Transnational piloting for smooth internationalization of health-tech start-ups

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Abstract

Health-tech business is increasing all over the global markets. Startups need agile and cost-efficient methods to study the needs and opportunities in foreign markets. Thus, the purpose of this paper is to advance the understanding of internationalization of health-tech startups and to discuss the practical issues related to transnational living lab practices based on a case study of health-tech startups. Finally, a preliminary model for transnational health and wellbeing living labs is introduced.

Keywords: *transnational living lab, lean startup, lean global startup, internationalization, health-tech*

1 Introduction

Lean start-up and lean innovation terms have been adapted from lean manufacturing meaning eliminating waste, the non-value-creating efforts, to emphasize the core idea behind the lean innovation and lean startup methodology (Rasmussen & Tanev, 2015). Later, lean term has been applied in similar contexts, e.g. in software development, lean development, and lean enterprise (e.g. Ojasalo & Ojasalo, 2018). Besides business development, lean startup methodology can be used to support internationalisation of "lean global startups" (Rasmussen & Tanev, 2015). Living labs, as local, agile and networked operators in the target market, could support "lean global startups" to validate their business model, learn from customer experiences and cultural aspects and identify the right partners and channels for marketing.

This study follows from the authors' aspiration for practice and preliminary research into the transnational piloting for smooth internationalization of health-tech startups. The results and key findings are reported in this stage.

The paper has four sections. The first describes the theoretical framework consisting of internationalization of startup companies, lean startups, and living labs. The second section introduces a case study of transnational piloting. The third section presents the preliminary results and findings. The fourth and final section discusses the contributions of the paper, notes the study's limitations, and presents the roadmap for the future development needs of the transnational health and wellbeing living labs.

2 Theoretical framework

Digital and technological solutions for health-tech business is increasing all over the global markets. Startups need lean and cost-efficient methods to find out, create and test market needs and opportunities in foreign markets. Lean startup approach (Blank, 2007, 2013; Ries, 2011; Maurya, 2012) has been identified as a structured and efficient process, which may help startups to achieve their strategic and business goals in internationalization (Neubert, 2017). Many startups aim at internationalizing early and fast to become profitable and therefore they seek for markets where it is easy and fast to enter. Based on Johanson and Vahlne (2009), the Uppsala model can be applied to firms that begin to internationalize fast after their founding, if they seek low-risk and low-cost market-entry modes such as exporting. However, in many cases, this is not enough or it is not even an option, and the business model has to be created within the cultural premises and local market conditions. On the other hand, internationalizing early and fast is very challenging for startups and entrepreneurs because it requires specific competences, networks, special

preparation, high experience, and willingness and readiness to enter international markets (Neubert, 2016, 2017).

Rasmussen and Tanev (2015) linked the two research streams: lean startups and born-global firms, and introduced the new concept of lean global startup, which is typically a high-tech startup aiming at creating a new product with innovative solution for a specific market niche. In lean global startups, the internationalization strategy is part of the initial business plan (Neubert 2017). The lean startup methodology may also be used in internationalization by applying incremental and iterative product development cycles to develop minimum viable products (MVPs) and test them with quick feedback in the market (Tanev, 2017; Coviello & Tanev, 2017; Neubert 2017; Blank 2013). According to Neubert (2017) and Johanson and Vahlne (2009) the speed of learning in small, iterative steps defines the speed of early internationalization.

In the literature, social networks and networking ability as well as ability to learn have been recognized as the main drivers of fast internationalization (Coviello, 2015; Neubert, 2017). Based on Ciravegna, Lopez and Kundu (2014) the social networks of an entrepreneur as a driver of the speed of internationalization is essential. For the lean startups, the networking in the internationalization context is especially the ability to create market opportunities to acquire new clients and distribution partners with local networks.

In their article, Ojasalo and Ojasalo (2018) formulate how lean service innovation approach and process can focus and solve the needs of early identification of core customer value with business potential, especially for new or potential customers utilizing latent needs in service innovation. Their article build on the idea of lean innovation (Blank, 2007, 2013; Ries, 2011), and they borrow this idea for the service innovation process to fulfil the knowledge gap in service innovation research. In addition to identifying the knowledge gap, the article presents a managerial framework for applying service-dominant (S-D) logic in practice. Ojasalo and Ojasalo (2018) argue that the existing lean development models focus on an early understanding of customer needs and value, and thus the lean approach has a lot to offer for the research of S-D logic. They also underline that much more than knowing what presents customer value is required to turn into a profitable business. That is a scalable and profitable business model. In their framework, lean service innovation approach is used throughout the service process, and case-specific development methods are applied for solution development, testing, and experimentation.

