Comparing Tools For Hypothesis Driven Living Labs

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Abstract

Rapid evolving markets and limited time spans create challenges for small and medium sized companies resulting in a growing interest for Living Labs. The latter strengthen the SME's innovations by allowing an open, multi-disciplinary and -stakeholder approach, where potential end-users are confronted with the innovation in real life settings. Over the years different innovation tools and techniques have been developed to improve the interaction between product, businesses and end-users. Yet, little research has been done on their applicability in a Living Lab environment. Therefore this paper will compare two different tools, namely the Value Proposition Canvas and Validation board. Both tools allow for the development and testing of hypothesis by means of experimentation. The tools are closely related to the Living Lab methodology because they suggest 'getting out there', testing and iterating accordingly. This study will research the applicability of both tools in Living Lab environment by means of a cross case analysis study.

Keywords: Living Lab, Lean Start-Up, Validation Board, Value Proposition Canvas, SME

1 Introduction

Innovation is a pervasive survival mechanism in growing competitive markets. Initially innovation was about the linear process of invention to diffusion, following a sequential process in time. Companies believed they had to control the generation of their ideas/inventions as well as the sequential phases of production and distribution. The closed, and linear innovation paradigms served their purposes, but had their limitations as well. The focus remained internal, resulting in market failure because there was no customer acceptance (Hines et al. 2004). Companies realised they had to open their business to different stakeholders in order to assure customer acceptance. The open innovation paradigm, suggesting firms can and should use internal and external ideas as well as paths to the market, was born. Open business models enable organizations to be more effective in creating and capturing value. They support value creation by maximizing the potential of internal and external ideas (Chesbrough 2010). Living Labs are a sub movement within the open innovation stream, advocating user insights and their usage context as determinants for a successful innovation. Living

Labs involve a select group of end users early in the innovation process to discover domain specific knowledge and capture the market. They elicit new understandings and meanings of domain specific and market knowledge by positioning innovation projects in real life contexts.

Smaller firms experience higher innovation risks. They usually have fewer technical and managerial competencies, limited finances and access to information that can help them (Dhakal et al. 2013). Additionally they are dealing with higher pressure from competitors and demanding customers requiring an acceleration of the innovation process. These challenges make Living Labs the appropriate mechanism to innovate. Living Labs are well known for their 4 P's or public-private-people partnerships (Westerlund & Leminen 2011). Policy makers are perceived as important stakeholders because they ask for and finance innovation (Katzy 2012). As such, Living Labs can reduce the financial challenges small business face. Additionally they offer a research climate with services as ideation, analysis, construction, deployment, use, evaluation, research and management of innovation in real-world contexts that otherwise would not be available to them (Ståhlbröst 2013; Hronszky & Kovács 2011). In other words, they offer a prominent research setting for in situ, in use study of technologies and research how technology and social behaviour configure each other. Living Labs are intermediaries for collaborative innovation and help to bring structure in the innovation process (Almirall, Lee, Wareham, et al. 2012) Living Labs have a customer value driven approach, allowing for learning and discovery.

Much of the academic literature deals with the user centricity of Living Labs, but less is known about the learning and iteration processes. The latter are important to appropriately tackle the innovation challenges and accelerate the innovation process. When looking at other research streams we noticed various methods and techniques have been developed to enhance the learning process, yet none of them are being used in a Living Lab environment. Addressing self-defined learning goals and testing assumptions are needed to succeed. Thus it will be important as a (Living Lab) researcher to have a thorough understanding of all relevant aspects.

Therefore within this paper we will compare the usage of two different tools in a Living Lab environment, namely the Validation Board and the Value Proposition Canvas. Both tools seem appropriate for SME Living Labs because they can reduce risks of small businesses by allowing designing, testing and optimization of innovations. In other words they can help researchers and practitioners to improve the learning and iteration processes in a Living Lab. The aim of this paper is compare both methods by means of a cross case study analysis and provide suggestions accordingly.

2 Tools for Living Labs

Living Labs are closely linked to disciplines such as Participatory design, Design thinking and Ethnography. They distinguish themselves by representing the belief that testing in real life environments is one of the main determinants for new product developments' success (Niitamo et al.

2006). The more traditional approaches are mostly used for one-shot testing in controlled settings, while Living Labs support an iterative approach in a real life environment. The iterative nature allows for trial and error and the introduction of variations that produces results. It also fosters organizational learning promoting change and stability. This will help entrepreneurs to make more informed decisions, thus increasing the likelihood of success (Trimi & Berbegal-Mirabent, 2012). Participatory design and Design thinking support the usage of tools to allow for expression and visualisation of ideas. Tools are the material components that are used in participatory design. They can be rich sources of information. Different tools have been developed over time and as every project is unique, it is necessary to decide which approach(es), methods, tools and techniques to use in a specific project. (Sanders et al. 2010). Sanders & Stappers (2012) suggest using these tools a way to structure a client's project. Furthermore Burkhart et al. (2011) identified the need for the research and development of tools to explicate business models.

