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Open Innovation with Entrepreneurial Users: Evidence from Living Lab projects

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Abstract: Entrepreneurs are struggling to implement open innovation in their innovation processes. Innovation intermediaries assist them in this process by connecting them to internal and external knowledge sources. Living Labs are such organizations mediating between entrepreneurs and end-users via co-creation and real-life experimentation. However, little is known regarding the mediating process for different types of entrepreneurs. In this paper, we investigated two groups of entrepreneurs engaging in Living Lab projects: three (lead) user entrepreneurs and three opportunity entrepreneurs. Our findings suggest that 'Living-Labs-as-a-service' intermediaries match better with the characteristics of opportunity entrepreneurs, as user entrepreneurs tend to consider themselves as lead users drawing upon their own need and solution information, only taking into account knowledge on the 'future state', whereas opportunity entrepreneurs in a Living Lab setting are more flexible and willing to adapt and iterate in terms of the innovation itself as well as in terms of the business model.

Keywords: Entrepreneurial Users, Entrepreneurship, Living Labs, Open Innovation, User Innovation.

Introduction

Opportunity discovery and entrepreneurial action are regarded as the core elements of entrepreneurship (McMullen & Shepherd, 2006). A specific case of entrepreneurial action occurs in the case of user entrepreneurship, as described by Shah & Tripsas (2007). They contrast this model with the classic depictions of the entrepreneurship process where experimentation

and adaptation occur after the entrepreneurial decision. This model emphasizes the collective nature of innovation and entrepreneurship, highlighting potential shared and open processes. They also focus on the role of usage experience and community interaction in the entrepreneurial process. This explicitly links entrepreneurial users with Open Innovation and User Innovation, although these links are seen as avenues for future research in the original paper. We specifically refer to the interaction between the user entrepreneur or innovator and the role of interaction with other users and the impact these interactions have on the eventual outlook and market success of the innovation. However, these explorations are still absent in the current literature base. Some work has been done on the difference in implementation of and reaction to user contributions between small and large firms (Heiskanen & Repo, 2007), but these differences were related to the size of the companies, not to the characteristics of the innovator, being a user entrepreneur or not. Other literature digging into the territories between open and user innovation is research on toolkits for innovation. However, the focus is not on entrepreneurial users, but rather the opportunity for users to generate personalized innovation (Franke & Schreier, 2002). Dahlander & Frederiksen (2012) illustrated the role of user communities as platforms for testing and experimentation, whereas Autio et al. (2013) also showed that user communities can be a fertile ground for entrepreneurial action. Although these studies build further on the concept of the user entrepreneur, they do not shed light on the differences between user entrepreneurs versus ‘ordinary’ entrepreneurs that act upon a felt business opportunity, something which is central in the original work by Shah & Tripsas (2007).

A very recent study by Frederiksen & Brem (2017) looks at the principles and statements on the ‘Lean Start-up’ by Eric Ries and concludes that there is empirical and academic support for the majority of them, being in essence repeated, validated experimentation. However, both the Lean Start-up and the study do not acknowledge the difference in knowledge levels between entrepreneurs. In the case where the entrepreneurial team is carrying out all experimentation by themselves, it is assumed implicitly that this is done according to their own knowledge base. In the case of innovation intermediaries, the knowledge levels or information stocks should be taken into account somehow in order to adapt the experimentation and validation activities. Because of the intervention of intermediaries in this process, and because of the focus in real-life experimentation in Living Labs, we regard Living Lab innovation projects as ideal case studies to study the entrepreneurial process and the role the characteristics of the entrepreneur play on the innovation development and innovation outcomes. Therefore,

within this paper, we investigate 6 cases in the domain of Living Labs, which also have been described as phenomena incorporating both elements from open and user innovation (Schuurman, 2015; Schuurman et al., 2016). By investigating Living Lab innovation projects, where active user involvement and co-creation are used to advance the innovation development process, and relating the outcomes of these projects to the characteristics of the project instigator (user entrepreneurs versus opportunity seekers), we want to better understand open and user innovation processes in the context of entrepreneurial users.

