Co-creation

13.3.1 Co-creation. The Method of Choice for HSB Living Lab

The HSB living lab is built on the Chalmers campus as a meeting place for business, society and academia. The lab includes ten business and society partners as well as Chalmers as the academic partner. During the formation of the partnership it was realized that there was a need for a methodology to bring partners together onto common ground, and also to provide a creative space where new ideas for innovations and services could be generated. As a consequence, co-creation workshops (CCW) became the method of choice underpinning the HSB Living Lab. The CCW methodology will not only be used during the operational phase of the Living Lab but has been integral in shaping and creating the design and conceptual basis for the physical infrastructure itself (see Fig. 13.1).

13.3.2 Co-creation Workshop as a Tool for Innovation

Business-society-academia workshops were designed to generate ideas in an intensive co-creative environment. The aim for these co-creation workshops was to provide early innovation ideas for HSB Living Lab which may or may not lead to prototyping in the Lab. These ideas generated through the workshops were then used by the design and planning teams to create the program for the building and inform the design documents. During the operational phase of the HSB Living Lab, CCWs will continue to be drivers of idea generation and the evolution of the living environment, where the residents will themselves be given the opportunity to co-create aspects of their environment and engage with the industry and academic partners.



Fig. 13.1 Image from a CCW during the concept and design phase of HSB Living Lab

13.3.2.1 Ideation

The co-creation workshop is used as a concept and idea generator in the first stage of the Conceive- Design-Implement-Operate (CDIO) framework, which takes an idea all the way through from concept to use. Product, process, and system lifecycle development and deployment are key elements of a CDIO program as defined by the CDIO Initiative (CDIO 2015). CDIO is considered an appropriate context for engineering education. Integrating co-creation into this framework through CCWs in a Living Lab environment can be used as well as a bridge between academia and industry. CDIO is a model of an entire product, process, and system lifecycle. The Conceive stage includes defining customer needs; considering technology, enterprise strategy, and regulations; and, developing conceptual, technical, and business plans (CDIO 2015). In this stage, the co-creation workshop methodology can be used as an effective tool in the process, creating an environment, in which knowledge and skills are taught, practiced and learned. A physical Living Lab infrastructure, then, provides the opportunity to implement and operate these concepts in an iterative design process. In the case of the HSB Living Lab and CCWs facilitated by Chalmers University, this is expanded from being applicable to engineering and education as set out by the CDIO initiative, to integrating multiple disciplines and linking education with industry, to a transdisciplinary methodology (Hadorn et al. 2008; Mobjörk 2010).

13.3.2.2 Transdisciplinarity

A transdisciplinary methodology primarily connects a diverse range of disciplines but can also be seen as a way to bring society, business and academia into a common space. As described by Hadorn et al. (2003), transdisciplinary research for sustainability strives to investigate problems on descriptive, normative and operational levels and it produces both systems and target knowledge. The complex nature of sustainability creates a need for a third type of knowledge. A transformative knowledge can create the necessary conditions and strategies for changing undesired processes. Given that sustainable development involves societal problem-solving based on research, the knowledge held by non-academic actors has an important role to play throughout the process of knowledge production (Hadorn et al. 2003). Here lies the functional importance of co-creation and CCWs, creating thematic based arenas to enable transdisciplinary collaboration. This is of more specific relevance when relating to sustainability science and sustainable development, which is the focus of the HSB Living Lab.

The complex nature of sustainable development requires knowledge from a wide range of disciplines which can then be used to develop and test this knowledge in real-life context i.e. through a living lab methodology. Here, the users' knowledge is taken into account. The CCW is the method used in the HSB Living Lab environment, "... to transcend the boundaries between scientific disciplines," and "... open the academic research process to actors in public bodies, business and civil society and go beyond purely academic definition, analysis and interpretation of research problems" (these quotes are from Hadorn et al. 2003).

13.4 Co-creation Methodology in Practice

13.4.1 Overview

This section describes the overall process from collaboration of academia-business-society to working with stereotypes and finally developing concepts.

13.4.2 *Preparing the Nature of the Co-creation Challenge*

The planning of CCWs in itself becomes a co-creative activity as inputs from others outside one's discipline and/or competence are necessary to successfully plan a workshop. The theme or topic of the workshop can be specified and chosen, however when planning a CCW it is crucial to leave flexibility built into the schedule and plan.

There are many possibilities regarding the duration of a CCW. The authors have planned and run numerous variations of CCWs, from full-day workshops,

to half day workshops, and 2-day workshops, evaluating their own pros and cons. The researchers have planned now to hold a workshop on 2 separate days with a 1 week interval. From past experience, we know that it can be difficult to bring together the right people for a workshop as they would need to take 2 full consecutive days from their other daily activities. Further, CCWs are very intensive and providing space between intensive sessions can help to foster creativity and keep participants excited and fresh.

Preparation of a CCW requires much planning, often a few months in advance. Careful planning of the theme and gathering relevant participants from a diverse range of industries and backgrounds is crucial in order to deploy and run a successful CCW, one example is the Next Generation Clothing and Laundry Workshop in February, 2014 (see further sections).