We evaluated the literature for potential tools to structure Living Lab research, focusing on their applicability for SME's and Start-up's innovation processes. Both the Validation Board and Value proposition canvas are based on the Lean Start-Up methodology focusing on the description and testing of hypothesis, resulting potentially in a pivot. This is in line with the underlying methodology of Living Labs proposing learning and iteration processes as a way to optimize innovations. Ries (2011) proposed the 'Lean Start-up Method' allowing for scientific management of start-ups in order to accelerate their market introduction. Management of start-ups has been perceived as chaotic. Ries (2011) suggested they should learn how to build sustainable business according to the principles of the Lean methodology. They can validate this learning scientifically, by running experiments and testing different elements of their vision, providing another overlap with the Living Lab methodology. The application of Lean thinking has made an impact on both academics and practitioners. This design approach was originally focused on the elimination of waste, but quickly moved focus towards customer value and managing the value stream. In this perspective, waste can be anything that inhibits the creation of customer value. Both tools help entrepreneurs staying focused on taking action while implementing the Lean Start-up process. They go beyond Lean Thinking by focussing on the identification of customer value and managing the value stream, a challenging task for entrepreneurs (Hines et al. 2004). The Lean-Startup suggests that self-defined learning goals and testing assumptions will help to succeed (Breuer & Mahdjour 2012). Both tools seem appropriate for both Living Lab researchers as entrepreneurs because they will need a thorough understanding of all relevant learning goals that will help to tackle innovation challenges.

3. Hypothesis Driven Tools

The Validation Board is a process-based tool, which takes a hypothesis-driven approach to collaborative innovation. In short, the Validation Board is a tool conceived in 2012 and designed on the premise to enable businesses to test a potential product idea without wasting too much money in

the process. The tool uses a 3-phase approach whereby a problem hypothesis is conceived, which is then followed by a series of experiments designed to either validate or invalidate the customer hypothesis and problem hypothesis; ultimately, the experiments allow the players to determine whether an idea will work. The Validation Board is the result of a process study that surveyed 500 startups in the United States (www.leanstartupmachine.com). It has proven itself effective in the tech startup culture with successful companies such as Instagram and Salesforce, as well as traditional environments, such as NewsCorp.

The Validation Board has three construction elements i) hypothesis, ii) experiment and iii) validation. Figure 1 shows the design of the Validation Board.

Figure 1: Validation Board based on www.leanstartupmachine.com

The Validation Board requires thinking about hypotheses, before finding a solution. A first focus is on the potential customer segment, also called the customer hypothesis. This needs to be explained in a descriptive manner for every potential segment. The problem hypothesis is related to the customer hypothesis. It should be described, as a story a customer would tell when defining his problem. In a next step, different assumptions can be made describing the needs related to the problem hypothesis. The riskiest assumption is the main learning goal for the company. The validation is established via minimum success criteria, meaning the worst-case scenario in which they will accept the results as valid. If a riskiest assumption is not valid, the business or innovation might fail. If a riskiest assumption is valid, one can start providing a solution.

The Value Proposition Canvas is a strategy-based tool focussing on testing, learning and pivoting by experimenting with the minimal viable product (www.businessmodelgeneration.com). The tool was also conceived in 2012 to help business people map, think, discuss, test and pivot their value proposition. The value proposition canvas zooms in on two of the nine business model canvas

building blocks, namely the value proposition and the customer segment in order to detect a fit. The purpose of the tool is to describe hypothesis underlying the value proposition and corresponding customer segment one is targeting. The tool uses a 6-phase approach before testing and pivoting. Figure 2 shows the design of the Value Proposition Canvas.
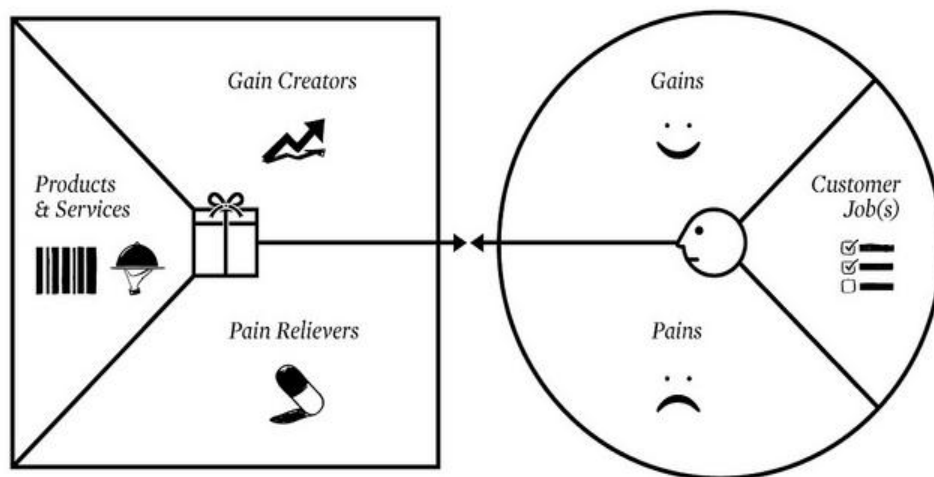

