# PRODUCT VALIDATION IN HEALTH

— Living Lab concept:
review of good practices
of health Living Labs

Tallinn University 2019

# TABLE OF CONTENTS

# 1. INTRODUCTION

**Work Package 2** Living Lab analysis, development tools and monitoring

**Task 2.2. Self-Assessment Toolbox**

**Task description:**

Based on the results of mapping and studying good practices of Living Labs in the BSR (Baltic sea region) and other parts of the EU and the world, and the monitoring of the progress of partner Living Labs a toolbox has been developed which can also be used by different kinds of Living Labs (in other sectors) to self-assess their progress and development. The main target groups include health Living Labs in the BSR and other parts of Europe. The indirect target group for this WP includes the companies who could potentially test their technologies with end users in the Living Labs.

**Objectives:**

Living Labs can follow its progress and assess the performance quality of their collaboration with users, SMEs (Small/medium enterprise), public sector and academic institutions.

The toolbox would assist in identifying the specific missing capacities of the LLs.

It would lead to identifying real needs of health innovation users and better opportunities for communicating them to the innovation developers.

The toolbox would allow self-assessment of LLs and hence the improvement of the identified capacities, which would then lead to better client validation in the Baltic Sea Region.

Defining the main characteristic elements of LLs was the first task for developing the self-assessment tool for Living Labs (LL). The preliminary work was needed also to set the aims and the structure for the tool design. The core things that had to be taken into account were defining the nature of LLs in health and wellbeing areas, the tasks, the outcomes and the business.

The criteria for the tool were easy access and use, it's flexible for multiple needs of different type of LLs, it's innovative and attractive. The self-assessment will help LLs to analyze their outcomes and setting aims for enhancements.

According to the ProVaHealth project plan the tool was to be tested by the project partners and launched through the ScanBalt **webpage**.

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# 2. CONCEPT OF LIVING LABS

Living labs (LL) are defined as open Innovation ecosystem or platforms which aim to create innovative and user-centred solutions by supporting development work and enabling real-environment testing and co-creation processes. Living Labs are involving user communities, solution developers, research labs, local authorities and policy makers as well as investors. Living Labs can operate with a research and innovation platform for providing access to science and innovation services allowing enterprises and users/citizens either as entrepreneurs or communities. The living lab also needs to create value to the ecosystem around it. Living labs can help to increase the amount of innovations. (Haurinen 2015; Pallot et al. 2010).

LLs belongs to the "family" of test and experimental platforms. The area in the framework according to Ballon et al. (2015) is located in the middle maturity level focusing to open innovations (Figure 1).
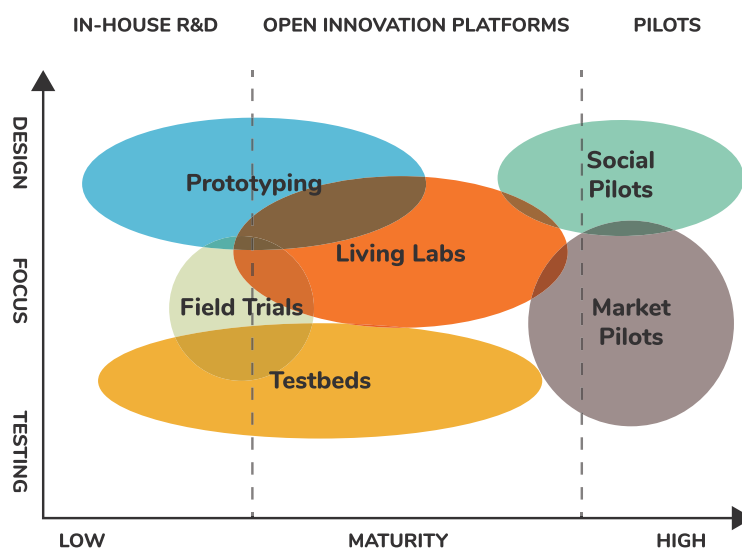


**Figure 1.**
*Conceptual Framework of test and experimental Platforms (Ballon et al. 2015).*

Leminen (2015) listed seven different characteristics of LLs.

- Innovations in real-life environments
- Public-private-people partnership
- The importance of users
- LLs are different from testbeds, field trials, and other forms of innovation. The innovations are more mature than in-house R&D, where prototyping and field trials are more appropriate, but the innovations are less mature than would be found in pilot projects. (Figure 1)
- Multiple stakeholders are essential
- Collaboration between stakeholders

The Living Labs participating the ProVaHealth represented many varieties of Living Labs concerning their focuses and business models. Some of them are operating more with innovating ideas and some of them testing and validating the prototypes and products. Some of them are also focused to help SMEs with commercialization.

As agreed in Gliwice meeting (Feb 7.-8, 2018) in ProVaHealth project we understand the Living Labs as follows: Living Labs as user-centered, open-innovation ecosystems often operating in a territorial context, integrating concurrent research and innovation processes within a public-private-people partnership.

Co-creation and experimental testing of products in real-life cases are key aspects of living labs and helping companies access new markets.

Living Labs provide SMEs help and support in order to rapidly commercialize and scale up their innovations and products to global markets. Living Labs offer SMEs efficient client validation opportunities, hands-on feedback and input for product development.

# 3. STAGES OF LIVING LABS

In order to prepare the skeleton for the assessment tool  it was important to find out the main activity areas of LLs. The main categories were quite easy to find out. The models and methodologies still differ a lot.

LLs focus on user-centered innovations. Dutilleul et al. (2010) mention five different meanings for using LL concept:

- an innovation system
- a real-life social setting
- an approach for user involvement in innovation
- an organization facilitating living lab approaches and
- the European living lab "movement".

The process of innovations has described in different stages. Three step methodology of product or service development is divided into three stages (Bergvall-Kåreborn et al. 2006).:

1. the design of concepts,
2. the design of prototypes, and
3. the design of the final system

Almirall et al. (2012) presented FormIT methodology of TestBed Botnia that is also based on three stages of product / service development. The methodology evolves in spiral through these three stages (figure below).
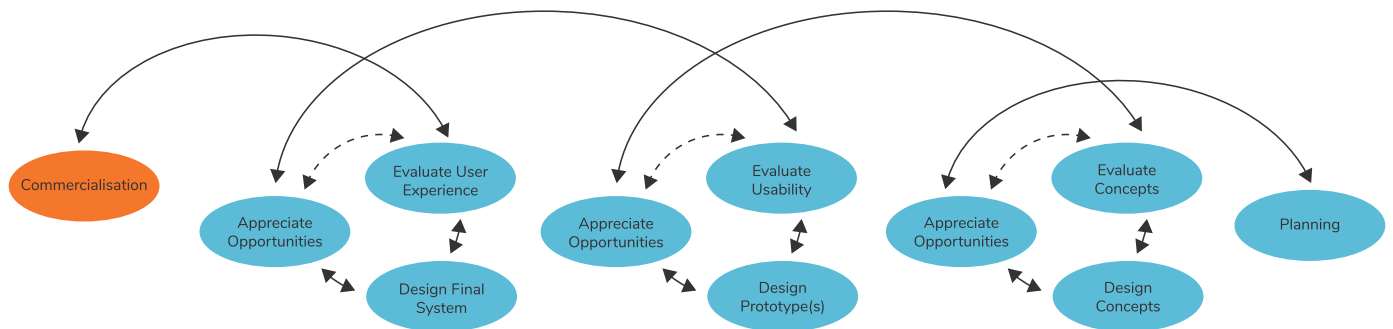


**Figure 2.**
*FormIT LLs methodology (Almirall et al. 2012).*

Almirall et al. (2012) described also the innovation methodology of iLab (Innovators Lab in Belgium) model in four stages:

1. contextualization
2. concretization
3. implementation and
4. feedback

Veeckman et al. (2013) describe the LL methodology in a triangle.

The two corners achieving the innovation outcome (third corner) are Living Lab environment and Living Lab approach. The LL environment means technical infrastructure, ecosystem approach, level of openness and community. The LL approach consists of user role, co-creation, context research and evaluation.
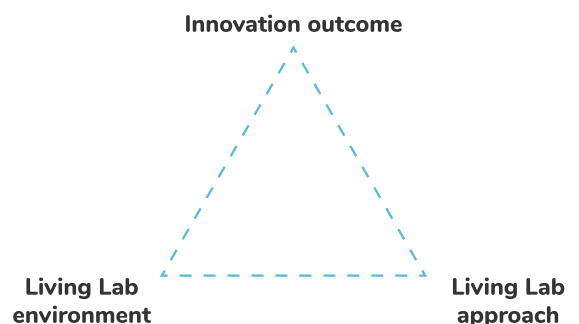


**Figure 3.**
*LL triangle (Veeckman et al 2013).*

# 4. CONCEPT OF SELF-ASSESSMENT

Based on Lusthouse (1999), some typical reasons for an organization conducting self-assessment are when the organization needs to make specific decisions about particular aspects of the organization like strategic decisions, program decisions, staffing decisions. Other less specific reasons to make the self-assessment could be:

- To identify organizations strengths and weaknesses and to take steps toward improvement
- To identify problems early enough to make corrections
- To identify the needs for specific actions
- To identify human or other resources
- To document outcomes of the activities
- To get information for planning and decision making
- To assist in fundraising
- To provide information about the organization's performance to stakeholders

The process of self-assessment consists of assessment itself, the feedback and possible guidelines to improve the performance. The development process of ProVaHealth self-assessment tool was focused on this kind of self-assessment.