Living labs are intermediaries for innovations. They can be characterized in multiple ways and they serve several purposes. In a Living Lab Methodology Handbook Anna Ståhlbröst (2017) define: "A Living Lab is an orchestrator of open innovation processes focusing on co-creation of

innovations in real-world contexts by involving multiple stakeholders with the objective to generate sustainable value for all stakeholders focusing in particular on the end-users".

Based on Westerlund and Leminen (2011) "living labs are physical regions or virtual realities, interaction spaces, in which stakeholders from public-private-people partnership of companies, public agencies, universities, institutes, users, and others that follow the philosophies of open and user innovation to collaborate for improving, developing, creating, prototyping, validating, and testing of current or new technologies, services, products, and systems in real-life contexts". Regardless of the multiple different definitions and implementations, living labs share certain common elements that are essential to the approach: 1) multi-method approaches, 2) user engagement, 3) multi-stakeholder participation, 4) real-life setting and 5) co-creation (Malmberg & Vaittinen, 2017). In addition, the living labs strives for mutually valued outcomes that are results of all stakeholders. Schuurman (2017) describes that three main elements have been distinguished within living lab projects, following the innovation development stages: 1) exploration; getting to know the current state and designing possible future states, 2) experimentation; real-life testing of one or more proposed future states and 3) evaluation; assessing the impact of the experiment with regards to the current state in order to iterate the future state.

In Living Lab Methodology Handbook (2017) the role of living labs is described as mediators to build and strengthen the European Open Innovation ecosystem that enables the internationalization of SMEs supporting validation of products and services in other markets throughout living labs' co-operation and consultancy. However, this role is new and emerging, and the living labs needs to advance their international collaboration and commercial offering for transnational validation of services for SMEs and startups.

Living labs has been used specifically by startups and SMEs, and they offer a structured approach to open innovation (Schuurman, 2015) in user innovation paradigm (von Hippel, 2009). Schuurman et al. (2016) have explored the value of a living lab approach for open innovation in small and medium-sized enterprises with comparative case study in 27 SME projects, and they argue based on the results that a real-life intervention and a multi-method approach increase the chance of generating actionable user contributions for the innovation under development.
In this study, a transnational living lab has been defined as a living lab, which serves companies or other institutions in an international context, i.e. at least in two countries. In literature, the terms cross-border or transregional living lab have been used in similar contexts. The mediator living lab, i.e. Laurea, is seeking transnational health and wellbeing living labs as testing partners to accomplish the needs of local startups in their internationalization processes. Transnational testing partners are

requested to act in commercial basis performing expertise in their functions, and they should follow the lean start-up approach in their services.

The overarching aim of this case study is to create better opportunities and efficient methods and models for health-tech startups to internationalize by following the lean startup principles in transnational living labs. Finally, the results are described as preliminary findings and a model for transnational health and wellbeing living labs.

3 Transnational piloting

The living lab practices and experiences presented in this study are based on two cases. They are a part of the publicly funded project, in which one aim is to create and pilot a model for the transnational health and wellbeing living lab. In order to achieve this aim three pilots were planned to be carried out. The piloting focuses on the service ideas/solutions that are trying to solve one or several of the following challenges: 1) how might we increase physical activity in everyday life, 2) how might we enable people to take their health and well-being in their own hands and to manage them and 3) how might we support active independent living of the elderly. The challenges were defined based on the needs in the market. First three pilots were selected but finally two of them continued for actual piloting phase.

Next, the case companies are presented. Company A creates differentiating products by connecting everyday goods with mobile applications and accessories. They create tangible digital experiences in everyday products using wireless connectivity, sensors and cloud services with hardware, smartphone middleware and services platform. They also offer consulting services. The company is currently developing its own product portfolio of wellness and rehabilitation products. The company wants to pilot their product in order to test its suitability to the target market. They are looking for partners with whom they can develop technologies, services and products focusing on rehabilitation and wellbeing and gather feedback from local users. They are interested to work with cities and public sector. In addition, a living lab as a part of university might be a potential partner for them. They are also interested in to join a bigger consortium. By doing this testing, they want to develop their service design further and internationalize their service. For the piloting, there was a need to recruit end users who represented three different customer segments plus a professional to support the testing with end users.