Figure 2: Value Propostion Canvas based on www.businessmodelgeneration.com

The first construct is the customer's jobs. It describes the jobs (e.g. performing tasks, solving problems, etc.) targeted customers are trying to get done. Based on these jobs, the customer gains and pains are described. Pains are the negative emotions, undesired situations and costs or risks that a potential customer experiences by getting the job done. The gains are the potential benefits a customer expects from getting the job done. After describing the potential customer targets, the value proposition can be drafted. First of all one has to focus on the products/services the value proposition is built around. These are the products/services that will help the customer to get the job done. The pain relievers are those aspects that will reduce the customer pains. The gain creators are those aspects that allow your customers to benefit from your product. By ranking the pain relievers and gain creators, one establishes an assessment of how valuable these aspects are for potential customers. Going out and testing these assumptions can research the fit between the product and customer. If there is no fit, pivoting will be necessary.

At first glance both tools appear similar in their overall approach, namely testing hypothesis. Therefore they seem especially suitable to implement in Living Lab environments. Yet, there is one major difference. The proponents of the Value Proposition Canvas, including its designer, point out that it addresses strategy, and not processes, which the Validation Board does. Therefore a comparison of both techniques in a Living Lab environment seems useful.

4 Research Design

Given the exploratory nature of this research, the study employed a qualitative research approach, analysing 4 Living Lab cases in Flanders, 2 for each tool. Case studies are considered an appropriate research tool in the early phases of a new management theory, when key variables and their relationships are being explored (Yin 1994; Eisenhardt 1989). They are performed in close interaction with practitioners, which is also the case when dealing with multi-stakeholder Living Labs (Gibbert et al. 2008). Living Labs in Flanders are one of the leading-edge members of Enoll (www.enoll.org). Therefore Flanders appears to be a relevant location to transform research findings from.

The cases were selected according to following criteria: i) each SME must have used one of both tools during the kick-off meeting of the Living Lab approach based on open innovation ii) each case must include the development of a new product/service, a business concept or a social innovation (manufacturer side) iii) each case must involve multiple stakeholders, including potential end-users. The cases vary on the innovation process they find themselves in, the end-user focus, the clearness of their vision and amount of employees (see table 1).

Table 1 The 4 SME Living Lab cases

	Case1	Case2	Case3	Case4
Phase of the innovation	Pre-launch	Idea	Launch	Pre-Launch
B2B vs B2C	B2B	B2C	B2B	B2C
Tool being used*	VB	VB	VPC	VPC
Vision (1 not clear at all – 5 very clear)	4	3	2	4

*VB= Validation Board / VPC = Value Proposition Canvas

During a period of 6 months (June 2013 – November 2014), both tools were implemented in 4 SME Living Lab Cases and evaluated. We opted for a multiple case study comparison because it allows for a more appropriate generalization of the results in different settings. The purpose of the case studies was to understand the mechanisms behind the implementation of the tools in a Living Lab. During the kick-off meeting, the tool was filled in with the entrepreneur and after each step in the Living Lab, it was revised and decisions were made accordingly.

During the four case studies, the entrepreneur and the team filled in the different aspects of the Validation Board or Value Proposition Canvas, supported by the researcher. Based on the learning goals, the researcher decided on the methods and different steps of the Living Lab the assumptions would be tested.

Pierson & Lievens (2005) identified five steps in the process configuration of Living Lab research. The different SME Living Lab cases follow those stages to test the potential success of their innovation.

1. Contextualization is an exploratory phase. Different research methods are applied to provide the required background and insights. The contextualization allows us to define the selection criteria and profiles of end-users.

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

3. Concretization is the initial measurement of the selected users before the technology or service is introduced. Specific characteristics of the users are measured such as their behaviour and perception on the technology.