This report aims to collect experiences and successful cases of Living Labs that have participated in ProVaHealth project. The self-assessment of 13 ProVaHealth partner Living Labs are included in this report.

# 5. DESIGNING AND DEVELOPING SELF-ASSESSMENT TOOLBOX

In order to design the self-assessment toolbox (SAT) desk research was carried out.

Various models for best practices were analysed. Models such as spider-web diagram and the harmonization cube suggested by the ENoLL are used to identify best practices of Living labs.
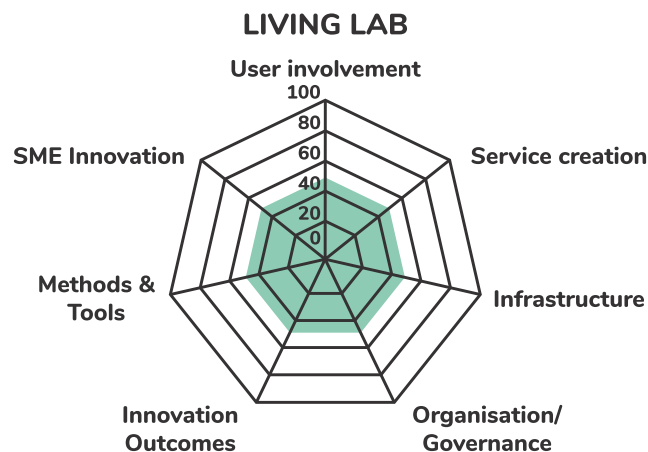


**Figure 4.**
*Spider-web diagram (Schumacher 2014).*

Spider-web diagram includes the analyses of the following stages:
user involvement; service creation; infrastructure; organisation and governance; innovation outcome; SME innovation.
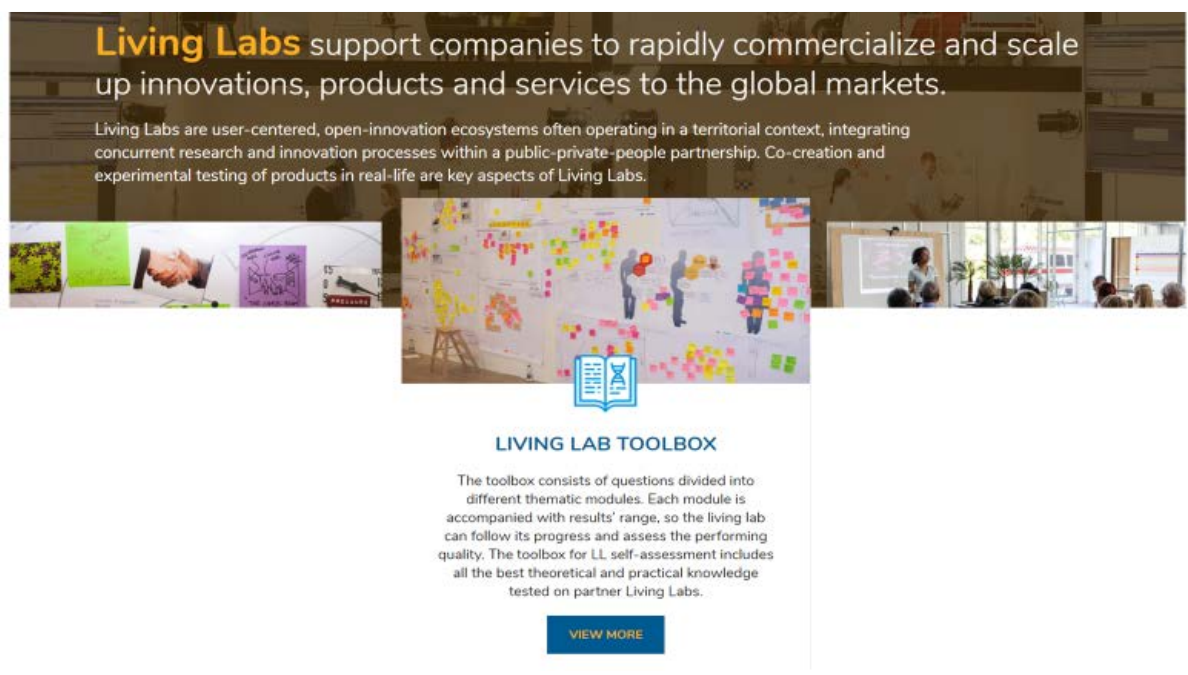
Another model is the harmonization cube which "represents the most important elements of a Living Lab, but also enables specifying bridges between existing Living Labs, i.e., to learn from each other, benchmark the validation of user behavior studies, exchange best practices, and interconnect the Living Labs. Next to facilitating a common ground for sharing, the cube model enables recognizing the degree of harmonization of used methods and tools in Living Labs (Schumacher 2014)."



**SME Innovation Support**

**USER INVOLVEMENT**

| | | |
|---|---|---|
| get users motivated | which type user, effort, expectations required? | provide tools to have users involved |
| keep users motivated | need for unobtrusive methods | automatic data collection |
| different approaches to motivate different users | knowledge on cultural and legal differences | need for low cost observation methods |

**SERVICE CREATION**

| | | |
|---|---|---|
| organisation, training | get users motivated | get users motivated |
| governance | get users motivated | get users motivated |
| management | market customisation | demonstration validation prototyping |

**INFRASTRUCTURE**

| | | |
|---|---|---|
| to deploy collaboration processes | selected infrastructure providers | infrastructures used to deploy first defined scenarios |
| collaborative infrastructures | best fitting infrastructures with environment | interoperable/ standardised infrastructures |
| different approaches to motivate different users | infrastructure to be adapted to other environments | most used infrastructures |

**GOVERNANCE**

| | | |
|---|---|---|
| commitment & reponsibilities | ownership drivers/ management structure | management working practices |
| financing service selection | get users motivated | sharing resources & infrastructure |
| business models | extensions (services, partners, users) | ..... |

**INNOVATION OUTCOMES**

| | | |
|---|---|---|
| innovation expertise, competencies | target market, value for stakeholders | innovation-supportive environments idea, Patent |
| IPR early phase innovation | optimal degree of interaction, context-sensitive | supporting optimal interaction |
| involvement of experts, stakeholders | extendable context target market | massively distributed multi-user environment |

**METHODS & TOOLS**

| | | |
|---|---|---|
| taxonomy of methods & tools | appropriate methods for LL available | technology support for methods & tools |
| methods & tools are institutionalised | Living Lab methods | technologies are implemented |
| methods & tools are exchanged in the ENoLL | pan-European Living Lab projects - sharing best practices | new technologies/ possibilities through ENoLL |

*Figure 5.*
Seven categories/ LL characteristics (Schumacher 2014)

In the ProVaHealth project a radar is used to capture the various stages of a Living Lab.



According to the project plan the toolbox will be in use in project website (like above). Next, the development process of the self-assessment tool is presented in chronological order.

**PRESENTING THE IDEA PAPER OF THE TOOLBOX IN KICK OFF MEETING**

First idea paper of the self-assessment toolbox was presented in kick-off meeting in Aalborg November 2017. The questions after the ideas to the project partners were:

- What are the most important contents to be included in the toolbox? Discuss and list in group five contents?
- What kind of tools are important to develop to improve service, business and collaboration between LLs in BSR?

The project was just started, and it was too early to get any answers from the partners. The only wish was to include the business model canvas in the tool. That was already planned to include in another work package and task in the project plan.

The timetable for development the task was presented in the kick-off meeting (Figure 6).
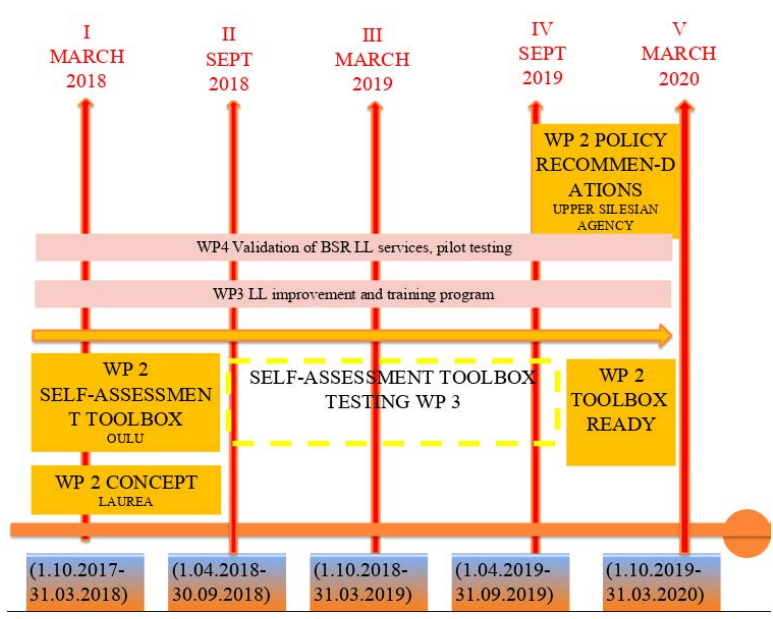


*Figure 6.*

*Timetable for development of self-assessment toolbox in ProVaHealth (K. Tarnov)*

The structure of the first draft was taken from "triangle model" (Veeckman et al. 2013). The model consisted relevant actions of LLs in different point of view. At first it seemed to us most practical structure starting to build the self-assessment tool.