Lead Users & User Entrepreneurs

Already in the 1970's, von Hippel (1976) introduced the customer active paradigm (CAP), which implied that under certain circumstances the user could take the initiative in various stages in the innovation process, as a counterweight to the dominant manufacturer active paradigm (MAP), where the manufacturer generates all innovation by himself. In later works, von Hippel dug deeper into the nature and the characteristics of these 'innovating users', introducing the 'Lead User'-concept (von Hippel, 1986). Lead Users display two main characteristics with respect to a novel or enhanced product, process or service: a) Lead Users face needs months or years before they will be general in a marketplace and b) Lead Users expect to benefit significantly by obtaining a solution to these needs. Urban and von Hippel (1988) state that Lead Users are especially relevant '[w]hen new product needs are evolving rapidly, as in many high technology product categories'. Eric von Hippel considers the employment of Lead Users as a counter weight for traditional market research that addresses users at the center of the market and had caused a flood of incremental innovation. Instead, Lead Users are users from the leading edge of the target market or users from markets facing similar problems in a more extreme form. Opposite to the majority of users, whose personal real-world experience sets the limits of their imagination and problem solving abilities, Lead Users do have real-life experience with novel product or process concepts (Lettl, 2004; von Hippel, 1986) which allows them to take the role of 'need-forecasting laboratory' (Lilien et al., 2002; Lüthje & Herstatt, 2004; von Hippel, 1986). However, besides the generation of innovative needs and ideas, Lead Users are also seen as sources of innovative solutions (Lilien et al., 2002; von Hippel, 2005).

This means that von Hippel sees Lead Users as capable of generating both need and solution information. Therefore, in the case of innovating Lead Users, we expect them to draw upon their own need and solution information, which means that they would be able to get the problem-

solution fit right by themselves, and instead go straight for the product-market fit stage. A first ‘macro’ dichotomy in academic literature is the difference between knowledge related to the current environment versus knowledge related to the innovation under development. Gourville (2005) describes these two phases as the ‘current state’ and the ‘future state’, also referred to as ‘as-is’ opposing ‘possible future states’ (Alasoini, 2011). This dichotomy is in line with the (sometimes implicit) logic of design thinking (Brown, 2008), in which the typical cyclic patterns always start from an exploration of the current state, the ‘as is’ state (inspiration, inquiry, empathize, research, observation, etc.) which is followed by the definition and experimentation of future states, the ‘as could be’ state (define, ideate, prototype, test, experiment, etc.).

Living Labs as innovation intermediaries

Howells (2006) describes innovation intermediaries as organizations that take over various tasks in the innovation process. These tasks are aimed at the combination of knowledge and competences necessary to solve innovation problems and to bridge different gaps between internal and external knowledge (Abbate et al., 2013). Living Labs are also considered an innovation intermediary with a transversal role in Systems of Innovation (Almiral & Wareham, 2008). What makes them novel compared to other intermediaries, is the actor they mediate: the users. This mediation consists of three new activities: 1) Living Labs provide services around user experience and involvement to companies in the context of projects, aiming to obtain products that relate better to users’ needs, concept validation or to capture new ideas that could improve a product or a service, 2) Living Labs support lead users as entrepreneurs providing networking, technical expertise, project management and sometimes funding, 3) Living Labs organize the user involvement in the innovation process by maintaining groups, setting up projects and creating societal involvement. This is in line with the work of Kusiak (2007) who states that within a Living Lab all stakeholders of a product or a service are invited to participate in the development process. The Living Lab thus acts as an innovation intermediary by aggregating all external inputs and translating them into requirements for innovation. Note that the second argument by Almiral & Wareham (2008) explicitly covers the ‘entrepreneurial lead user’ aspect and suggests Living Labs as ideal breeding grounds for this type entrepreneur. Main assets and resources offered by the Living Lab to these user entrepreneurs are networking, technical expertise, project management and funding. The first point is more in line with opportunity entrepreneurs, where the Living Lab is regarded as an organization offering services

regarding user involvement for innovation. This idea of Living-Labs-as-a-service is also mentioned by Ståhlbröst (2013) as “the offering of such services such as designing the idea-generation processes, planning or carrying out real-world tests of innovations, and pre-market launch assessments”. In terms of Schuurman’s (2015) model of Living Labs, ‘Living-Labs-as-a-Service’ can be defined as follows: Living Lab organizations that have developed a specific project process or methodology aimed at entrepreneurs to assist them in their innovation process. These entrepreneurs, sometimes referred to as utilizers of the Living Lab, engage in a customer-client relationship with the Living Lab to get in touch with (end-)users to help shape their innovations.