13.4.3 Co-creation Workshop Process

The most basic tools of a CCW are sketching tools such as paper, pens, clay, wood, cardboard, glue and computer programs. Having a wide diversity allows participants to choose the medium/media they are most comfortable with or excited about using, and enables participants to explore the topic at hand from different points of view through mixed media.

Another type of tool that we use in the CCW is called brain writing. This has proven to be extremely useful and important both in idea generation and in setting and fostering group dynamics and communication. In brain writing, facilitators craft one or more statements or questions related to the topic/theme of the workshop. This is meant to be an intensive, rapid generation of views about the topic where deep reflections are not the focus. Brain writing, while helping to start the ideation process, also allows for participants who may be less likely to speak in a group discussion to get their views out and read by everyone in their group, helping to mitigate issues with certain personalities dominating the conversation in later discussion sessions.

Brainstorm sessions often begin with the statement that there are no rules, this is important to provide the basis for innovative ideas and creativity. In a CCW there is a need to specify and create limitations and frames to narrow focus yet still allow for flexibility. Scheduling as well as the formation of the teams is an important aspect of preparing the proper environment for creativity. One such way to do this is through what has been termed brain swarming. This is done by forming teams where some of the members are familiar with one another and some are newcomers as well as having the teams or groups within the CCW remain intact throughout the entire workshop. Ideal group size for the breakout sessions is recommended to be between three to seven persons, and odd number groups are desirable. As the members become familiar with one another they tend to become more open, apt to share ideas and productive.

When planning the agenda of a CCW the tempo and pace must be considered, i.e. having long presentations, and/or long group sessions can stagnate the process. This tempo can be achieved through careful pre-planning of the agenda and integrating flexibility into the schedule where the facilitators are able to read the atmosphere of the participants and change the program accordingly.

13.5 The Washing Room Example in HSB Living Lab (Next Generation Clothing and Laundry Workshop)

The decision was made to hold a 2-day co-creation workshop dealing with the everyday human activity of washing. This was carried out with the help of researchers from the RCA in London (who ran the co-creation process) and was co-located at Chalmers University of Technology in Gothenburg, Sweden and the Johnson Space Centre in Houston, Texas. The participants communicated via video link.

The background for this workshop stems from the HSB Living Lab project which is a physical asset in the Climate-KIC BTA flagship. The lab has 12 business and societal partners to date. Electrolux, a multinational appliance manufacturer, and the housing association, HSB, have an interest in cutting edge innovation combined with issues of social inclusion (loneliness being a particular problem in Sweden). Meanwhile Chalmers University researchers have an interest in the sustainable design of technology connected to human behavior in everyday life. NASA and Rice University became engaged, being interested on the sustainability of washing on the planned missions to Mars. The co-creation workshops are seen as a central aspect of the BTA Living Lab network as they bring together researchers and stakeholders into the prototyping space. The aim is to provide early ideation that can then be accelerated by entrepreneurs or the partner companies.

The 2-day workshop was carefully planned beforehand with interviews of housing association residents, astronauts and others providing a common platform for the workshop groups. The workshop was met with much enthusiasm from the delegates in Sweden (Electrolux, HSB and other company employees, Chalmers students and researchers, architects—including the person who later designed the HSB Living Lab) and at NASA (NASA engineers, Rice students and researchers).

It became clear that washing does not necessarily involve only the traditional washing machine. Some interesting ideas included the wasketball (a basketball loop in which clothes can be thrown through with a sensor to detect whether the clothing actually needs washing—effectively turning the act of washing into a game—see Fig. 13.2) and a designer T-shirt dispenser with cubicle for changing (useful for those who need to change T-shirt after cycling).

Two ideas stood out. The first was the refreshment cabinet whereby clothes can be refreshed either through connection to the home ventilation system and/or through low energy UV LED. We do not know whether the residents will use this



Fig. 13.2 Workshop team (Peter Elfstrand, Charlotte Farrouch, Michail Mavromatis) presenting Washketball concept

and therefore Electrolux will install cabinets on each floor of the Lab for testing through research projects.

The second idea was recently the focus of a national (Swedish) press release by Electrolux. This involves the social washing room. The larger Electrolux washing machines have now become much quieter and allow the possibility of social spaces around or adjacent to the machines. This differs from the cellar washing rooms of Swedish housing associations that used to be standard. The Lab will be designed to allow a large multifunctional space where different layouts can be tested and will connect to a student design space where alternative furniture can be built. A prototype (See Fig. 13.3) was presented as an exhibition at the major political meeting (Almedalen) in July 2015 and will move into the living lab with the students as the Lab opens in February 2016.

13.6 Conclusion

CCWs provide a means to:

Engage a transdisciplinary team, bringing academia, society and business into a Living Lab. This becomes a neutral space with common respect for the tacit



Fig. 13.3 Render of Multifunctional laundry (Photo Tengbom Architecture)

knowledge held by business and society and the stringent scientifically based knowledge held by academia. Further, the presence of students brings intergenerational aspects into the process.

Ideate, revealing early common concepts and ideas that can be developed for prototyping in a Living Lab. This is important for a Living Lab as it keeps people in the knowledge-innovation-business pipeline active.

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