The LL environment consisted:
- **technical infrastructure**
- **ecosystem approach**
- **level of openness**
- **community**

The LL approach consisted:
- **user role**
- **co-creation**
- **context research**
- **evaluation**

The draft model was presented in project workshop in Gliwice Poland, February 2018 to get comments from the partners to continue the development work.  The draft worked in three levels based on the structure: The main page – next level titles – statements with Likert scale answering – after the assessment a summary of the result was seen in a radar figure.

The main message after the discussion with the partners was that the drafted version was not relevant to the criteria in the project plan, because it should also be suitable to the company point of view.

The comments and new ideas were asked to be sent before the end of Feb 2018. No feedback or new ideas were received after the workshop.

# 5.2. SECOND DRAFT OF THE SELF-ASSESSMENT TOOLBOX

A new idea to create the tool was taken from a presentation which was presented in the demo date organized of Oulu Health Ecosystem in April 2018. The presented model was possible to use in self-assessment of the LLs as well as in company's point of view. It was based on five step innovation process (Figure 7). The model was drafted as the structure of the self-assessment tool and sent in May 2018 for the comments to the partners. No feedback was received, and the development work continued based on that structure.
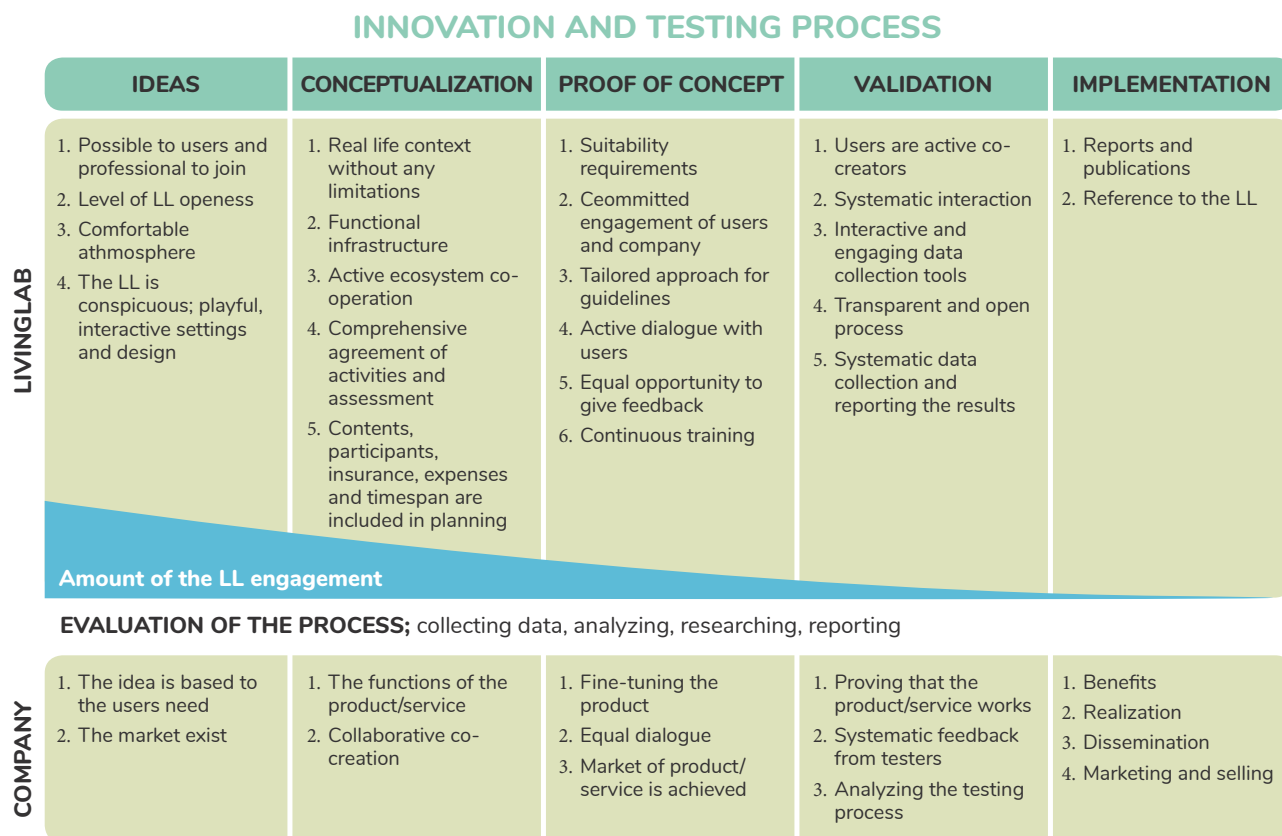
## INNOVATION AND TESTING PROCESS

| | IDEAS | CONCEPTUALIZATION | PROOF OF CONCEPT | VALIDATION | IMPLEMENTATION |
|---|---|---|---|---|---|
| **LIVINGLAB** | 1. Possible to users and professional to join<br>2. Level of LL openess<br>3. Comfortable athmosphere<br>4. The LL is conspicuous; playful, interactive settings and design | 1. Real life context without any limitations<br>2. Functional infrastructure<br>3. Active ecosystem co-operation<br>4. Comprehensive agreement of activities and assessment<br>5. Contents, participants, insurance, expenses and timespan are included in planning | 1. Suitability requirements<br>2. Ceommitted engagement of users and company<br>3. Tailored approach for guidelines<br>4. Active dialogue with users<br>5. Equal opportunity to give feedback<br>6. Continuous training | 1. Users are active co-creators<br>2. Systematic interaction<br>3. Interactive and engaging data collection tools<br>4. Transparent and open process<br>5. Systematic data collection and reporting the results | 1. Reports and publications<br>2. Reference to the LL |

**Amount of the LL engagement**

**EVALUATION OF THE PROCESS;** collecting data, analyzing, researching, reporting

| | | | | | |
|---|---|---|---|---|---|
| **COMPANY** | 1. The idea is based to the users need<br>2. The market exist | 1. The functions of the product/service<br>2. Collaborative co-creation | 1. Fine-tuning the product<br>2. Equal dialogue<br>3. Market of product/service is achieved | 1. Proving that the product/service works<br>2. Systematic feedback from testers<br>3. Analyzing the testing process | 1. Benefits<br>2. Realization<br>3. Dissemination<br>4. Marketing and selling |

**Figure 7.**
*Draft of self-assessment tool based to the innovation process.*

The new draft of the self-assessment toolbox for LLs was presented in ProVaHealth workshop in Vilnius June 2018. The draft consisted of introduction page and guidelines how to continue testing. Each phase of the tool had also a short introduction and statements to be answered ticking the suitable answer of the Likert scale. At the end the result of the self-assessment was shown in a radar figure.

The statements were created based on co-creation actions during the innovation process (Schuurman et al. 2015; Veeckman et al. 2013; Greve et al. 2017; Bailey S. 2017). The theory of LL characteristics (environment, approach etc.) was integrated to the statements (Figure 8).
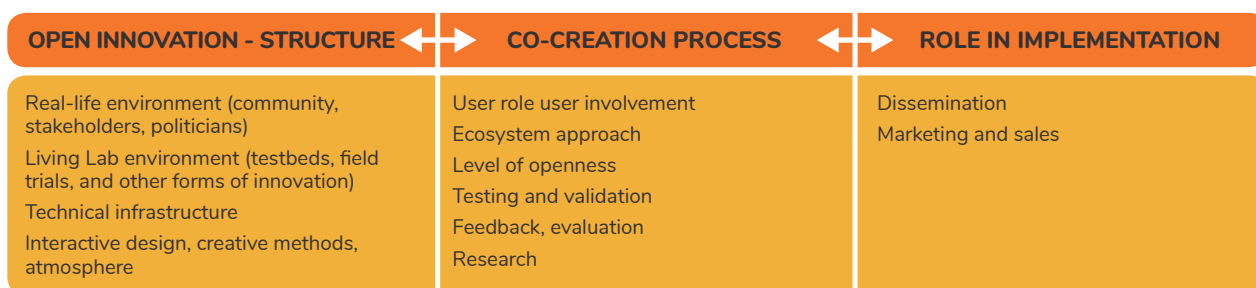
| OPEN INNOVATION - STRUCTURE ⟷ | CO-CREATION PROCESS ⟷ | ROLE IN IMPLEMENTATION |
|---|---|---|
| Real-life environment (community, stakeholders, politicians)<br>Living Lab environment (testbeds, field trials, and other forms of innovation)<br>Technical infrastructure<br>Interactive design, creative methods, atmosphere | User role user involvement<br>Ecosystem approach<br>Level of openess<br>Testing and validation<br>Feedback, evaluation<br>Research | Dissemination<br>Marketing and sales |

**Figure 8.**
*Contents to be taken in account in the tool design.*

Interreg
Baltic Sea Region

EUROPEAN REGIONAL DEVELOPMENT FUND
EUROPEAN UNION

ProVaHealth

The draft was accepted for further development. The deadline for comments was decided until 17. August 2018. The company version of the  toolbox was designed after the meeting and left for comments 7. August 2018. Later on the development of that version was finished.

