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How transnational Living Labs can help SMEs to internationalize?

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Abstract: Due globalization there are increasing opportunities for SMEs to pursue international markets. Transnational Living Lab (LL) approach has been suggested as a promising way to help SMEs to pursue in international markets. However, what kind of services SMEs are expecting from transnational LLs is less clear. By conducing 82 semi-structured open-ended interviews among health and wellbeing SMEs from eight different Baltic Sea region countries, a typology for transnational LL-service needs is defined. As a result of a conventional content analysis, twelve main needs were identified. By far the most popular LL need was testing service. The second most popular need group was formed by eight equally important services, which origin can be linked to the commonly known internal barriers of SME internationalization. Suggestions for key characteristics of transnational LL concept are proposed.

Keywords: Living lab, Transnational, cross-border, Internationalization, SMEs, Small and medium-sized enterprises, innovation

1. Introduction

Internationalization is a synonym for the geographical expansion of economic activities over a national country's border (Ruzzier et al. 2006). Due globalization there are increasing needs and opportunities for SMEs to pursue in the international markets by developing international and global proof innovations. However, the prior research has identified multiple internal and external barriers for SME internationalization including high innovation costs and limited knowledge on innovation processes (Tiwari and Buse, 2007). In all developing international innovation is a difficult challenge for SMEs, which in most cases lack human and financial resources.

According to European Network Living Labs (ENoLL) – the international federation of benchmarked Living Labs in Europe and worldwide – Living Labs (later LL) are grounded on multi-stakeholder participation and active user involvement which in real-life

setting are utilizing multi-method approaches while co-creating novel solutions across the different innovation process stages. Among the main aims of the LL approach is to lower the innovation risk while maximizing the likelihood of successful market entry in the target market.

It has been suggested (Bódi et al., 2015) that transnational LL approach could enable new ways of boosting SMEs internationalisation by offering access to international markets already from the fuzzy front end of innovation (FFE) stage (Smith and Reinertsen 1991) until the post-launch evaluation when innovation has been introduced to the market. In general, LLs have been struggling to find sustainable business models and most of them currently rely mainly on public grants (Gualandi, and Romme, 2019, Santonen and Julin, 2019). In contrast, SMEs are not typically aware of the existence of public support programmes for internationalisation and in all the use of public support for internationalization is rather low among SMEs (European Commission, 2015). In our opinion, SMEs and LLs could form an interesting partnership for developing global proof solutions. By helping SMEs in their domestic and especially international research and development efforts, LLs has a great opportunity to diversify their current revenue source repertoire and seek new ways to improve their current business models.

1.1 Objectives and Structure of this Study

The main aim of this study is to identify *"what kind of needs and expectations SMEs have for using transnational LL services"* in order provide guidance for LLs to develop their transnational service offerings. Thematically this study focuses on health and wellbeing sector, which by the ENoLL member statistics is the most popular thematic area among LLs. Furthermore, health and wellbeing sector as a regulated industry is an interesting thematic area since the national healthcare systems, practices and legislation are differing significantly among EU-countries (Ferreira et al., 2018). Thus, entering to a new country requires in-depth understanding about the local market.

This study is structured as follows: *First* we briefly present the theoretical background of the SME internationalization and innovation as well as prior studies focusing on transnational LLs. *Second*, we present our research methodology and data collection process. *Third*, we present our results and *finally* conclusions and suggestions for future studies are presented.

2. Theoretical foundations for developing transnational Living Lab services to support SME internationalization

2.1 Approaches and barriers for SME internationalization

According to Calof and Beamish (1995) internationalization is "the process of adapting firms" operations (strategy, structure, resources, etc.) to international environments. Entering to international markets has traditionally seen as a stepwise learning process in which internationalization processes have started from geographically and culturally close markets. Various models have been proposed such as Uppsala internationalization model (Jansson, 2007) and five-stage model proposed by Cavusgil (1980). However, these incremental process have been challenged by born-global company approach which from or near their founding seek superior international business performance (Knight et al.

2004). The selection of the internationalization strategy have also an impact on a SMEs' innovation strategy. The SMEs following stepwise internationalization strategy can gradually expanding their domestic innovations to global markets, whereas born-global companies are aiming to develop solutions directly to global markets (Archibugi and Iammarino, 2002).