Company B has two product lines of which product x is the newest. Several healthcare providers and companies in Finland use its predecessor, product y. This has allowed the company to collect data from hundreds of thousands of users over the years, which led to the development of the product x. While the product y is

designed for occupational health care professionals, product x is created for its end-users and employers. It is not just a mobile version of its predecessor but rather a scalable, more intelligent, user-friendly tool with several new features and more content. The company is heading to international markets and they are willing to test the service in a company/ies operating in their target market. They want to learn if there is a need to make significant changes to the product/service and how it works outside of Finland. The objective is to get a test data of a couple of hundred users in order to fine-tune the algorithm used in the application for the target market. In this case there was first a need to recruit a piloting company/ies who was/were willing to pilot the product with their employees. Thus, the focus is in business-to-business market.

Before explaining the piloting processes of the case companies further, some background information is given in order to present the whole development process of transnational health and wellbeing living lab model. The first draft of the transnational living lab model was planned based on the workshop done in the Open Living Lab Days 2017. The main organizers of the workshop were Laurea Living Labs and Licalab. The goal of the workshop was to move forward in setting up a Transnational Living and Care Lab as a unique innovation instrument to support SMEs in developing and scaling up innovations for 'living and care' and 'active and healthy ageing'. The transnational living lab model was discussed and considered through the lenses of the customer (e.g. SME). The workshop provided insights how to promote the transnational living lab, and revealed that there are development needs for the coordination of the international projects. It was identified that there is a need to improve the awareness of the healthcare living labs and their services. In addition, the contact information should be easily available, preferable one contact point. Further, cultural differences were discussed.

The process of piloting included several phases: call for ideas, selection of the pilots (inc. selection criteria), invitation to tender, selection of the living lab, planning, testing, results and next steps. Before explaining the phases in more detail, the stakeholders and their roles are presented. The project coordinator, Laurea University of Applied Sciences (Laurea Living Labs), works as a mediator in the piloting. Laurea is an official contracting body and facilitates the process between the company and the living lab. The company gives the brief and practical instructions and support for the piloting. In this pilot support is for example providing the products for testing and organizing the training for the living lab staff and the users in the target market. The living lab is responsible of the implementation of the pilot, analysis and reporting the results.

Call for ideas was a necessary step in this publicly funded project in which all the organizations who fulfilled the criteria should have a similar possibility to leave their

application and participate. The content of the call for ideas was: description of the challenges, the focus and the limitations, responsibilities, selection criteria, timetable, monetary support and contact information. The project partners who had a direct access to their startup networks were valuable messengers during this phase. In total nine applications were received before the deadline.

Selection of the pilots were done based on the criteria, which was planned before the call for ideas were published. First, the best applicants were selected based on the data they had provided, then the meetings were organized to discuss the piloting plan and confirm the common interest and understanding. A lot of practical information and new insights were received in these meetings. The meetings had also an important role to get acquainted with each other's and to build trust.

Invitations to tender were planned based on the applications for call for ideas and the meetings during the selection process. Thereafter it was sent to the case companies for comments. Some iterations were done, and legal aspects were checked before sending invitations to tender forward. Simultaneously with this phase, potential service providers (living labs) were searched. That happened by the help of the European Network of Living Labs (ENoLL) and its Special Interest Group in healthcare, project partners from different ongoing or past projects and colleagues. The name and country of origin of the living labs were quite easy to get but what was more difficult was to find out their contact information and descriptions of them, their expertise and services. In some cases, there were web pages describing the living lab but not always in the language you could understand.

Selection of the living lab was done based on their offers. The selection criteria were explained in the invitation to tender. Before signing, the agreement there was a negotiation together with the service provider, Laurea and the startup company. For company A, the service provider is an experienced living lab having expertise in the business sector in question. For company B, the service provider is a private company offering partly similar services than living labs. The first drafts of the agreements were done by Laurea and they were sent to the service providers and startups for comments. After finalizing the agreements, they were signed by Laurea and the service providers. In the case of the company B a separate confidentiality agreement was signed with the sub-contractor of the service provider. In this phase the support from the legal services was needed and it was easily available as an in-house service at Laurea. The time for planning the agreements was not considered when making the initial schedules for testing.

The initial plan for testing was introduced in the invitation to tender. This plan covered following aspects: description of the case company and its product/service to be tested (what, to whom, how), implementation of testing (when, objectives, guidelines),

outcomes and the role of the testing partner (living lab). The plan was finalized together with Laurea, the startup and the testing partner. The planning was done in the skype meetings. Some modifications were done later in the process. The timeframe for the implementation of testing was first between January and May 2018. Because of the delays in the invitation to tender process, time used for the agreements and delays in the recruiting phase in the case of the company B the deadline was postponed until September 2018.