## THE SELF-ASSESSMENT TOOLBOX IN WEB

The development work continued with the partner ScanBalt and the hired web designer.  The Likert scale to each statement was: 1-5: 5 Totally realized, 4 Realized, 3 Partly realized, 2 Randomly realized, 1 Not at all realized. The radar consisted summary of each phase of the tool. The draft was finalized with feedback texts after the radar figure.

The feedback included also a short summary of the LLs performance and recommendations for improvements.

## FINE-TUNING THE SELF-ASSESSMENT TOOLBOX WITH THE PROJECT PARTNERS

The self-assessment tool in web version was presented to the partners in Odense October 2018.

Most of the comments were given of toolbox version for companies. Only few comments until the deadline were given of the LL version.

In the workshop, active conversation and comments arose about the tool. A working group was nominated to collect all feedback for fine-tuning the tool. It was decided that the toolbox for companies is not finalized as it requires more work and it is not a required output in this project.

The work package 2 leader was nominated as coordinator of the working group. The toolbox development was continued by the working group remotely, by having Skype calls and commenting the versions on google drive. A web version was ready in January 2019 which the working group members could test and comment. The comments and additions  were made and the web SAT  was finalized by March 2019. The testing of the SAT was launched and the LLs tested it by mid-May 2019. The results of the first testing round were presented in the workshop in Lublin, Poland in May 2019.

One of the reoccurring comments regarding the visual side of the SAT concerned the benchmark. It was discussed in the workshop in Lublin that the general approach is that not all the phases should have the ideal highest score of 5 and therefore the benchmark is not the ideal radar where all phases are scored with 5. The benchmark cannot be any other LL either nor the average of the LLs which have taken tests, as all the LLs vary to a great extent in their characteristics and focus. Therefore it was decided to omit the benchmark  altogether. The second biggest amendment concerned the ranking. As some of the LLs said that not all phases were relevant in their case, it would be possible to say that it is not applicable.

It was decided in the working group to change the scale as follows: 5- always, 4- mostly, 3- half of the time, 2-rarely, 1-not relevant. Together with the second round of SAT we also inquired about of the LLs think that the SAT works for their benefit in the current format where they can also choose the option that some phases in the living lab process are not relevant for them. 9 answered positively to that. There were comments that the option is relevant, but the tool does not provide value to the organization as that organization is heavily regulated and many question do not apply (i.e. implementation). There was a suggestion that the SAT should be focused on LL capability of providing services to SMEs, for their product development phases. The tool gives an overview of the focus and prioritization of services related to the various LL phases. This overview can serve as the basis for further considerations about the value proposition of the region's LL elements.

We asked about the relevance of the SAT with its adjustments that were made for the 2nd round. 3 respondents claimed it to be very relevant, 2 relevant and 6 moderately relevant. 5  thought it is a very useful tool to assess our LL activities/services regularly, 3 thought it to be useful and the rest were of lesser opinion.

Due to the changes with the communication partner ScanBalt, some technical delays occurred and it was not possible to get the changes made before January 2020. The second round of testing with the LLs took place in February 2020. It was also accompanied with a short additional questionnaire on the changes that the LLs had made in their organisations since the first testing round of the SAT. The final toolbox was presented in the ProVaHealth final conference in March 2020 in Tallinn.

# 6. SELF-ASSESSMENT TOOLBOX RESULTS

*Table 1.*

*Results of the 2 SAT testing rounds*

| NAME OF THE LIVING LAB | IDEAS | | CONCEPTU-ALISATION | | PROOF OF CONCEPT | | VALIDATION | | IMPLEMENTA-TION | |
|---|---|---|---|---|---|---|---|---|---|---|
| | I | II | I | II | I | II | I | II | I | II |
| Health Innovation Zealand | 3 | 3,1 | 3,5 | 3,5 | 3,2 | 3,1 | 2,5 | 4,2 | 2 | 2 |
| Latvian Health tourism cluster | 3 | 2,5 | 3 | 3,2 | 2,2 | 2,1 | 2,9 | 2,4 | 1,7 | 2,9 |
| South-Eastern Finland University of Applied Sciences | 1 | 3 | 1 | 2,5 | 1 | 2 | 4,2 | 5 | 1 | 1,8 |
| Seinäjoki University of Applied Sciences | 2,9 | 2,6 | 3 | 2,8 | 1,7 | 2,8 | 3,5 | 2,6 | 3 | 3 |
| Haapsalu Neurological Rehabilitation Centre | 4 | 4,6 | 4,5 | 4,5 | 4,2 | 4,5 | 4 | 4,9 | 2,8 | 3 |
| CoLab Denmark, Region of Southern Denmark | 3,5 | 3,9 | 4,2 | 4 | 4,9 | 4 | 5 | 4,9 | 1 | 2 |
| Cluster of Lublin Medicine | 3 | 4,2 | 3,8 | 3,9 | 3,1 | 3,9 | 3,1 | 3,9 | 3,6 | 4,2 |
| North Denmark Region | 3,6 | 4,4 | 4,1 | 5 | 4,1 | 4,9 | 4,1 | 5 | 2 | 2,2 |
| Innovation Skåne | 3,5 | 4,2 | 3,8 | 4,2 | 3,7 | 3,9 | 3,5 | 4,9 | 3,5 | 4 |
| Laurea University of Applied Sciences | 3,6 | 5 | 4,1 | 5 | 4,1 | 5 | 4,9 | 1 | 2,9 | 1 |
| Upper Silesian Agency for Entrepreneurship and Development | 2 | 1,9 | 3 | 2,9 | 4 | 4,2 | 3,5 | 2,9 | 2,6 | 3 |
| Oulu University of Applied Sciences | 3,1 | 3 | 4 | 2,5 | 4 | 4,8 | 3,9 | 4,9 | 1,5 | 1,9 |
| Vilnius University | 2,8 | 2 | 3,8 | 2,9 | 4,2 | 4 | 4 | 3,4 | 3 | 2,2 |

SAT was tested twice: in May 2019 and in February 2020. The second round was also accompanied with a short additional questionnaire on the changes that the LLs had made in their organizations since the first testing round of the SAT.

*The first round* indicated that ideas, conceptualization and proof of concept tended to be scored low:

**Ideas** - 1, 2, 2,8. The highest was 4 (Haapsalu NRC).

**Conceptualization** – 1, 3, 3,8. The highest was 4,5 (Haapsalu NRC).

**Proof of concept** – 1, 2, 2,2. The highest was 4,9  (CoLab Denmark)

**Validation** is scored high compared to other areas –1, 2,4, 2,6.  The highest was 5 (CoLab Denmark)

**Implementation** results are generally the lowest – 1, 1,5, 1,7. The highest was 3,6 (Cluster of Lublin Medicine). *Results of the second round differ.*

**Ideas** – 1,9 , 2, 2,5. The highest was 5 (Laurea University of Applied Sciences).

**Conceptualization** – 2,5, 2,8, 2,9 .The highest was 5 (North Denmark Region, Laurea University of Applied Sciences).

**Proof of concept** –  2, 2,1, 2,8. The highest was 4.9 (North Denmark Region).

**Validation** is scored high compared to other areas – 1, 2,4, 2,6. The highest was 5 (South-Eastern Finland University of Applied Sciences, North Denmark Region).

**Implementation** results are generally the lowest - 1, 1,8, 1,9, the highest being 4,2 (Cluster of Lublin Medicine). What should be remembered in this phase is that there is no ranking of LL-s. In some cases not all the phases should have the ideal highest score of 5, if it is not at all relevant for the LL, in that case 1 indicates "not relevant".

Changes could be considered in the next phases of the  LL development.

Biggest shifts are noticeable as follows.

|  | First round - lowest;... highest | Second round – lowest;... highest |
|---|---|---|
| "1" is in brackets as "not relevant". | | |
| • Ideas: | (1), 2; ...4; | 1,9; ....5 |
| • Conceptualization: | (1), 3;... 4,5; | 2,5; ...5; 5 |
| • Proof of concept: | (1), 1,7; ..4,9; | 2,1;...4,9 |
| • Validation: | 2,5; .........5; | 5; . ...5 |
| • Implementation: | (1), (1), 1,5; | (1); ...4,2 |

As can be noticed,  the "not relevant" area has significantly diminished, at the same time "5" and "4,9" increased from 3 (5; 4,9;4,9), the first round to 5 "5-s" and 5 "4,9-s" in the second round.