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

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

Each of those five stages allow for reflection and iteration if necessary. The tools were used to evaluate and make decisions accordingly at the end of each Living Lab stage (see figure 3).
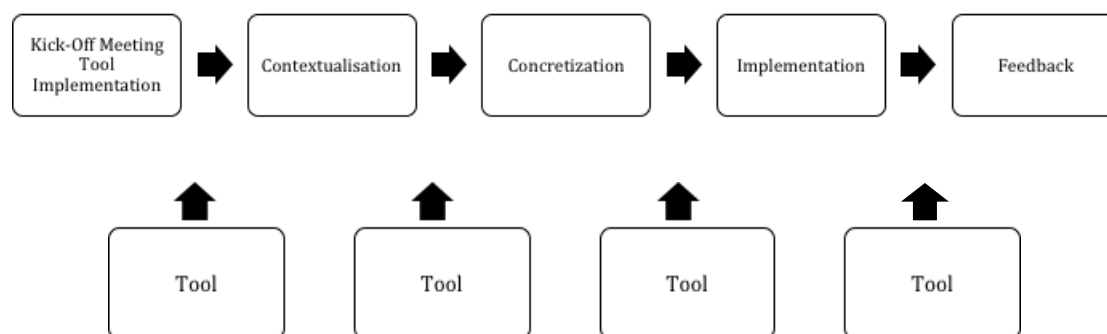

Figure 3: Research Flow

In order to perform a cross-case analysis, the researcher used open coding to identify themes and categories based on collected data. Field notes and informal observations of the meetings were used as data. In a later phase, several researchers involved in the Living Lab cases evaluated the concepts.

5 Results

The coding resulted in two major themes: the challenges during kick-off meeting and the researchers' perspective on the subsequent phases of the Living Lab. The results were further analysed based on these themes to gain insights in the value both tools can bring to SME Living Labs.

During the start-up session researchers and practitioners used one of both tools to map out potential customers and their needs. When implementing the Value Proposition Canvas we noticed a redundancy between gains/pains and pain relievers/gain creators. Both researchers and practitioners tended to put the same items in both gains and pains on the customer side. The same was valid for the product side. For example in case 3 we placed 'investment cost' on the pain side, while 'low costs' were filled in at the gain side. On the product side we placed 'monthly contracts' in the pain reliever as well as the gain creator angle. The start-off point was not customer segment specific, taking overall potential customers into account. This led to a limited amount of hypothesis created by the Value Proposition Canvas compared to the assumptions derived from the Validation Board. The Validation Board showed its advantages by starting off with potential customers and their assumed problems. It was hard not to come up with solutions immediately, but the researchers were always able to broaden the entrepreneur's scope. Determining minimum success criteria was merely a matter of conjunction. Practitioners never had an indication of an acceptable cut-off point. Therefore researchers used their own experience to make decisions in the next phases. Despite the difficulties, the Validation Board helped practitioners to refine their needs and research questions more distinctly. This in turn allowed researchers to better understand the input from the practitioners and eliminate miscommunication.

In the later stages of the Living Lab research, the Value Proposition Canvas was almost never used during iteration phases. The limited hypothesis researchers derived from the canvas mainly caused this. The Validation Board on the other hand allowed for a more structured way of performing research because levels of understanding were accessed. It provided the researcher with concrete insights in the strategy of the entrepreneur and their value proposition. Therefore it was easier for researchers to provide answers to concrete research questions throughout the entire Living Lab trajectory. Researchers also felt they were more in sync with the practitioners because they were able to understand their learning goals better. They used the Validation Board as a source of information for the different phases of the Living Lab such as survey development, identification and selection of potential users. After each step, the Validation Board was revised and adjusted according to the validation of the different hypothesis.

6 Conclusions

Overall it can be concluded that the Value Proposition Canvas did not provide an extra value for researchers and practitioners in a Living Lab environment. The focus on processes makes the Validation Board an ideal choice for collaborative environments and startups whose key challenges often lie in solving a problem or need. The Validation board is a tool that identifies these goals resulting in an easier decision-making process. Therefore we suggest the usage of the Validation board as a tool to develop hypotheses and use it as a driving force throughout the Living Lab. This will allow for deeper learning, validation and iteration. Additionally the Living Labs offer a complementary approach to the entrepreneurs using the Validation Board by reducing the risks to test their hypothesis and innovation as such

Each Living Lab project is unique and requires a specific approach. Although it is hard to structure a Living Lab, the Validation Board can help in organising the different steps taken by the researcher. The implementation of the Validation Board can provide useful insights and help the decision making process for other Living Labs as well. Therefore future research should investigate the applicability of the Validation Board in different Living Lab settings.