Reflecting back on von Hippel, the ‘mediation of the users’ is linked to the concept of ‘sticky information’, which implies that user needs can be latent and thus hard to transfer to the manufacturer (von Hippel, 2005). When looking to the ‘locus of innovation’, or the initiator of the innovation process, users will tend to develop innovations that draw heavily on their own information between need and context of use, while manufacturers will tend to develop innovations that draw heavily on the types of solution information in which they specialize. When a company succeeds in integrating Lead Users into their innovation processes, they can possibly overcome this information stickiness and solve their own functional fixedness. By mediating the user through co-creation methods and by real-life experimentation, sticky information is transferred from end-users to the opportunity entrepreneurs which would help them in the process of determining the problem-solution fit.

Based on our literature review, we come up with the following propositions:

- 1. By mediating the end-user Living Labs are able to act as valuable innovation intermediaries for either type of entrepreneur*
- 2. As entrepreneurial lead users are able to provide both problem and solution information, we expect them to mainly engage in Living Lab projects to focus on the product-market fit*
- 3. As opportunity entrepreneurs do not necessarily have direct access to sticky need information, we expect them engage in Living Lab projects for the problem-solution fit, as well as the product-market fit.*

In the remainder of this paper, we will investigate these propositions based on an exploratory comparative case study research of six Living Lab projects with a mix of user entrepreneurs and opportunity entrepreneurs.

Methodology

We use an exploratory in-depth comparative multiple case study analysis (Yin, 2009). We selected a sample of six Living Lab projects, carried out within the same Living Lab organization (imec.livinglabs), where we could assess whether the project instigator could be regarded a user entrepreneur or a regular entrepreneur who has spotted an opportunity or is forced to innovate based on external circumstances. For each case study, we interviewed the project instigators, used two surveys the instigators filled out before and after the project, had access to all project deliverables, meeting minutes and field notes, and used the project researchers as informant to verify the findings. Three projects were classified as ‘user entrepreneurs’: Djubble, Planza and Partago. Three projects were selected that fit the ‘opportunity seekers’-category: Planidoo, Postbuzz and Wadify. All projects deal with digital innovations that have a mobile component, which allows to better compare the results.

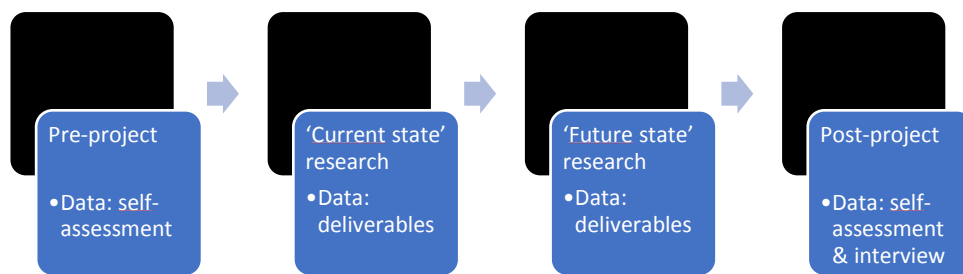


Figure 1: data collection

We identified the user entrepreneurs by using a lead user-scale to survey the instigators at the start of the project (see Schuurman, 2015) and based on qualitative data gathered during the project. For each project it was decided whether the main entrepreneur was a (lead) user entrepreneur or as opportunity entrepreneur. This was done for a long list of projects finished at imec.livinglabs by the author team. Based on the criterion of theoretical sampling (Coyne, 1997) six projects were selected where these labels were the most ‘clear’ to facilitate comparing both conditions with each other.