**LIVING LABS' SELF-ASSESSMENT**
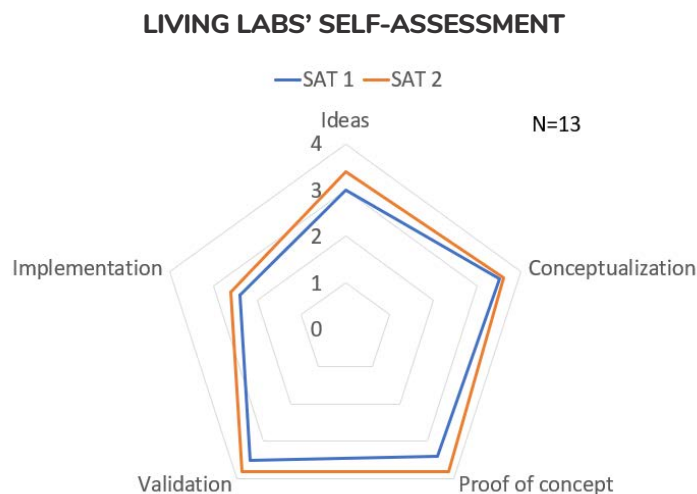


**Figure 9.**
*LLs' average self-assessment and improvements  from 2019 to 2020.*

In a year, based on two SAT assessments the LLs improved their actions in average in each stage of the innovation process (figure 9).

**MANAGEMENT OR ORGANIZATIONAL STRUCTURE**

Based to the feedback questionnaire, it became evident that 3 LLs did not change anything as a result of the self-assessment tool (SAT) since May 2019. The other LLs mentioned several changes such as more stakeholders and more actors involved and thus the quatro helix has been realized in practice, involving more real users, produced products to the companies, developed new possibilities for students to participate in testing processes. Planning, processes and the involving of end users were more systematic.

New knowledge has been gained. Some have better understanding of their offering as a LL, and are better prepared to collaborate internationally with other LLs and SMEs. For example compared to last year there are experiences gained also in other phases of the testing process, development within validation and implementation phases, Improvement has been observed in phase of ideas, proof of concept, validation, implementation.

It was also mentioned that all ecosystem are developing at the moment. The overall organizational changes have changed the LL situation. Also the legislation in some countries has impacted the offering and the LLs are not able to / allowed to assist companies in the implementation phase. LLs are focused on validation but put less emphasis on implementation due to a structural reform of the business promotion system in Denmark took effect from early 2019. The implications of the reform were that the responsibility for business promotion of the five Danish regions was removed from the regions.

**HUMAN AND TECHNICAL RESOURCES**

In terms of changes concerning use of human and technical resources (databases, technical solutions, small infrastructure etc.), there have been some. A LL has more personnel and new professionals in the team so the competence is increased. Some LLs have more facilities and equipments in their use. But others have needed to cut the personnel due to no allocations to the regions. A LL has expanded the end-user database which includes health and wellbeing data from individuals who have participated in the measurement protocol. In general there is an increased focus on using data in innovation processes and better knowledge about possible access to technical solutions and infrastructure in LL ecosystem.

## 6.2. LEARNING EXPERIENCE

It was relevant to capture the general learning experience of the LLs since the first testing round and understand if the LL had an increased capability to work in transnational environment. Some of the LLs claimed that they have learned from best practices and gained knowledge in many fields, such as cooperation between sectors, stakeholder involvement, universities involvement, different models of Living Labs concepts. The main benefit has been better understanding about risks, therefore also more systematic LL service process and also the better understanding about possible workable business plan. It has been very inspirational and giving to see some of the more specific metrics and methods used elsewhere. The bases for transnational cooperation has been created as there are international contacts, developed network and methods, as well as tools for international collaboration between LLs, co-operation with other LLs and SMEs. There is more willingness to work transnationally due to the pilot test project under ProVaHealth The process is still to be continued and strengthened. There is better access to end-users especially patients and seniors thank to active approach to patient's and senior's organizations.

## 6.3.  IMPROVED SAT AND BENEFITS OF SELF-ASSESSMENT

In terms of understanding the changes from the previous SAT round to the current round, we asked if the management structure and organisational set-up had  improved since the previous round. 3 LLs claimed some more significant changes. There has been a significant growth in staff (doubled) and the management structure is more professional now. However, the staff is mostly working 100% for projects and they are not available for product/service test cases for companies. The management structure has changed from primarily focusing on one element of LL-services to broadening it to more elements in the region. This is a structural change but it remains to be seen if it will turn out to be an improvement. One organization has shifted towards TEAL or more on self-management and self-organisation.

As one aim of the tool is to make LLs think about the development and strategy of their organisations, we also asked about what new ideas have they received in order to expand their Living Lab services according to the innovation process stages.

A LL has planned to involve more municipalities with finances and explore their needs, to make platform where all needs from hospitals, clinics and doctors can be submitted and analysis of LL work and status can be organized. The planning and development stage of health and well-being ecosystem has started. A LL has received better understanding about validation activities need, possibilities and shortages. It was noted that we would need to implement, test and validate the transnational LL business model. This calls for harmonizing the services offered. After that LLs would be better prepared to establish regular collaboration within the network and help local SMEs to grow and internationalize.  In connection with the transnational market service the suggestion is to provide the basic service or describe each countries health care system and structures to increase international growth.

Some LLs have planned to expand the offer with additional companies support, with subcontractors. More active approach to end users and their involvement in innovation process is needed starting from the phase of the ideas. That creates the necessity for  documents and process formalization.

## 6.4.  FUTURE PLANS AND IDEAS FOR LL DEVELOPMENTS

Finally we asked the LLs about the future plans regarding the phases. Similarly to the present of the living labs, they have different levels of plans for the future. E.g. some plan improvement of all ecosystem creating one for all start-ups and a chain where all stakeholders will be involved. One is focusing on every phases because it has started to build the Health and well-being entity. In one LL the plan is to look into the proof-of-concept phase since this is something that SMEs need. In a LL the plan is to focus on the validation phase and build the core competence around that. From their perspective, with limited resources, it is not possible to offer high-quality services in all phases of the living lab process. A Living Lab suggested that processes in different phases should be even more evidence based. Higher formalisation of processes (scope of standardised documentation) is the task for the future.

# CONCLUSIONS

As we have to take the local context into account, thus two Living Labs will never be the same. Thus the aim of the self-assessment tool was not to establish a ranking of Living Labs. In order to help Living labs to assess their performance we have developed a framework to evaluate the different aspects that are most important for Living Labs. However, while the defined indicators are in-line with the main goals of Living Labs, depending on the particular setting, certain Living Lab will not be able to reach maximum points in every category. Thus the indicators described are in general better suited to characterize the specifics of a Living Lab in a particular sector than to judge upon the overall quality of a Living Lab and try to make ranking out of it.

The main goal of the SAT is to make the Living Labs think more strategically about their plans and development of their service offering. It provides them with the guidelines of how to think about different relevant stages in their development. In terms of the policy making for Living Labs, it would serve as the tool that enables creation of evidence-base and understanding of the current situation of the Living Labs. If the SAT is repeated regularly, it would allow the Living Labs to evaluate their own progress and if shared with other stakeholders, would also contribute to better policy making.

- LLs are different, acting through different organizations (Quatro helix) in different stages of innovation process
- The LLs can focus in different phases of the process and strengthen their services
- In this moment, ecosystem collaboration (quatro helix) is minimal. The LL can get new ideas to create better interprofessional collaboration using the SAT.
- The LLs will get more scientific power and research competencies when they are working together with the academies.
- As a result the SAT is a practical tool to get visible the strengths and needs to be developed. The assessment can be utilized as a marketing reference.
- Beside the SAT, it's important to collect feedback from the customers.
- In future, using the SAT will standardize the LLs actions in all stages of the innovation process
- Common tools like SAT etc. will help to build the transnational LL concept

In conclusion we share the opinion of one of our Living Lab representatives:

"It would be lovely if we could keep up the collaboration and sharing of relevant tests and SMEs between the Living Labs in the Baltic Sea Region".

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ProVaHealth

## 1. HEALTH INNOVATION ZEALAND

**Domain of innovation infrastructure:** health and wellness, treatment and rehabilitation

**Services:** support hospitals and psychiatry in their efforts to introduce (implement) new processes, equipment, treatment concepts and organization with the aim of increasing quality of care, treatment safety, efficacy and cost-effectiveness; streamline cooperation between the hospitals and their wards and the private sector; enhancing integration of user-friendly eHealth solutions especially for Rehabilitation and self-management of chronical diseases purposes.
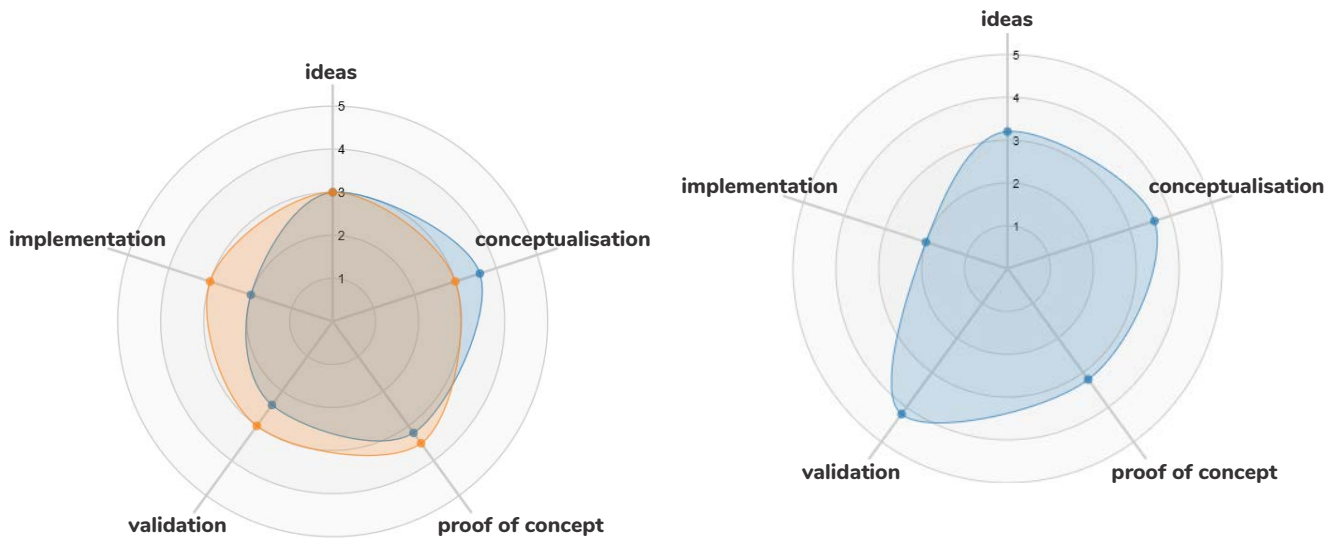