In practice in most cases, SMEs have only limited possibilities to manage their internationalization progress and innovation efforts due series of internal and external barriers. Among the most dominant barriers for SME internationalization are (e.g. Paul et. al 2017):

- **INTERNAL:** 1) finding distributors, 2) lack of negotiation power, 3) lack of target market knowledge, 4) poor organization of export department, 5) limited international experience, 6) lack of competitive advantage in foreign market, 7) insufficient resources and information
- **EXTERNAL:** 1) lack of proper trade institutions and support from government, 2) political instability and problems, 3) legal issues, 4) insufficient demand and market entry problems.

2.2 Innovation enablers and barriers in SMEs

In the case of SMEs, there is a positive correlation between exporting and innovation activities (Golovko and Valentini, 2011). Furthermore, SMEs have also shown an increasing interest towards applying various kinds of open innovation practices (Van de Vrande et al., 2009). Thus, transnational LL-approach as one of the open innovation practices should look interesting for those SMEs who are seeking growth via internationalization and innovation.

Innovation enablers and barriers among SMEs have widely been discussed in prior scientific literature (e.g. Love and Roper, 2015). SMEs have competitive advantage over larger organizations mainly due flexibility and agility, which are also a foundation of service design methodologies often utilized in LL-project (Zomerdijk and Voss 2010). However, the lack various resources is the key barrier for SMEs to innovate, which makes them more depended on their broader operating ecosystem and external support. Lack of resources covers various dimensions such as skills, human resources, R&D capabilities, financial capital, infrastructure, intellectual property management and strategy.

The ability to take an advantage of the external resources and knowledge is among the key enablers of SME success. Among these are partners and networks for supporting open innovation driven R&D, availability for public support for innovation including public procurement and finally R&D approaches focusing on user driven innovation.

As a result it is argued that the transnational LL-approach focusing on SME internationalization and supported by public funding is addressing many of the validated innovation enablers and barriers among SMEs. Thus, there is a genuine opportunity to develop and establish a transnational LL-approach for health and wellbeing sectors, which highly linked to public procurement processes.

2.3 Transnational Living Lab concept

So far there has been relatively limited interest towards transnational LL research which have over the years received public funding especially in context of health and

wellbeing (e.g. Lievens et al. 2011, Lepik et al. 2010, Schaffers and Turkama, 2012, Finnsson & Co, 2017). By definition a transnational LL (also known sometimes referred as cross-border or trans-regional LL) is a concept offering seamlessly LL-services at least in two countries (Haho and Kaartti 2018). Interreg funded HELIUM project provided more extensive definition and proposed that "*transnational LL which helps companies that want to launch a new product or service and make an informed decision about their cross-border/worldwide R&D or commercialization plans by exploring the user and market context and the local healthcare ecosystem"* (adopted from Daniels, 2018).

Haho and Kaartti (2018) also suggested a preliminary model for transnational health and wellbeing LLs on the basis of two case studies, which obviously limits the generalizability of their results. The suggested model defined different tasks for mediator and testing partner LL. Tasks including such as making LL services and actors visible for SMEs by acting as contact point, managing tendering process by bring to together LLs and SMEs, offering templates for briefs and agreements, and executing LL activities and finally presenting the results.

Lievens et al (2011) proposed system requirements for transnational LL as follows: 1) presence and discovery relating partner identification and transparent resource and operations, 2) communication and end-to-end connectivity between LL and their partners, 3) interoperability via standardized protocols and open standards, 4) accessibility to LL-services via multimodal interfaces, 5) secure operation environment and trust between partner, and 6) knowledge and information management and sharing.

Lievens et al (2011) also tested their transnational solution and identified various challenges relating to 1) setting up an ecosystem, requirements, methodologies for LL-testing, 2) LL ability to provide local contextual information and stakeholder as well as the differences in operational environment in different countries, 3) a need for intensive communication and tracking during the LL-project, and 4) a need to have versatile actors in LL-ecosystem.

In all developing and establishing transnational LL appears to be a multi-phased process. Schaffers and Turkama (2012) identified the following main phases for transnational LL development: 1) connecting including identifying opportunities and partners for collaboration, 2) planning including defining actors and their roles and responsibilities within a collaboration network officially, 3) support when conducting transnational LL activities and finally 4) assess the achieved benefits and impacts. Furthermore, authors (ibid.) also highlighted the importance of the adequate open-innovation partnership models and integration into existing innovation networks and ecosystems such as regional innovation systems.

Although, transnational LL have a high potential for helping SMEs to innovate and internationalize, the prior research have identified multiple challenges. Therefore, an in-depth understanding of the SMEs needs for transnational LL are playing a critical role when developing and implementing transnational LL.