For each project, we kept track of all user involvement steps that were taken both in terms of the ‘current state’ (current user habits & practices, current solutions and current usage context) and the ‘future state’ (future user habits & practices, the new solution and the future usage context), and we assessed the contributions the outcomes of these steps had on the eventual

innovation. For each project, we also looked into the current market situation of the innovation and company. This allowed to better understand the similarities and differences in the entrepreneurial process of both types, and to assess the influence of Living Lab projects on the process. We divided the two ‘pivots’ or iterations between innovation (where there any changes made to functional requirements or features of the innovation) and business model (was there any change in the go-to-market approach). For the overall outcome, we assessed whether the innovation was on the market, completely stopped or rebooted (continuation of entrepreneurial activities with a radically different idea).

Results

1. Djubble

Entrepreneurial type: Djubble is a smartphone application that allows people to spontaneously bring friends together. Hereby simplicity is a crucial element of the application. The idea was based upon the personal experiences of the founder of Djubble. She was frustrated by the fact that when inviting friends for sporting together, she needed to use a diversity of communication tools and had to cope with a lot of excuses and late replies. Therefore, Djubble was a solution to her personal needs, being a simple way of inviting people who simply replied by swiping yes or no. Therefore, Djubble is a Lead User entrepreneur.

Main reason to engage in a Living Lab project: Based on the pre assessment, the project was conceived to test the usability of the application and to gain insight in the future market.

Results used: The results were used to identify the target market and the roll-out strategy, and to gain insight in the usability of the application. However, as it appeared that the stickiness of the app was not that high, the results were used to reflect on refocusing the app towards another user segment.

Pivot innovation: No fundamental changes were made to the concept of Djubble, besides some usability and UX issues.

Pivot Business model: In terms of target market there was a drastic change, based on the results, as a very generic ‘inviting’ use case was not very

successful during the field trial. They also changed their business model towards a B2B-model.

Outcome innovation process: Last year Djubble stopped all of its activities.

2. Partago

Entrepreneurial type: Partago is an electrical car sharing initiative based in the city of Ghent. With a smartphone app, users can locate, unlock and pay for the usage of the car. After usage, it is returned to the neighborhood where it was located initially. The founder of Partago is a Lead User entrepreneur as his idea evolved out of his frustration with the current situation in terms of parking space in his own street in Ghent and the observation that the majority of the time the majority of the cars is simply parked and not in functional use. He regarded Partago as a system to optimize mobility means and decrease the number of parked cars in the crowded streets in Ghent.

Main reason to engage in a Living Lab project: Assessing the concept with experienced partners to gain credibility for the brand and to connect with the first potential users.

Results used: The project focused especially on segmenting the potential user base and supporting a first real-life pilot of the technology with one electrical car.

Pivot innovation: No main changes in terms of the innovation, besides a ‘reservation’ feature that was added to the concept based on feedback from the interviews and test-users.

