
A hypothesis driven tool to structurally embed user and business model research within Living Lab innovation tracks.

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Abstract: *Living Labs a structured approach to open innovation, have the potential to focus on the triple combination of technology, user and business model research. Hypothesis driven living labs ensure that the living lab project remains process oriented and goal oriented. Thus far, the validation board has been utilized to manage the process to remain focused within the user research aspects of the Living Labs approach. However, the validation board only takes into account user research hypotheses and learning. In this paper iMinds Living Lab researchers introduce a hypothesis driven living lab framework (iLLAB – iMinds Living Lab Assumption Board) incorporating both user and business model learning*

Keywords: Living Lab; Open Innovation; Lean Management; Business Model Innovation; SME

1 Introduction

Living labs are complex partnerships, as they facilitate university-industry relationships but also relationships between large companies, SMEs and start-ups. Living Labs are often referred to as public-private-people partnerships (4P's) (Westerlund and Leminen, 2011). Based on a meta-review of the Living Labs literature, Schuurman (2015) defines Living Labs as an organized approach (as opposed to an ad hoc approach) to innovation consisting of real-life experimentation and active user involvement by means of different methods involving multiple stakeholders, as is implied in the Public-Private-People character of Living Labs. Moreover, he also concludes that Living Labs are emanations of both Open Innovation and User Innovation practices, as external inputs, including end-user contributions, are used to iteratively design and co-create the innovation in development. This opening of the innovation process and the involvement of external actors in a structural process have the potential to increase the value and sustainability of the business model of the innovation (Baccarne et al., 2013).

Even though Living Labs aim to combine the technological, user and business aspect of innovation through open innovation approaches, Rits et al. (2015) point out that the use of the Living Lab to explicate and validate an actual business model seldom occurs. The approach suggested by Rits et al. (2015) implies the structural embedding of and collaboration between different types of researchers and viewpoints into the living lab platform.

Learning to grow a new venture, or business model innovation, is not a matter of ideation but of iterative experimentation (Thomke 2002). The selection of the right tools and methods to structure and optimize such iterative innovation processes is key to the success rate of a business in the ever-changing economy (Brem and Viardot, 2013). The need to include not only several stakeholders (universities, large companies, SMEs and start-ups) but also several types of researchers (technical, user and business researchers) into the living lab process as discussed above, does however substantially increase the complexity of the Living Lab projects.

As a result of the missing link between business modelling and living labs (Rits et al. 2015), the different innovation tools available today either focus on strategy and business modelling, or focus on the process of iterative innovation tracks and Living Labs specifically. None of these tools take the combined effort of strategy/business modelling and iteration/living lab into account.

This paper aims to introduce a hypothesis driven living lab framework which incorporates innovation track design and management and business model innovation, allowing living lab researchers to efficiently embed and link user and business modelling research.

2 Tools for hypothesis driven Living Labs

The best known innovation tool today is probably the business model canvas proposed by Osterwalder (2010). The business model canvas is a strategic framework to develop an innovative business model, where customer and value proposition are only 2 components out of a total of 9 different business model components. This framework does not link to living lab research explicitly nor does it provide clear guidelines on the process of designing and especially iterating the business model, which often leads to a mere filling-in exercise as stipulated by Verrue (2014). So the business model canvas is more focused on the strategy than it is on processes.

The Value Proposition Canvas (Osterwalder, 2015) is a derivative or rather subcategory of the business model canvas, making the different sub-categories of the 2 above mentioned components (user and value proposition) much more explicit. Coorevits et al. (2014) compare the usage of the validation board (Ries,

2011) with the Value Proposition Canvas in a Living Lab Framework. The validation board is proposed by Ries (2011) in the Lean Startup where it is used to support start-ups and innovators in being focused on the process of solving the problem or need of a customer through validated learning.

The Value Proposition Canvas (Osterwalder, 2015) focuses on the needs of the customers (customer jobs, gains and pains) and the corresponding value proposition (gain creators, pain relievers and products and services). Coorevits et al. (2014) conclude that the Value Proposition Canvas addresses strategy, not processes, while the validation board addresses processes with only limited incorporation of the strategy. Through tests within 4 SME Living Lab cases, they conclude that the Value Proposition Canvas did not provide value throughout the Living Lab project, as it focused more on the strategy and not on the process. The validation board is a tool that identifies not only customer specific strategy assumptions, but also forces researchers to link these to research steps for validation. As such the validation board provided more value by guiding researchers and innovators through the research decision-making processes within Living Labs. In short, the Validation Board was suggested as a tool to develop hypotheses and to set (research) goals within Living Labs. Additionally, Coorevits et al. (2014) conclude that the validation board does not take into consideration all aspects which influence the business model, such as customer touch points, partners, revenue model and cost structure.