3. Research methodology

3.1 Data collection and response

The unit of analysis in this study is a SME operating in the Baltic Sea region, developing products or services for health and wellbeing sector and interested to internationalize. Semi-structured open-ended interviews in eight Baltic Sea region countries were carry out by local LLs who took a part to European Regional Development Fund (ERDF) funded ProVaHealth-project. The SME interviews were one of the project tasks, which enabled carrying out the interviews in the local language. The ProVaHealth-project aims to develop sustainable business models for individual LLs as well as to define a transnational LL concept to amplify transnational collaboration among LLs.

During interviews SMEs were asked to describe their 1) service/product solution offering including its current maturity level, 2) business model, 3) key customer groups, 4) target markets for internationalization, 5) prior experience and interest of using LL services, and 6) needs and expectations for using transnational LL services.

In all 82 interviews were made in following countries: DE (9 interviews), DK (10), EE (10), FI (12), LT (10), LV (10), PL (11) and SE (10). SMEs prior experience on LL activities varied as follows: No previous experience (48 SMEs, 58.5%), limited experience (13 SMEs, 15.9%), prior experience (17 SMEs, 20.7%) and substantial amount of prior experience (4 SMEs, 4.9%).

3.2 Data analysis

After the interviews, SME specific interview summaries in English were written by using the common template, which was structured on the basis of the above defined open-ended questions. A conventional content analysis approach (Hsieh and Shannon, 2005) was applied by two experienced researchers in order create a typology for SME needs and expectations for transnational LL services. The iterative reading and coding scheme process was applied and a group of thematic subcategories were organized into a smaller number of main categories, which represent the foundation of the transnational LL concept. Finally, the main categories of the transnational LL model derived from the interview results were compared to the prior finding of SME internationalization and the LL literature in order to define the final typology. Finally, the interview summaries were carefully read and “SME x Need” binary matrix was constructed in which SMEs represented the rows and need typology the columns.

4. Result – Typology of SME needs

On the basis of the content analysis the typology for SME needs presented in Table 1 was created.

Table 1: SME need typology for transnational Living Lab services

ID	*SME needs categories*	*N*	*%*
1.	Testing	51	29.8
2.	Marketing (and sales) support	19	11.1
3.	R&D for getting new ideas	18	10.5
4.	Networking and collaboration	17	9.9
5.	Access to various end-user groups	13	7.6
6.	Market knowledge	12	7.0
7.	Innovation management support	11	6.4
8.	Localization and landing support	11	6.4
9.	Financial and resource support	10	5.8
10.	Clinical and formal validation	4	2.3
11.	Prerequisites for Living Lab services	3	1.8
12.	Business advisory and management consulting	2	1.2
	Total	**171**	**100.0**

TESTING: Testing was clearly the most often named LL need among the interviewed SMEs (51 times). Based on Wilcox Signed Rank test, there is a significant (2-tailed at the 0.001 level) mean difference between testing and all other variables. Based on the SME comments testing services should include offerings for 1) product, 2) service and 3) software/application testing while enabling short and long-term testing cycles in different geographical markets. Getting feedback and validation regarding usability, functionality and handling of their solution in real environments from the real end-users is what SMEs were mostly looking for from LLs.

The second most popular need group is formed from Table 1 items 2 to 9, which mean values are not differing significantly between each other, but besides testing are also differing to items 10 to 12 excluding following items. “Localization and landing” item mean value is not differing with item 10 “Clinical and formal validation” and “Financial and resource support” is not differing with 10 and item 11 “Prerequisites for Living Lab services”. Thus, SMEs perceived the needs 2 to 9 perceived equally important. In the following, the needs 2 to 9 are described more in-depth.

MARKETING (AND SALES) SUPPORT: The second most popular (19 times) LL need was marketing (and sales) support. Besides testing SMEs were looking for marketing and sales support services, which enable easy access for SMEs to advertise (and sell) their solutions to relevant customers via right channels and strategy. SMEs see LL as a facilitator and matchmaker between SMEs and their potential clients by providing an access to different target groups. Possibility to participate in exhibitions and events alongside LL and/or having visibility in LL showroom was also mentioned as a marketing tool. Via marketing support SMEs are looking for support to scaling their solutions to different countries, markets or industries.