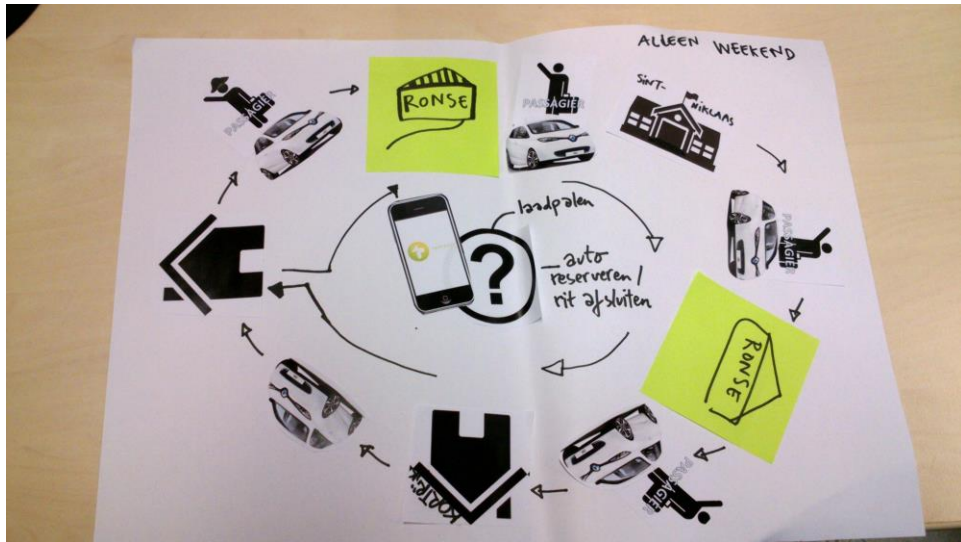


Figure 2: experience map from a Partago test-user

Pivot Business model: The major pivot and shift in the project was the organization model. Based on the great enthusiasm of some of the involved users, Partago became a cooperative, which means that users buy shares in order to buy a car together.

Outcome innovation process: Partago is active in the city of Ghent as a cooperative with at the time of writing 12 cars up and running in different neighborhoods in the city.

3. Planza

Entrepreneurial type: Planza as a young start-up wanted to solve the current frustration of endless back and forth mailing when organizing a social activity by developing an intelligent, semantic, all-in one online platform with the same name as the company. The goal was to be a simple, convenient and user-friendly online plaza where you can meet to plan every detail of your upcoming event with the attendees. Planza is a clear case of a Lead User entrepreneur as the founder created the idea based on his own personal frustration with current planning and organization tools. During the project, he also referred to his own experiences and frustrations with organizing and planning.

Main reason to engage in a Living Lab project: The main reason to engage in the project was extrinsic, as Planza was forced to do this by VLAIO, the Flemish funding agency, as a condition to get further funding.

Results used: In the post-project interview, the main entrepreneur stated that he did not really listen to the users as he does not believe in bottom-up innovation. He literally stated he was forced to do the project because of the Flemish funding agency and admitted being stubborn at the time of the project.

Pivot innovation: None. The people from Planza themselves were not convinced of this approach, as they thought it was too early for Planza to be judged by end-users. They felt as if the user feedback and input consisted of mostly suggestions and issues they already knew themselves, with no real ‘eye openers’ or novel insights.

Pivot Business model: None for Planza itself, but changed its course to form a new company with a different focus and business model.

Outcome innovation process: All activities regarding Planza were stopped some time after the Living Lab project. The owner founded a new company focusing on B2B-applications with two new projects. Interestingly, he has evolved from Lead User entrepreneur towards an opportunity entrepreneur. Therefore, we regard the status for Planza as ‘reboot’.

4. Planidoo

Entrepreneurial type: Planidoo can be regarded as an opportunity entrepreneurship project. The idea emerged from a not-for-profit organization on cultural activities. They spotted the opportunity to create a platform in order to generate more funds and to offer it as a service to their members.

Main reason to engage in a Living Lab project: To gain academically founded user research results regarding the concept.

Results used: The results of the project were used during the process as Planidoo was still in conceptual stage at the start. After a first project, two follow-up projects followed where Planidoo was further developed and tested with end-users. The final project investigated the business model for Planidoo in the context of a local government.

Pivot innovation: The second project used ‘design sprints’ to develop the platform based on user feedback. This allowed to tailor the platform and the different components towards the actual user needs.

Pivot Business model: In terms of business model, initially a B2B-approach was pursued, but based on the research results, the model where a local government buys a license for using Planidoo and makes it available to all local organizations also seemed to hold potential.

Outcome innovation process: Planidoo engaged in two follow-up Living Lab projects and is on the market with quite some organizations as listed users.

5. Postbuzz

Entrepreneurial type: Postbuzz is an online platform which makes it more easy to communicate with people in your neighborhood. It can be regarded as an address-based digital mailbox that aggregates all relevant content related to your location, such as digital advertisements, official communication of the local authorities, or local news. The entrepreneurial team consisted of people from a market research company and from a communications agency. The idea was based on an observed need from advertisers to reach their target audience as more and more people are putting a 'no printed advertisements'-sticker on their physical mailbox.

Main reason to engage in a Living Lab project: They indicated to engage in a project to get insights in customer behavior.

Results used: The results from the project were used during the project. As the platform itself was still in development, this also allowed to make direct changes based on the user input. This included input regarding current habits and practices of end-users, as well as results from the field trial.