“...Using the Validation board, only the value proposition is researched .A framework to enable validation based business models in Living Labs: integration of business model aspects such as customer touch points, partners, revenue model and cost structure. “

Breuer & Ketabdar (2012) propose the ‘Business Modeling toolkit’ which focuses on eight basic components for validated learning. This tool uses a canvas of 8 components, which are quite similar to the 9 components of the Business Model Canvas. Almost all components in the Business Model Toolkit can be mapped one-on-one to a component of the Business Model Canvas, except for the ‘Capabilities’ component, which aggregates the ‘Key Activities’ and ‘Key Resources’ components of the Business Model Canvas. So at least on the strategic side, they take the same approach as the business model canvas. But Breuer & Ketabdar (2012) have improved this strategy-oriented approach by adding a process-oriented framework for tracking and improving the maturity of each business model component.

Although the business model kit comprises both strategy and process focus, some issues arise for use in a living lab innovation track. On the strategy side, some important business model components are missing or at least not explicitly mentioned. The customer need, addressed by Osterwalder (2015) and by Ries (2011) are both key components when designing and performing user research.

The aspect of incorporating competition and the differentiation compared to the competition of an SME are core, as well, to understand the business model. On the process side, the tool is focused rather on creating common ground for teams and allowing for self-assessment based on maturity of assumptions. The sustainability of business models is however not only determined by maturity of validation.

3 iLLAB: a Hypothesis Driven Living Lab tool with integration of Business Models

The iLLAB (iMinds Living Lab Assumption Board) framework was set up within the iMinds Living Labs based on the experience gained through over 40 SME cases. iLLAB has been created to serve 3 main purposes:

- A **strategic purpose**, as it needs to be able to support strategic workshops with SMEs
- A **process purpose**, as it needs to enable researchers to manage different research steps
- An **assessment purpose** in order to analyse and challenge SMEs.

1.1 The strategic purpose of iLLAB

At the strategic level, the iLLAB tool was created on top of an aggregation of principles from Ries (2011), the Osterwalder Value Proposition Design (2015), the business model matrix of Ballon (2007), the business model canvas of Osterwalder (2010) and Porter's five forces model (1985) and translated into a set of strategic components. The link of business model references to the proposed hypothesis driven Living Lab framework can be found in figure 1.

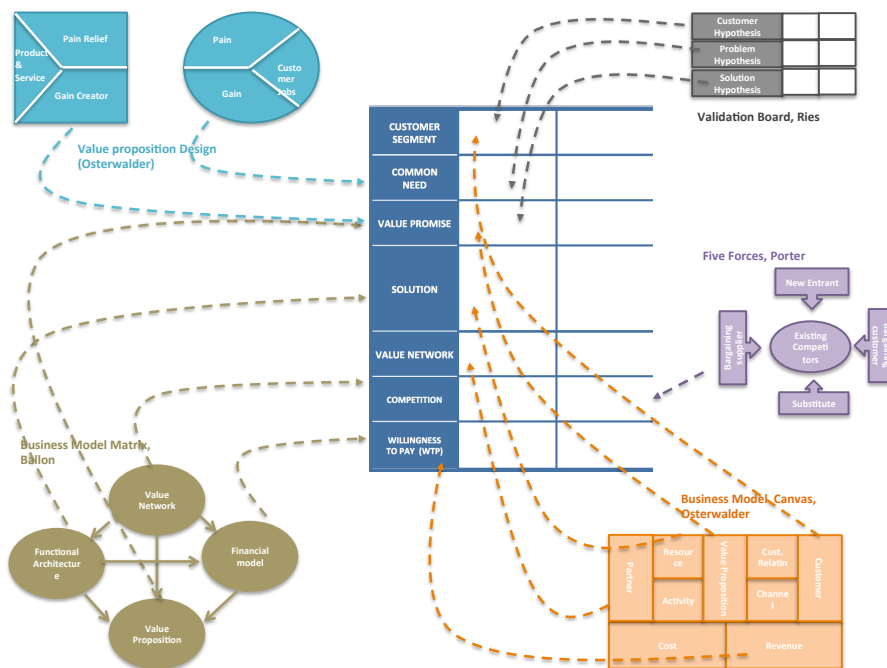


Figure 1: Link of business model references to the proposed hypothesis driven Living lab framework

The validation board (Ries, 2011) puts the customers at the core of its framework and therefore focuses on customer hypothesis, (customer) problem hypothesis and solution hypothesis. The approach is process oriented, more specifically for highly iterative (and lean) innovation processes allowing for structured learning and pivoting (Coorevits, 2014). Given the highly iterative nature of Living Labs and their inherent focus on customers, users and stakeholders, the validation board served as a starting point for the iLLAB tool. Osterwalder (2015) introduced an alternative with the value proposition design. As mentioned above, Coorevits (2014) found that it less applicable to the process oriented Living Lab trajectories, but the modules of pain and gain are included in the framework.