R&D FOR GETTING NEW IDEAS: The third most popular (18 times) need – getting new ideas via end-user driven R&D – is closely related to the previously presented testing need. However, in the case of testing the emphasising is on the validation and fine-

tuning the usability, functionalities and handling while R&D focuses on developing the new idea and discovering new opportunities.

NETWORKING AND COLLABORATION: Networking and knowledge sharing support need was named 17 times which resulted the fourth position. It appears that SMEs consider LLs also as a tool to expand their existing networks. Potential cooperation partners varies from individual experts (e.g. designers, documentation experts) and entrepreneurs, to international enterprises and public institutions as wells as other relevant authorities and stakeholders including key opinion leader. Thematically knowledge sharing needs covered best practices regarding R&D, testing, validations, operating procedures and regulations. There is an interested to find possibilities to do joint projects including the student projects.

ACCESS TO VARIOUS END-USER GROUPS: Access to various forms and types of end-user including individual persons, patients and families in real environments in different countries was named 13 times by the interviewed SMEs. Importantly, in the case of ICT solution, a digital database including various kinds of patient information could be regarded also as a user-group.

MARKET KNOWLEDGE: Market knowledge was named 12 times. It includes providing data, insights and knowledge relating markets, infrastructures and ecosystems in specific countries. Thus, market knowledge it is not only about understanding what kind of customer profiles, needs and illnesses are existing in the country. but also understanding how local legal issues, regulation, supply chain structures, payment mechanisms, insurance systems and healthcare organizations are operating. Providing reference and comparison data or aligning results to commonly known metrics was also suggested.

INNOVATION MANAGEMENT SUPPORT: Innovation management support**,** mentoring and consulting gained in total of 11 nominations. A need for test planning, suggested solution maturity and time to the market estimation were highlighted.

LOCALIZATION AND LANDING SUPPORT: Adapting and localizing the solution received 11 hits. It is about helping to adjust the proposed solution and functionalities according to country and cultural preferences based LL findings, market information and a better understanding of the cultural differences. Also, identifying actors, who are interested operate as Entrepreneur in Residence were included for this category.

FINANCIAL AND RESOURCE SUPPORT: Funding and resource support gained 10 nominations including aid, discount or support to finance LL services as well as ability to use LL equipment and infrastructure by themselves in order to avoid investing rarely used equipment. Using LL personnel as leased or outsourced human resource for innovation support services such as process and risk management or programming was indicated as a need.

The Table 1 items from 10 to 12 were perceived equally important by SMEs. In the following, the remaining needs are described in more detail.

CLINICAL AND FORMAL VALIDTION: Due operating in regulated industry, new solutions in certain cases are requiring clinical and formal validation and the related documentation for the application of CE certification mark or similar. The need among interviewed SMEs was small and generated only four references.

PREREQUISITES FOR LIVING LAB SERVICES: Various pre requirements were highlighted for LL-services by three SMEs. Among these were time and cost savings in research and development, easy access to LL services, ability accelerate time-to-market or time-to-new-market. SMEs were looking for result having practical relevance for the SME instead of doing academic projects as well as flexibility to do short or long LL-projects and verification that LL process will support the commercialization.

BUSINESS ADVISORY AND MANAGEMENT CONSULTING: Two SMEs indicated needs for mentoring and consultation services relating business planning, business modelling and business growth, which are comparable to business advisory and management consulting services typically found also in incubator services.

5. Suggestions for key characteristics of transnational LL concept

5.1 Grounding the main value promise and service offering on testing services

The interviewed SMEs perceived LL mainly as tool to test and validate their current solutions, which can cover products, services and software/application. Testing need was perceived ca. three to five times more important than the second most popular need group, which was consisted by eight equally important needs. Importantly, the other needs had clear link to prior findings in SME internationalization and innovation research. Due overwhelming popularity of the testing needs, it is suggested that LL value promise and marketing message for SMEs should first and foremost highlight a testing possibility in real-life environment with real end-users. To redeem the value proposition, it argued that transnational LL should develop various standardized easy to sell testing services, which should be available from a single-entry-point platform.

The above findings are also challenging the marketing name of the LL services. It is commonly known among LL practitioners, that LL as a marketing term has been a challenging to communicate to non-LL actors. Furthermore, a great variety of rivalling terms for LL kind of activities are existing among practitioners and scholars. Recently Santonen (2018) evaluated the popularity of the LL related terms in scientific literature and the dominance of the testing in a form of testbed (also test bed) notation was evident. As a result, it is suggested that LLs should adopt testbed (or similar which emphasis testing possibility) notation regardless the possible definition differences between the terms in scientific literature. In the Nordic countries this suggestion has already been adopted when presenting testing facilities for healthcare innovations (Finnsson & Co, 2017; Norden, 2015).