Actual testing phase has now ended with the company A. The testing was implemented quite independently by the testing partner: there were some communication between the company A and the testing partner regarding to the information needs and functionalities of their product and application. Further, Laurea and the startup visited the testing partner in this phase to discuss the process and see the testing in action.

The results were presented in the skype meeting. The final report was shared in advance to be able to discuss in more detail in the meeting. The expected outcomes in the report were analysis of the usability and the end user experience, needs for local adaptation and business model (potential for licensing, service as a part of the package, value proposition, marketing channels). These aspects were discussed and further information was asked, especially by the company A. For the company it is crucial to understand the context of testing and how it has been implemented in order to interpret the data correctly and to be able to apply the new knowledge in the similar circumstances elsewhere.

Testing phase with the company B proceeded with one piloting company to their human resource department. The research on that is still in progress and the results are not yet in use. Thus, the results and findings are based on the experiences so far. They are presented in the next chapter.

4 Preliminary results and findings

The preliminary results of the ongoing case studies provide guidelines to create a practical collaboration model for transnational living labs to support startups'/SMEs' internationalization. These results and findings are presented in the table 1 and discussed in more detail thereafter.

Table 1: The results and findings of the case studies

Results: Tasks of the startup/SME	Results: Tasks of the Living Lab, mediator (LL1)	Results: Tasks of the Living Lab, testing partner (LL2)	Findings
Need to internationalize their business	Call for ideas for international piloting		LL services have to be visible in the regional/national/international startup ecosystem
Searches for support to test their product/service in their target market	Contact point for startups to discuss if their need match with the service offering		Permanent contact point for the inquiries of LL services is needed
Describes a preliminary brief	Modifies the brief of startup/SME		A ready made template helps when preparing the brief
	Searches for potential living labs for collaboration from the target market	Services are visible/known in the living lab network	Information needs to be available in English. More information of the focus areas (content, geographical area), services and expertise of LLs is often needed. Need to get an access to B2B customers.
Accepts the invitation to tender (matches with the brief)	Plans the invitation to tender		Consultation with the legal services. A ready-made template helps when preparing a call for tender.
Gives further information if needed	Sends the invitation to tender and replies to the inquiries	Receives the invitation to tender and asks further questions if needed	Timing is critical (holiday seasons)

			Enough time for leaving a tender (quality)
Evaluates the offers together with the LL1	Evaluates the offers and asks further questions if needed	Prepare an offer (implementation plan for testing, expertise, costs, contact details)	A detailed information of the LL2 is essential in the offer because otherwise the information is not available.
Negotiates with the LLs	Negotiates with the LL2	Negotiates with the LL1	Readiness for online meetings
	Signs agreement	Signs agreement	A separate agreement between the startup and the Living Lab/s or their sub-contractors might be needed. Notify the time for planning of an agreement. Legal services might be needed.
Support the process	Facilitates the process, quality/cost/schedule control	Implements the testing as agreed	Depending on the testing partner, a mediator can have a smaller/bigger role in facilitation. Depending on the brief a startup/SME can have a bigger role in the recruiting process Longer time period to recruit B2B customers.
Gets the results and plans the next steps	Accepts the results and pays the invoice. Discuss the possibilities for the future collaboration.	Presents the results, sends the invoice. Discuss the possibilities for the future collaboration.	Quality check of the results

The findings are focusing on roles and responsibilities of the different actors and the whole process of piloting starting from the identification of the need to the results and planning of the next steps.

Several roles were identified in the project: living lab as a mediator, living lab as a testing partner, a piloting company (a company who is willing to test the product/service), end users, and a funding organization. The roles and responsibilities may vary depending on the expertise and available resources in the collaborating living labs (mediator, testing partner). Another thing, which defines the roles and responsibilities, is a possible project funding which was the situation in this particular case presented in this paper.

Process of piloting includes several steps: searching for companies, negotiations between a mediator and a company interested to pilot their product/service, preliminary plan for testing, invitation to tender, searching for living labs, sending the invitations to tender, analysing offers, negotiations, selecting a living lab for piloting, making a contract, modifying the plan for testing, training the living lab to use the product/service, implementation of the pilot, observing and following the project of piloting, results, and planning the next steps.