As discussed above, this process-oriented approach is missing some important strategic components that need to be taken into the innovation track at the strategic level. Osterwalder's (2010) business model canvas has the customer segment and value proposition components in common with the Validation Board, but analysing the other components, it was found that for most of the SME projects, one or more of these components were not always relevant or important to the case at hand.

Here the Business Model Matrix of Ballon (2007) served as a first guiding framework given its market-level viewpoint. The business model matrix was created out of 4 different determinants, of which 2 comprise of value parameters

(value proposition and financial model) and control parameters (value network and functional architecture).

The value proposition layer is similar to Ries (2011) and with Osterwalder (2010) and (2015). In order to capture the marketing and positioning of an SME, the iMinds Living Lab researchers replaced the 'value proposition' by the 'value promise'.

The solution in iLABB is determined by technical components as well as non-technical components, part of the product and/or service. The solution refers to 'the functional architecture' of Ballon (2007). The functional architecture comprises of the technical systems composed of at least one building block (or module), governed by certain rules (or intelligence), and that interwork (or not) with other technical systems.

The value network definition is an alternative to the broad approach the business model canvas, though the applicability is more adapted to living labs and to several cases. Ballon (2007) bases the framework on 3 concepts, i.e. roles, actors and relationships. The definition of the value network used in this research comprises of defines the roles, relationships and actors in the ecosystem plays. Additionally, it is defined which actors' create-, deliver-, consume- and capture value. Additionally, the sales model is described in the value network.

Ballon (2007) introduced the financial model in the Business model matrix, which described the revenue model and the revenue sharing model. Osterwalder (2010) takes into account the revenues model, where the pricing level and the pricing model are being discussed. The researchers opted to utilize the definition of 'Willingness to pay', which comprises of the pricing model and the pricing level, and in cases where revenue sharing is applicable this section can be utilized.

One last, important, missing pillar in Ries (2011), Osterwalder (2010) and (2015) and in Ballon (2007), is the competition and the differentiation of an SME/start-up. Competition refers to the 5 market forces of Porter (1985), which draws from 5 forces model, which make up the attractiveness of a market. The 5 forces are rivalry within the industry, threat of new entrants, threat of substitutes, bargaining power of suppliers and bargaining power of buyers. In order for a company to differentiate itself, it needs to differentiate itself influencing these 5 forces.

Taking these 7 parameters into account, the researchers created the iLLAB (Figure 2). iLLAB has a similar spread sheet based lay out to the validation board as Ries (2010), as this way different eco-systems can be represented and a full overview of the different segments. Per column, a customer segment can be

filled out with its respective common need, value promise, solution, value network, competition and willingness to pay.

CUSTOMER SEGMENT		WHAT IS THEIR COMMON CHARACTERISTIC IN WHAT WAY DO THE DIFFERENT SEGMENTS DIFFER		
COMMON NEED		WHAT IS THEIR COMMON NEED, PAIN OR ASPIRATION WHAT MARKET OR SOCIETAL TRENDS WILL AMPLIFY THAT NEED		
VALUE PROMISE		WHAT IS YOUR VALUE PROPOSITION WHAT IS YOUR MARKETING MESSAGE		
SOLUTION		CORE COMPONENTS OR FUNCTIONALITIES SPECIFIC COMPONENTS	SPECIFIC COMPONENTS	
VALUE NETWORK		COMPONENTS ⇔ E2E SOLUTION ROLES ⇔ SERVICE CREATION, DELIVERY & CAPTURING SALES MODEL		
COMPETITION		WHO ARE YOUR COMPETITORS AND ALTERNATIVES HOW DO YOU DIFFERENTIATE FROM THEM		
WILLINGNESS TO PAY (WTP)		PRICING MODEL PRICING LEVEL		

Figure 2: iLLAB: iMinds Living Lab Assumption Board

3.2 The process oriented purpose of iLLAB

Similarly to Ries (2011) a division is made between unknown aspects, assumptions and facts. In contrast to the business modelling toolkit (Breuer, 2012), the iMinds Living Lab researchers do not incorporate 5 maturity levels in order to simplify the process for the entrepreneur and for the researchers and due to the scope and size of the Living Lab trajectories.

When filling out the iLLAB, researchers utilize a colour code indicating whether a cell is an assumption (green), a fact (red) or whether a cell is completely unknown (blue) as the example in figure 3 shows.