5.2 Internationalization vs. LL needs among SMEs

The second most popular need group was formed by the following eight needs: “MARKETING (AND SALES) SUPPORT”, “R&D FOR GETTING NEW IDEAS”, “NETWORKING AND COLLABORATION”, “ACCESS TO VARIOUS END-USER GROUPS”, “MARKET KNOWLEDGE”, “INNOVATION MANAGEMENT SUPPORT”, “LOCALIZATION AND LANDING SUPPORT”, “FINANCIAL AND RESOURCE SUPPORT”. It is apparent that these needs can be linked to prior findings in SME internationalization literature (e.g. Paul et. al 2017). These observed needs were mainly related to SMEs internal barriers including gaining better understanding about the international markets and customers via high-quality R&D activities leading to market-proof solutions, which can be marketed and delivered to customers via proper channels and partner networks.

Moreover, the above eight equally important needs are mainly related to innovation ecosystem facilitation, which highlights the importance of LL as an innovation intermediary actor (Howells, 2006). Therefore, it is argued that a successful

implementation of transnational LL is not depending only on the LL themselves, but also the wider regional, national and EU-level support structures, which also are helping SMEs to innovate and internationalize. Transnational LL can provide a substantial value to SMEs, only if they are able combine their existing partnership and networks to a seamless cross-border eco-system. However, achieving this goal is expected to be somewhat problematic.

The current and future business models for health and wellbeing LL were recently empirically evaluated by Santonen and Julin (2019). This study revealed that there was not a common business model among the investigated LLs. Therefore, transnational LL services enabling research process replication in multiple countries, becomes difficult to implement due different objectives and infrastructure among the LLs. Instead, transnational LL approach based on complimentary services and partnership, could be more promising propagation path for the future.

In this approach, each LLs would have a specific and unique role for serving a certain type of research needs among SMEs. The LL having incompatible infrastructure and business model, would then act as a local intermediary and providing leads to the other LLs for a lead fee. This suggestion is in line with network theorists of innovation, which argue that partners should provide the resources and capabilities, which your own organization is lacking in order to gain the suggested positive effects of collaborating and additional capabilities (Gulati, 1995; Becker and Dietz, 2004).

Moreover, according to Lievens et al (2011) system requirements, knowledge sharing is an essential part of the transnational LL. By sharing knowledge, the transnational innovation process can be transferred into on-going and continuous learning process between organizations and various agents surrounding it (Lundvall, 2010) on a team, organization and network level. Eventually, this could be then lead to standardized services between transnational LL (and other actors) and enabling more homogeneous service offerings between LL. It is suggested that short-term and relatively simple testing services including showroom service, in which end-users can in real-life experiment with various solutions, would be the starting point for transnational LL concept.

Finally, LL should also consider will they desire to become a specialised expert on research and development activities and outsource innovation ecosystem facilitation to other OR do they wish to become a jack of all trades, who master the both roles. When evaluating the benefits of these two strategy options, the regional and preferably national and EU innovation system authorities should be involved into discussion to genuinely redeem the synergy benefits of the transnational LL approach.

6. Conclusions

Transnational LL approach has been suggested as a promising way to help SMEs to pursue in international markets. Yet, there has been relatively limited interest towards researching this phenomenon even if public funding has been devoted to develop and implement cross-border LL activities in context of health and wellbeing. In all prior studies have mainly investigated transnational LL from LL viewpoint, instead of focusing on identifying needs from SMEs perspective. By conducing 82 semi-structured open-ended interviews among health and wellbeing SMEs from eight different Baltic Sea region countries, a typology for transnational LL-service needs was defined.

As a result, twelve main needs were identified and by far the most popular LL need was testing service. The second most popular need group was formed by eight equally

important services, which origin can be linked to the commonly known internal barriers of SME internationalization. Besides testing, among the most popular needs included e.g. “marketing and sales support”, “getting new ideas via end-user driven R&D”, “support for networking, knowledge sharing and access to market knowledge ”. It is suggested that LL actors and researchers should more tightly seek collaboration with each other, but also existing ecosystems and actors who also are already actively working with SMEs. A successful implementation of transnational LL is not depending only on the LL themselves, but the regional, national and EU-level support structures, which are also a part of innovation ecosystem helping SMEs to innovate and internationalize.

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