Contracts were done between a mediator and a living lab/s and the legal services of the mediator organisation were used. When having this service in-house it is easier and cheaper to use. There might also be a need to make e.g. confidentiality agreements between the startup/SME and the sub-contractor of the living lab (testing partner). The needed agreements with the end users and other test participants were in the responsibility of a testing partner. The process of making and accepting the contracts may take time, especially if there is not a ready-made contract templates that can be modified. There are many other moments, which take time in the process as well, and not all of them have been thought about thoroughly beforehand. Thus, there is a risk for delays in the process.

Information of the living lab services is not easily available whether it is on regional, national or international level. Even if the potential for the creation of new international growth companies has been created through the startup associations, entrepreneurship societies, business accelerators and incubators they are not aware of the living lab services and how to use them. If living lab services are not found in the certain country or region other service provides will be searched. That might be an only option also in the project where service has to be tested in business organization.

Transnational health and wellbeing living lab model could benefit different actors.

Startups would get an access to the international living lab network, get support from the local living lab, and utilize easy and agile way to implement piloting in their target market. Living lab as a mediator or as a testing partner could get new clients and collaboration possibilities with other living labs where to learn and broaden their network.

Building blocks for the preliminary transnational health and wellbeing living lab model consists of the structure of the ecosystem, different roles, process and methodology. In this case, the living labs had a regional and industry specific (healthcare) focus. Furthermore, the living lab who worked as a testing partner had a cross border and international scope in their existing ecosystem. Long-term relationships within the network offers a platform for testing and validating services in agile manner. The collaboration between the industry specific, regional and international ecosystems provide not only the expertise in the substance area (industry) but also the expertise to analyse the cultural aspects and overcome the language barriers. The role of living labs are a mediator/facilitator and a testing partner. Besides testing and validating the product/service, there is a need to act as a business developer. The process of working can be divided to a pre-testing phase, a testing phase and a post-testing phase. The methodology follows service design and lean startup approach even if not always identified as such. Interesting is that the aim of promoting regional development and industry is strong. Compared to that the business orientation of the living lab is not so much in focus. Together with business orientation, the commercialization of the services is still in its infancy. In continuously changing business environment and rules and legislation, the legal expertise may not be forgotten of the skillsets of the living lab.

5 Conclusion

The main contribution of this paper is the preliminary description of a model for collaboration of transnational living labs and startups in the validation, testing and local adaptation of service innovations of startups. In previous studies of transnational living labs (e.g. Bódi et al., 2015), description of experiences of living lab methodology and maturity of innovation and highlights and lessons learned from the internationalization aspect of transnational cases of startups have been elaborated, but any assumptions or a model have not been presented.

Based on the learnings and experiences in the workshop a year ago and two case studies during the past six months there is a clear need to conceptualize the living lab services and make them visible both regionally, nationally and internationally. This development is a necessary step towards commercialization and sustainable

business with startups or any other paying customer. The collaboration between the living labs increases the potential to offer the services to startups in several countries. Startups could contact transnational living labs by themselves when the contact information is easily available and they have resources to do that, or through the local living lab if that is more convenient solution for them.

Transnational context brings new expectations to the living lab that is used to operate locally. They have to be ready to work in a different language and there is a need of understanding the cultural aspects in the business relationships as well as when analysing the test results. Product or service to be tested might have texts that have to be translated to the local language, thus translation services might be essential add on in the service package. Furthermore, they have to have enough knowledge about the legal issues in international context. Transnationality in services brings also new roles and responsibilities. A living lab can have a role of a mediator when it is connecting a startup and a living lab abroad. Besides acting as a mediator, it can be a facilitator and support the process in various levels depending on the resources of other actors.

In this paper, we have presented through a case study how transnational living labs can be applied for validation and testing of heath-tech products and services in international markets, even in commercial bases. However, the role is new and emerging for living labs, and only few cases (e.g. Bódi et al., 2015) have been realized in transnational settings so far. Initially, a focus of living labs has been in user innovation and open innovation, and the validation of business models, business potential, marketing channels, and needs for local adaptation have not been in the scope. In lean startup approach, service development occurs cyclically in incremental steps at the same time when testing and validating a product, thus, transnational living labs are expected to offer this service as well (compared to the agencies). Based on this case study, the transnational living labs can serve the startups in their internationalization process in the means of mediators of lean startup or even lean global startup approach.

The study is in its' initial phase, and the conclusions cannot be completed, yet. Knowing the limitations and benefits of a case study, in the next phase of research a model for collaboration of transnational living labs and start-ups is demonstrated.

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