The Validation Board does not take into consideration all the aspects that might influence the business model such as customer touch points, partners, revenue model and cost structure that are present in the business model canvas. It is important to take these aspects into consideration as well during research. Therefore the Validation Board can merely be seen as a tool organise the processes within the Living Lab, and will not assure success. Nonetheless, the Validation Board can help the researchers in providing those recommendations that will improve the success rate of the innovation.

6 References

Almirall, E., Lee, M., Wareham, J., et al., 2012. Technology Innovation Management Review. , (September).

Almirall, E., Lee, M. & Wareham, J., 2012. Mapping Living Labs in the Landscape of Innovation Methodologies. *Technology Innovation Management Review*, (September), pp.12–18.

Breuer, H. & Mahdjour, S., 2012. Lean Venturing : Entrepreneurial Learning to Model and Grow New Business Henning Breuer. In *The 5th ISPIM Innovation Symposium- Stimulating Innovation: Challenges for Management, Science & Technology*. Seoul, Korea, pp. 1–14.

Burkhart, T. et al., 2011. Analyzing the Business Model Concept. A Comprehensive Classification. In *ISIS 2011 Proceedings of the 32 International Conference on Information Systems*. Shanghai, pp. 1–19.

Chesbrough, H., 2010. Business Model Innovation: Opportunities and Barriers. *Long Range Planning*, 43(2-3), pp.354–363. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0024630109000569 [Accessed November 10, 2013].

Dhakal, S. et al., 2013. Living Labs to Strengthen Small and Medium Enterprises in Regional Australia. *Australasian Journal of Regional Studies*, 19(3), pp.456–474.

Eisenhardt, K., 1989. Building Theories from Case study research. *Academy of Management Review*, 14(4), pp.532–550.

Gibbert, M., Ruigrok, W. & Wicki, B., 2008. What Passes as a Rigorous Case Study? *Strategic Management Journal*, 29, pp.1465–1474.

Hines, P., Holweg, M. & Rich, N., 2004. Learning to evolve: A review of contemporary lean thinking. *International Journal of Operations & Production Management*, 24(10), pp.994–1011. Available at: http://www.emeraldinsight.com/10.1108/01443570410558049 [Accessed March 20, 2014].

Hronszky, I. & Kovács, K., 2011. Living Labs for SMEs. In *9th International Conference on Management, Enterprise and Benchmarking*. Budapest, pp. 1–13.

Katzy, B.R., 2012. Designing Viable Business Models for Living Labs. *Technology Innovation Management Review*, (September), pp.19–24.

Niitamo, V. et al., 2006. State-of-the-Art and Good Practice in the Field of Living Labs. In *In: Proceedings of the 12th International Conference on Concurrent Enterprising: Innovative Products and Services through Collaborative Networks*. Milan, pp. 341–348.

Pierson, J. & Lievens, B., 2005. Configuring Living Labs for a "Thick" Understanding of Innovation. In *Ethnographic Praxis in Industry Conference*. Redmond, WA, pp. 114–127.

Ries, E., 2011. *The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses* 1st. ed., New York: Crown Business.

Sanders, E.B., Brandt, E. & Binder, T., 2010. A Framework for Organizing the Tools and Techniques of Participatory Design. In *PCD '10: Proceedings of the 11th Biennial Participatory Design Conference*. New York, pp. 195–198.

Sanders, E.B.-N. & Stappers, P.J., 2012. *Convivial Toolbox: Generative Research for the Front End of Design* 1st ed., Amsterdam: BIS.

Ståhlbröst, A., 2013. A Living Lab as a Service : Creating Value for Micro-enterprises through. *Technology Innovation Management Review*, (November), pp.37–42.

Trimi, S. & Berbegal-Mirabent, J., 2012. Business model innovation in entrepreneurship. *International Entrepreneurship and Management Journal*, 8(4), pp.449–465. Available at: http://link.springer.com/10.1007/s11365-012-0234-3 [Accessed November 11, 2013].

Veekman, C. et al., 2013. Characteristics and Their Outcomes in Living Labs : A Flemish-Finnish Case Study Dimitri Schuurman Seppo Leminen Bram Lievens Mika Westerlund. In *The XXIV ISPIM Conference - Innovating in Global Markets: Challenges for Sustainable Growth*. Helsinki, pp. 1–24.

Westerlund, M. & Leminen, S., 2011. Managing the Challenges of Becoming an Open Innovation Company: Experiences from Living Labs. *Technology Innovation Management Review*, (October), pp.19–25.

Yin, R., 1994. *Case Study Research: Design and Methods*, London: Sage.