Pivot innovation: In terms of the innovation, major changes were including official communication of the local authorities, as this emerges directly from the co-creation sessions. They also completely redesigned the way in which content was presented to the users from hierarchical towards a more intuitive presentation of content cards (see figure). Also, the platform was more and more conceived as an aggregator of all neighborhood-related content, such as hyper-local news, applications related to the sharing economy (e.g. PeerBy),... etc.

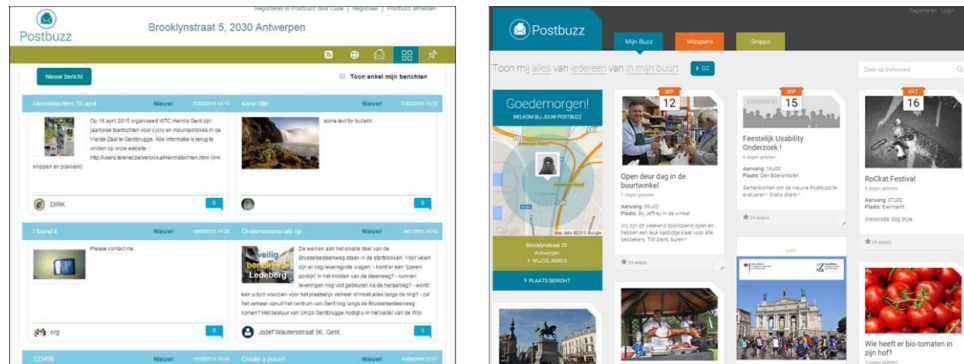


Figure 3: Postbuzz interface before (left) and after (right) the project

Pivot Business model: Initially, the business model was based upon fees from advertisers to push their content through the platform. Because of the interest of users in public sector communication, a new model was conceived where local governments would by ‘bundles’ which they could use for local organizations to spread their content via the platform.

Outcome innovation process: Postbuzz engaged in a follow-up Living Lab project and is now active on the market and is active in a lot of cities and villages.

6. Wadify

Entrepreneurial type: Opportunity entrepreneur. The team for Wadify consisted of people involved in PlayOut!, an organization active in the music and fashion business that focused on delivering PR and communication services for creative brands. Based on trends they detected in the market and within youngsters (the so-called millennials, which are a target population for a lot of their clients) they spotted the opportunity for a platform on which young people could watch ads and get paid per view. To assure they actually viewed the add, they needed to answer a question at the end of the movie. There was also a maximum amount that could be earned per month.

Main reason to engage in a Living Lab project: Main reason for a Living Lab project was to obtain results in order to convince stakeholders and potential partners to engage with the platform. Getting direct feedback from the youngsters themselves on the platform was a second reason.

Results used: The results used especially as input for shareholders and stakeholders, but despite positive feedback from the youngsters and favorable survey results, Wadify did not succeed in convincing the right partners. However, the results were also used to make changes to the platform itself. Based on an analysis of current practices and a survey, the reimbursement model could be validated, as well as the interest. The test provided new inputs to the platform and a whole new feature, being the discussion groups.

Pivot innovation: The project resulted in several changes being made to the platform and also in the idea to create closed discussion groups with youngsters regarding brands or products. The youngsters themselves also appeared to be very enthusiastic regarding the platform. However, because the interest of advertisers and other relevant market players was not overwhelming, PlayOut! changed its strategy and came up with another innovation that was closer to their core business: the PlayPass, a festival wristband with access control and other relevant features.

Pivot Business model: The business model itself did not change during the project or based upon the results.

Outcome innovation process: As outcome, all activities regarding the Wadify-platform were stopped, although the founders still believe in its potential. They stated that the 'time was not right' for this kind of disruptive advertising model. All that was missing, were investors. Because they did not find them, the whole project was put on hold. However, interestingly, the founders went on to pursue another innovation: Playpass. With this company, they are quite successful. Interestingly, they can be regarded as 'user innovators' for the new idea, as based on their experience in the music industry and in the domain of marketing, they started Playpass out of a personal frustration with access control and payments on music festivals. With this new company, they also engaged in a multi-stakeholder Living Lab project.