CUSTOMER SEGMENT	Customer Segment 1	Customer Segment 2	Customer Segment 3
COMMON NEED	Need 1	??	Need 2	
VALUE PROMISE	Value promise 1	Value Promise 2	Value Promise 3	
SOLUTION	Component 1		Component 2	
	Component 3	Component 4	Component 5	Component 6
VALUE NETWORK	Value creation	Value distribution	Value Consumption	Value Capturing
COMPETITION	Competitor 1	Competitor 2	Competitor 3	Competitor 4
WILLINGNESS TO PAY (WTP)	Price Level 1 Price Model 1	Price Level 2 Price Model 2	Price Level 3 Price Model 3	Price Level 4 Price Model 4

Figure 3: iLABB assumptions, facts and unknowns

iLLAB is that it is incorporated in the overall management and process of the Living Lab:

- First, it is utilized as a framework to **track the learning of different research steps** concerning the business model. After each research step, iLLAB the content is updated together with the validation of the content (assumption vs. fact vs. unknown) during STEERCOs.
- Second, iLLAB is utilized to **take content from to aid the research steps**. The components and the content of iLLAB are utilized to create topic guides for interviews, co-creation sessions, surveys and tests.

1.2 The assessment purpose of iLLAB

iLLAB serves as a tool to analyse business models throughout the different research steps. During STEERCOs after each research step, the business model is analysed by business model researchers. The analysis is utilized to challenge the instigator on the user inputs and the alignment of the business model.

Three principles are utilized to analyse the business models of the instigator:

- **Focus:** Does the SME/start-up focus on a single market segment/solution/ value network/...? The approach here is based on opportunity cost. The concept of opportunity cost is fundamental to the

economist's view of costs. Since resources are scarce relative to needs, the use of resources for one activity prevents their use in others.

- **Differentiation:** Does the SME/start-up differentiate compared to competitors? What are the core components/capabilities of the SME/Start-up that competitors do not have? In short, what is the reason why this specific team of innovators need to implement this solution, and not another team?
- **Coherence:** Are all the building blocks of the business model coherently designed? Are there any contradictions in the model?

4 Research and results

Given the exploratory nature of the research, the study utilizes a qualitative research approach based on case study analysis (Yin, 2009). The approach utilized was 'participant observation' where there was an active observation and interference of researchers. In practice, this consisted of 10 business model workshops guided by iMinds Living Lab researchers utilizing the iLLAB framework. The sample of companies diverts from companies who are in a very early stage (less than one year) to companies which have a more stable business model and which are in a less exploratory phase. After the workshops, feedback was gathered on the impact the iLLAB framework had on the conversation.

In order to analyse the data, the researchers relied on pattern matching between the different workshops that were delivered (Yin, 2009). The results of the utilization of the iLLAB framework were analysed and grouped. **Five main results** were identified after analysing the feedback

- i. Making a **choice between assumptions and facts has proven to be challenging but useful**. The latter are easily mixed and entrepreneurs are unaware of the importance of the difference, which exposes them to the risk of making the wrong assumptions and might potentially lead to failure. In order to capture this value, the researcher leading the workshop needs to be able to challenge the facts and assumptions an entrepreneur indicates, as the entrepreneur might be overly positive about certain facts.
- ii. The iLLAB framework helps entrepreneurs to **focus on a certain customer segment and its business model** during a workshop. Entrepreneurs understand that they need to focus on the core of their business. On the other hand, too many columns (customer segments addressed) might indicate a lack of focus. The researcher has the important role to challenge the entrepreneur to focus.
- iii. iLLAB has shown to be a useful framework to make early stage start-ups to be **more concrete and specific about use-cases**. Entrepreneurs in early start-ups still have a lot of unknown facts and thus many decisions

to make. Some tend to stay abstract about certain points in their business. The role of the researcher there is to always safeguard the message is clear and to ask about concrete use cases.

- iv. During workshops with several team members, the **validation board sparked different discussions** on different opinions between team members. The discussion did not get resolved immediately during the workshop, but the researchers assume that those discussions will have a positive long-term impact on the focus of the project, the communication and structure within the team and the end result of the innovation.
- v. As a point of improvement to the iLLAB framework, different researchers indicated that the row on **'value network'** could become rather complicated in case of many stakeholders involved, which was the case in 3 cases. The business model researchers will combine value network analysis with filling out the iLLAB framework in the case of complicated eco-systems in the future.

5 Conclusions

iLLAB (iMinds Living Lab Assumption Board) is a proposed framework for hypothesis led living lab trajectories which includes business model learning arising throughout a living lab project. iLLAB is focused on the strategy, process and assessment of user- and business model learning in a living lab trajectory. The iLABB framework was created out of the experience of over 40 SME Living Lab projects combined with models and frameworks taken from literature.

The iLLAB has gone through a preliminary test with 10 start-ups, where mainly the division between facts and assumptions, the ability to focus and to be specific and the power to spark discussions have added to the quality of the workshop.

For further research iLLAB needs to be applied on living lab trajectories, and not only on a single workshop as the assumption of the researchers is that iLABB mainly will prove it's value in the process and assessment aspect, not only on the strategic business model value.

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