## 2. LATVIAN HEALTH TOURISM CLUSTER

**Domain of innovation infrastructure:** health and wellness, prevention and diagnostics, treatment and rehabilitation, social care and special care

**Services:** Information, consultation, marketing, info and consulting of customers, training of entrepreneurs, making new health tourism products.
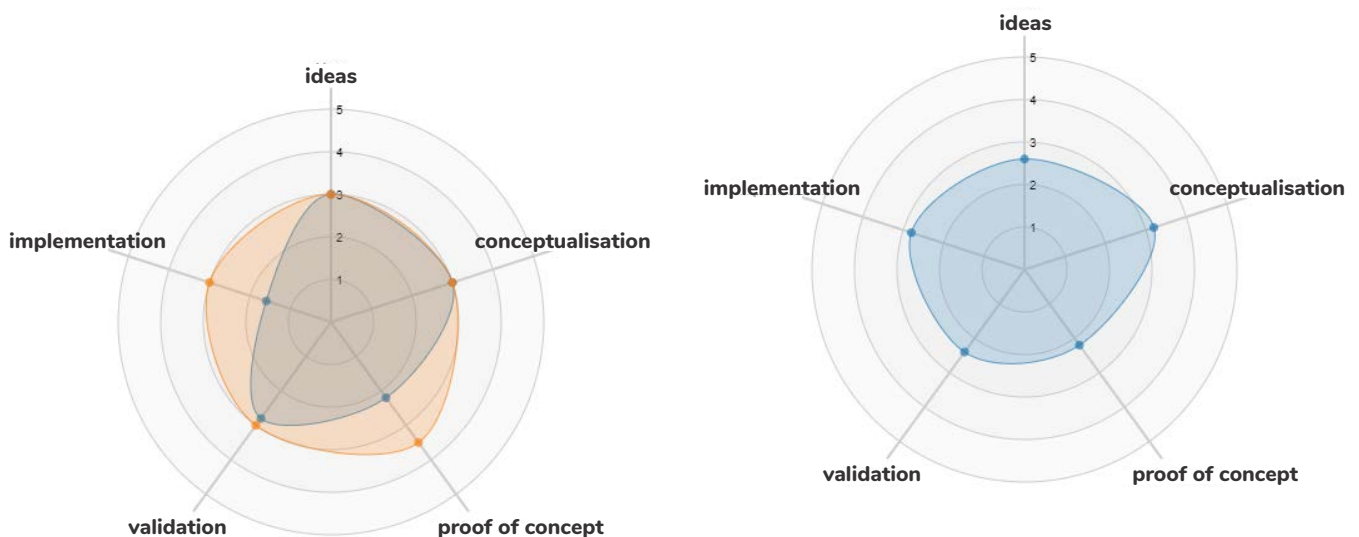
# 3. SOUTH-EASTERN FINLAND UNIVERSITY OF APPLIED SCIENCES
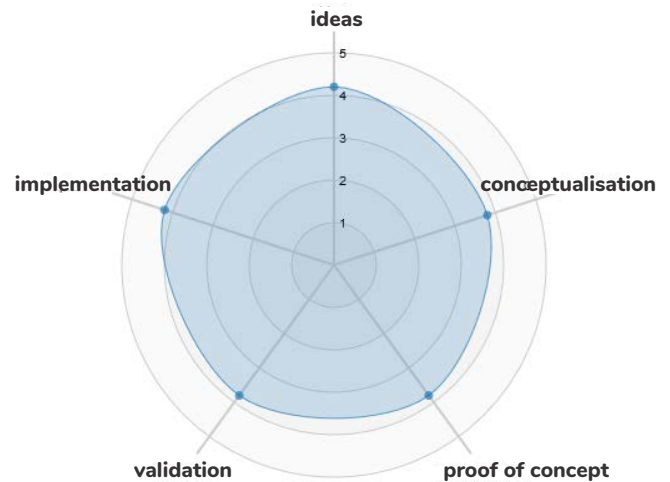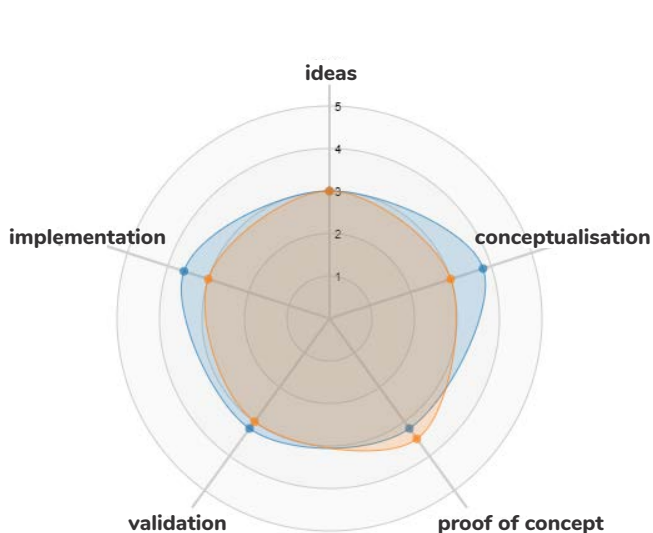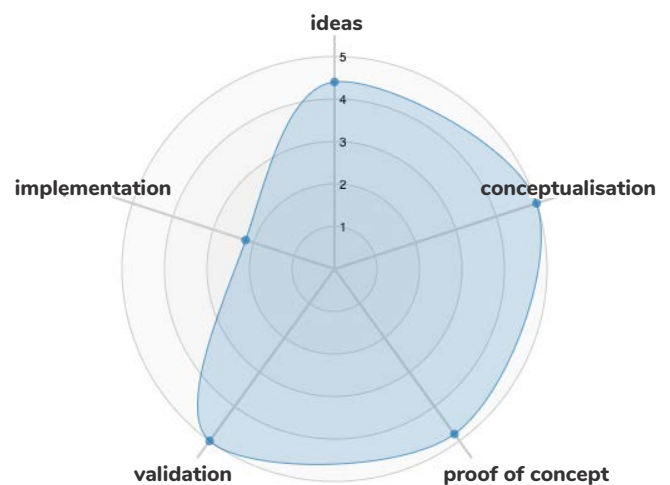
**Domain of innovation infrastructure:** health and wellness, prevention and diagnostics, treatment and rehabilitation

**Services:** New methods required in the preventive health and wellbeing, cognitive rehabilitation of stroke patients
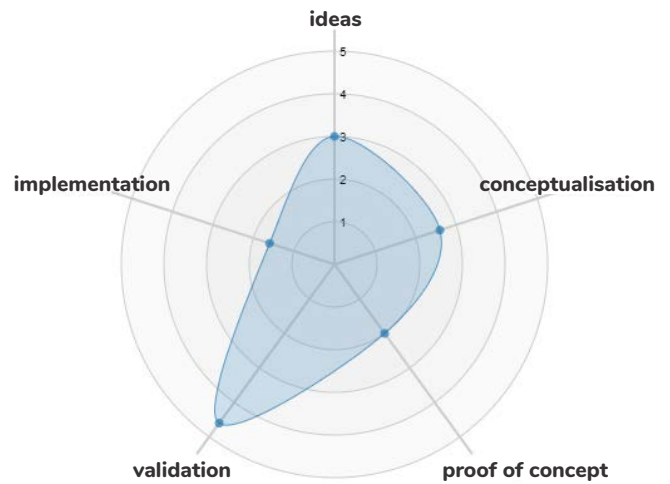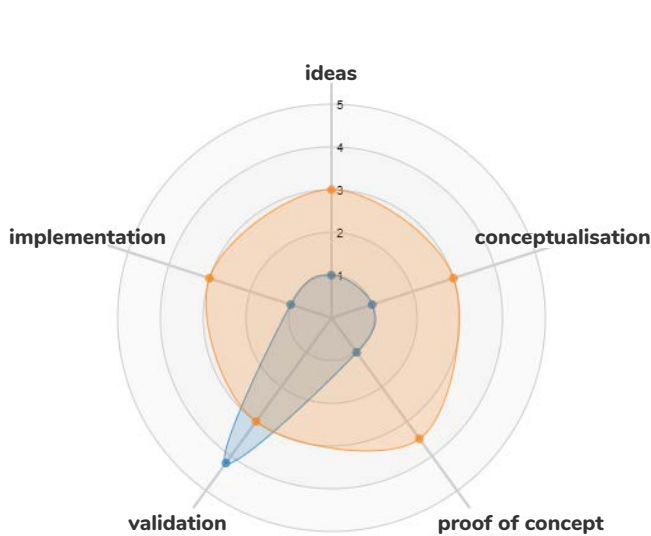