Discussion and conclusion

When we summarize the main results and outcomes from the case, we can compose the following table that allows to make a comparison between the two entrepreneurial types.

	<i>Entr</i>	<i>Pivot Inno</i>	<i>Pivot Bus mod</i>	<i>Main reason</i>	<i>Results used</i>	<i>Outcome</i>
Djubble	LU	No	Yes	Usability & insights in target customers	Future state	Stopped
Partago	LU	No	Yes	Generating initial market demand	Future state	On the market
Planza	LU	No	No	Funding condition from funding agency	None	Reboot
Planidoo	OPP	Yes	Yes	Academic user research	Current & Future state	On the market
Postbuzz	OPP	Yes	Yes	Insight in customer behavior	Current & Future state	On the market
Wadify	OPP	Yes	No	Results needed to convince investors & stakeholders	Current & Future state	Reboot

In general, the Lead User entrepreneurs did not make any fundamental changes to the core features or functionalities of their innovation based on the research results, whereas all opportunity entrepreneurs did so. In terms of business model, all but one iterated. The differences between both groups are also reflected in how the results are used. Lead User entrepreneurs only seem to draw upon insights in the ‘future state’ to pivot their business model, whereas opportunity entrepreneurs are more likely to draw upon the results from both current and future state research activities. The reasons to engage in the Living Lab project in the first place are more diverse. In terms of actual outcomes, only one out of three Lead User entrepreneurs is on the market, whereas two out of three opportunity entrepreneurs succeeded in this, with the other being successful with a ‘reboot’. It is also remarkable that all three opportunity entrepreneurs continued the collaboration by means of one or two follow-up Living Lab projects, whereas this was not the case for any of the Lead User entrepreneurs.

In conclusion, most of the findings seem to support our propositions derived from the literature.

1. By mediating the end-user Living Labs are able to act as valuable innovation intermediaries for either type of entrepreneur

With the exception of one ‘forced’ user entrepreneur, all five other projects received valuable contributions and inputs to their innovation process. However, the user activities where they derived the most value from seemed to differ, as well as the way in which they dealt with these inputs. This finding suggest different approaches in terms of research activities according to the entrepreneurial type.

2. As entrepreneurial lead users are able to provide both problem and solution information, we expect them to mainly engage in Living Lab projects to focus on the product-market fit

This was validated by the results as the iterations and pivots of the user entrepreneurs were in terms of their business model. For the innovations themselves, only minor usability and UX modifications were made. This suggests that this entrepreneurial type tends to ‘stick’ to its own need and solution information and mainly search for the target market that represents the same needs. One entrepreneur literally admitted being ‘stubborn’, whereas in the other project the diversity of use cases was only narrowed down when the results from the field trial were very negative. This suggest to use more coaching and challenging methods and techniques to get them out of their own ‘lead user bubble’.

3. As opportunity entrepreneurs do not necessarily have direct access to sticky need information, we expect them engage in Living Lab projects for the problem-solution fit, as well as the product-market fit.

We could also find evidence for this proposition in our studied cases. The opportunity entrepreneurs were more likely to iterate on both innovation and business model, drawing upon the insights from both current state and future state practices and knowledge. This suggests that the current ‘Living-Labs-as-a-service’ is more tailored towards opportunity entrepreneurs. The fact that all three also engaged in follow-up projects further supports this claim.

Regarding our research, there are also some limitations. We only used six case studies, which were selected based on theoretical criteria, but nonetheless these findings should be validated in a more quantitative setting. Also, the cases studied were all in the mobile application domain. Other innovation domains should be studied to see whether similar results are obtained or whether type of market or innovation might play a role as well. We also grouped the projects based on the characteristics of the main entrepreneur, but as innovation is about teamwork, the role and the composition of the team will also play an important role. In our cases with user entrepreneurs, these people were the sole founder or the dominant actor in the team, but when a team is more balanced, we assume that the outcomes will be different. Therefore, a lot of future studies are still needed to better grasp this phenomenon, but with this paper we hope to have started the discussion and further research efforts in this fascinating area.

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