# 4. SEINÄJOKI UNIVERSITY OF APPLIED SCIENCES

**Domain of innovation infrastructure:** memory impairment technologies

**Services:** consultation, education and technical support on home care and other assistive living technologies.
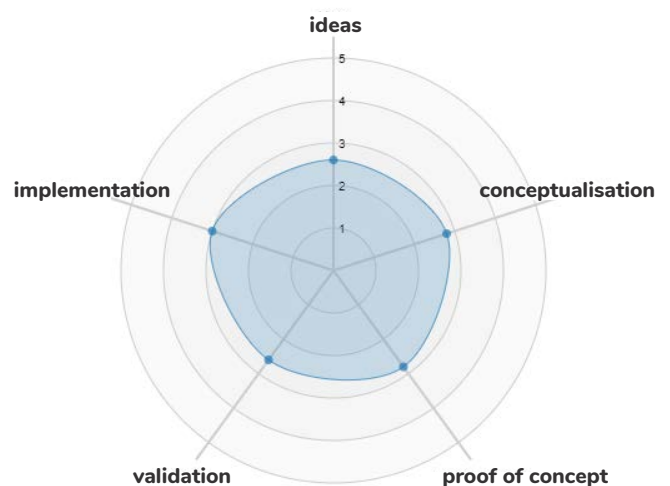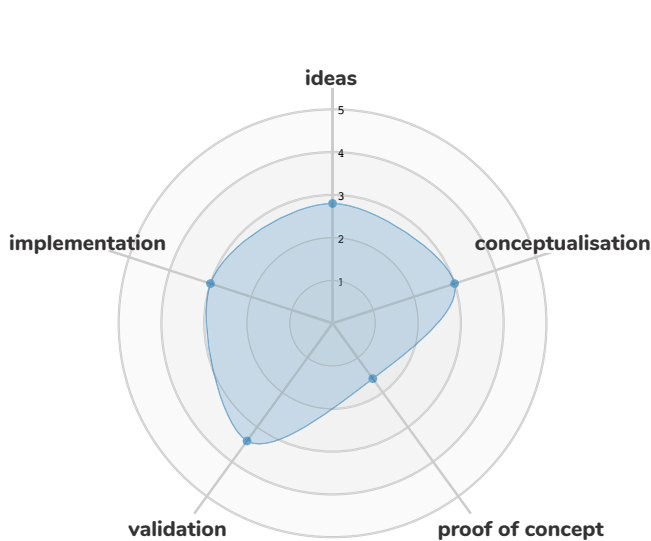
# 5. HAAPSALU NEUROLOGICAL REHABILITATION CENTRE

**Domain of innovation infrastructure:** prevention and diagnostics, treatment and rehabilitation

**Services:** Multidisciplinary team-based neurorehabilitation services, including services connected to different adaptive devices, for adults and children with a variety of neurological conditions, especially spinal cord injury, brain injury, cerebral palsy.
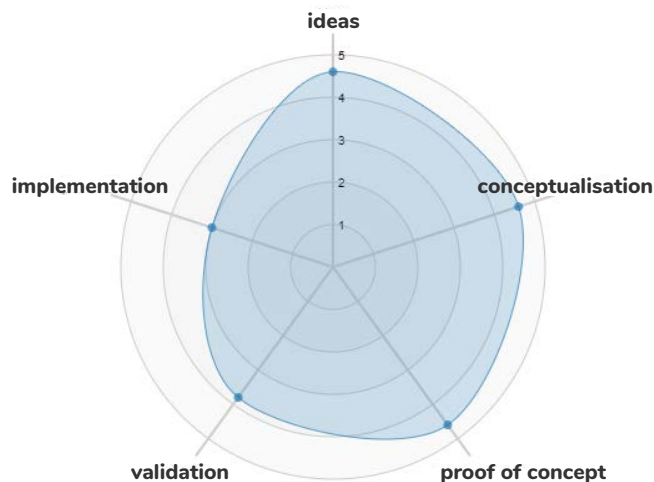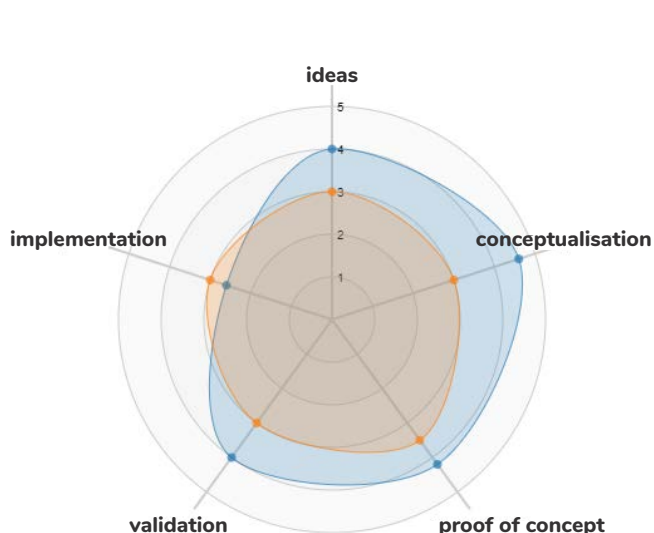
# 6. COLAB DENMARK, REGION OF SOUTHERN DENMARK

**Domain of innovation infrastructure:** health and wellness, treatment and rehabilitation, social care and special care

**Services:** new solutions within health innovation are developed including new ways of designing hospitals, and improved telehealth and telecare solutions in close corporation and collaboration between public health and care organisations and private companies as well as close collaboration with knowledge- and education institutes.
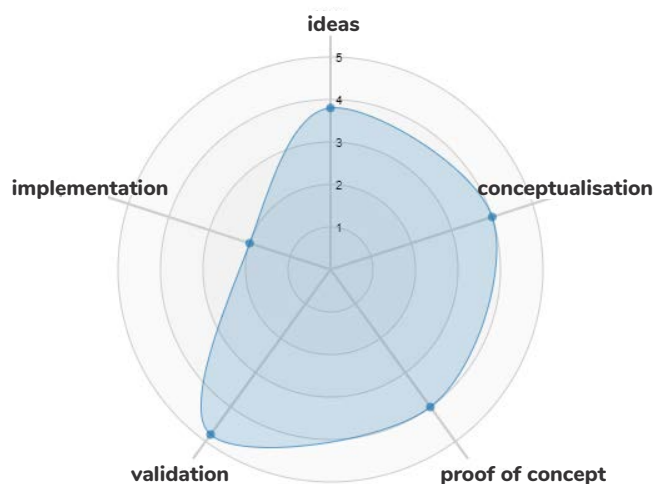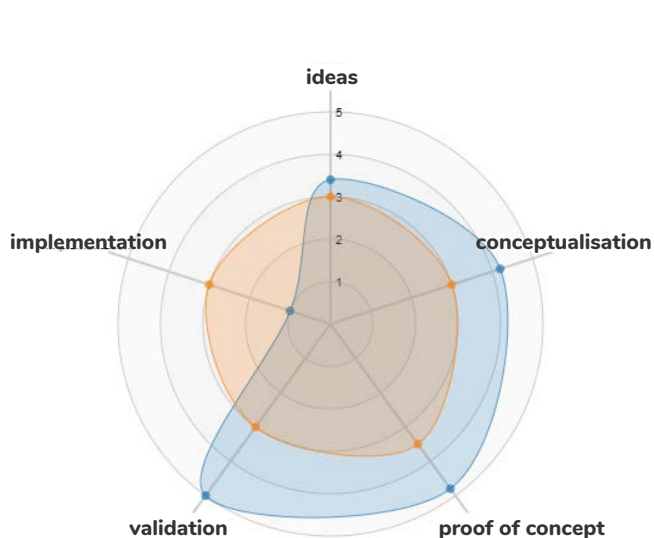
# 7. CLUSTER OF LUBLIN MEDICINE

**Domain of innovation infrastructure:** health and wellness, prevention and diagnostics, treatment and rehabilitation, social care and special care

**Services:** incubation, acceleration, advisory services, trainings, projects financing, competitions for startups, technology testing with end users, users involving in technology development
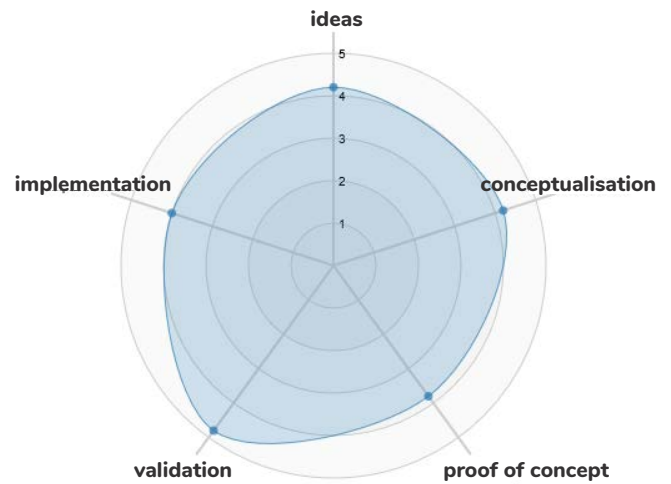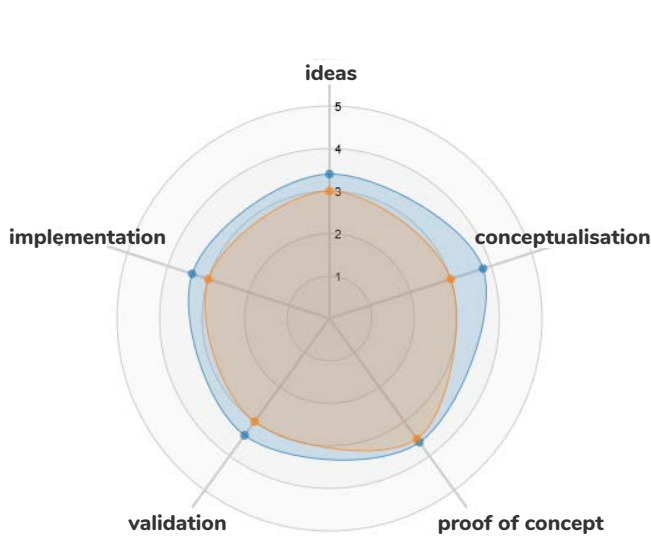
# 8. NORTH DENMARK REGION

**Domain of innovation infrastructure:** health and wellness, prevention and diagnostics, treatment and rehabilitation

**Services:** test, evaluate and reveal pharmacological mechanisms and effects in models of experimental pain; The Center of Excellence in Osteoarthritis - it combines research across different professions that all relate to osteoarthritis
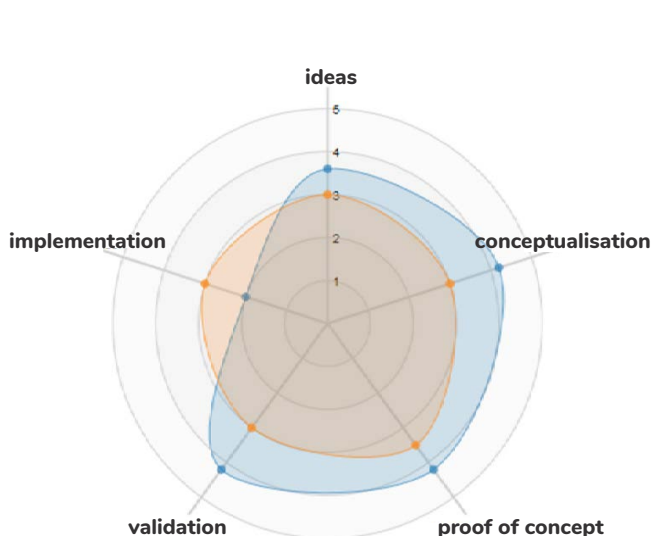
# 9. INNOVATION SKANE

**Domain of innovation infrastructure:** development of fast-growing companies and contribution to increased efficiency and quality in the healthcare through innovation

**Services:** Innovative HealthTech companies have the opportunity to test and validate their e-health products and services against real needs in the healthcare sector, from product idea and onwards.



# 10. LAUREA UNIVERSITY OF APPLIED SCIENCES

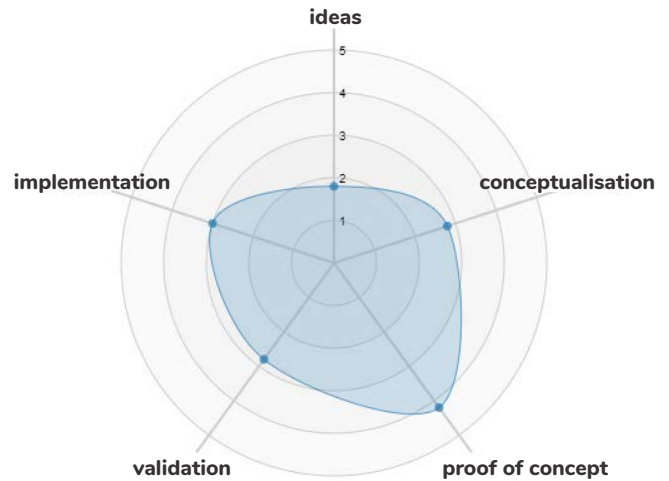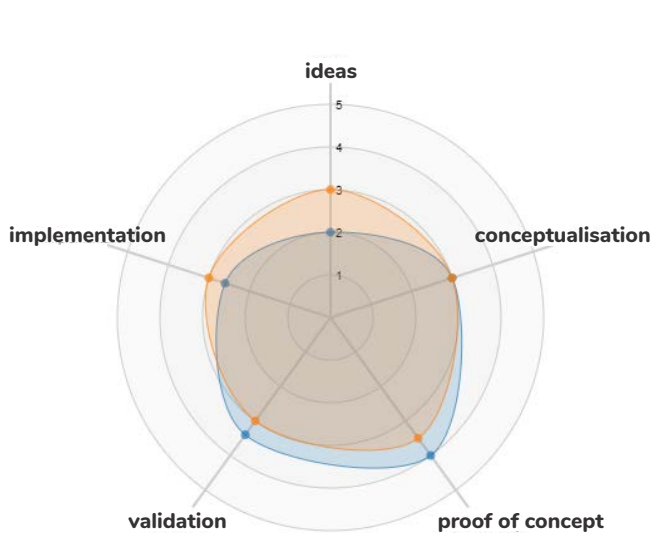**Domain of innovation infrastructure:** health and wellness

**Services:** Test bed and development environments, development programs for innovative companies.
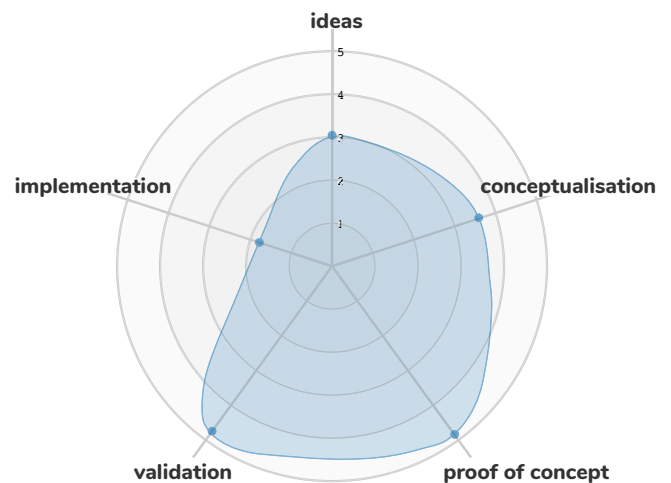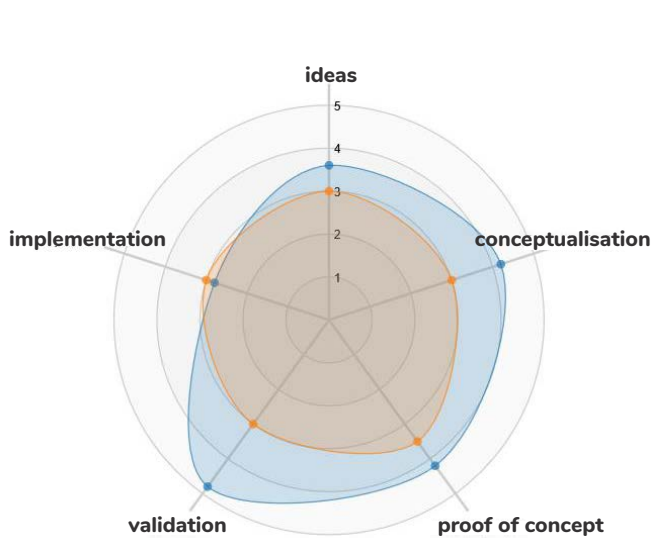
# 11. UPPER SILESIAN AGENCY FOR ENTREPRENEURSHIP AND DEVELOPMENT

**Domain of innovation infrastructure:** prevention and diagnostics, treatment and rehabilitation

**Services:** Cardiac Surgery Development, Technical testing of medical equipment, EMC Testing Laboratory, Telecardiology

# 12. OULU UNIVERSITY OF APPLIED SCIENCES

**Domain of innovation infrastructure:** health and wellness, prevention and diagnostics, treatment and rehabilitation, social care and special care

**Services:** under- and post graduate health care and medical education: teambuilding, interprofessional and clinical competencies, communication, management - new innovations: safe testing, developing, research - usability, training new tools

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