HOW TO SPEAK THE SAME LANGUAGE WITH EUROPEAN INNOVATION-POLICY IN TERMS OF LIVING LABS?[1]

Ave Lepik, Urmas Varblane
University of Tartu

Abstract

A Living Lab is a user driven open innovation ecosystem, which combines consumers, firms and public sector. It is a rather new innovation methodology, which steadily gains stronger acceptance and becomes a significant innovation policy's instrument in many countries. This article provides suggestions and conceptual framework for the applying living lab as the innovation policy instrument in the framework of national innovation-system in small countries. In the countries with the total lack or very limited experience about using the living labs the introduction of living lab approach requires answering several important questions. The paper is focused on the identification of potential areas of using living labs approach as well highlighting also potential obstacles in the process of its application in Estonia.

Keywords: innovation and invention: processes and incentives; management of technological innovation and R&D; technological change: choices and consequences; diffusion processes

JEL Classification: O31, O32, O33

Introduction

During the last decades radical changes happened in the functioning of national innovation systems. The dominant linear innovation model is gradually replaced with the interaction and learning based approach. Open innovation approach and understanding about the utmost importance of using different sources of knowledge in the innovation process becomes basis for thinking and modern policy-making. The economic crisis has put more pressure to governments and firms to be more effective and innovative. When most of all new products don't make it on the market, it is crucial to learn and find out what users actually want and need. One solution here is to engage end-users into the innovation process more strongly, even as active co-creator. The same goes for public social services - to supply services that raise welfare among users most effectively.

In last decade, a shift in innovation paradigms has taken place – new innovation concept has been developed, implemented successfully into practise and has found acknowledgement in many counties. Living lab is methodology of innovation

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system as well the organisation that mainly uses it. Living lab is user-driven open innovation platform with real-life settings, which could be called as the public-private-people-partnership. End-user involvement and co-creation in innovation process is seen as powerful instrument at all stages of innovation process. By the end of year 2009 there were 129 members represented in European Network of Living Labs (ENoLL) (European Network... 2009). Also there are many non-members, operating mostly in Western European. The concept of Living Labs reached to Europe from USA around millennium, so the living labs in practise are rather new phenomenon.

Living labs gain more support also from the European Commission to contribute effectively to European innovativeness and competitiveness. So far Estonia is making only its first steps and has not stated its clear attitude towards living labs.

The aim of the article is to give recommendations for the Estonian innovation policy makers in order to use living lab as an innovation policy instrument. The findings of the article could be used also for the other small economies where living labs are not used yet, or the experience is rather occasional. Explaining the characteristics and criteria of living labs provides a general picture where the innovation process should be directed and how living labs could be used to create innovations more effectively. As living labs have various forms, existing living labs are studied and the framework for categorization is created by authors. The question how to choose the direction, form and sector for implementing living lab is raised and some options are proposed and analyzed. For discussion many critical issues about living labs are brought out.

Since living lab is rather new research area, the amount of systematic analyses and supporting theories are limited. Besides research-papers this article bases also on conference presentations and papers, roadmaps and reports. The living lab concept can be taken into smaller parts and literature can be found on specific aspects. Following article is based on the analysis of the work of 68 European living labs, including all ENoLL living labs from Nordic countries. During the research process also two interviews were made, with the president of European Network of Living Lab and Nokia development director Veli-Pekka Niitamo and CEO of Forum Virium Helsinki Jarmo Elukka Eskelinen.

Different approaches toward the living labs concept

The term “Living Lab” presents a methodology as well organisation that mainly uses this approach in innovation process. Different perspectives have been stressed by various authors about the concept of living labs. Typically a living lab is understood as an environment where ICT developers and service providers can test and validate new solutions on users, be sensitized with regard to new and unexpected uses, and find inspiration for future innovation (Følstad 2008).

From the methodological perspective living lab can be defined as research- and development methodology as well innovations that are created and validated in co-creation based, multi-contextual real-life setting. (Eriksson *et al.* 2005) Ballon *et al.*

(2005) define living lab as experimental environment where technology is given in real-life context and where end-user is involved as co-creator. The emphasis is on environment, experimentation and testing as well on the user who is seen as co-creator.

The official definition comes from ENoLL: Living Lab is open innovation environment with real-life setting, where user-driven innovation is co-creation process for new services, products and social infrastructure. Living Lab is co-creating environment for human-centric research and innovation. The emphasis here is on user-driven and open innovation. (European Network... 2009) The definition used in CoreLabs projects: system allowing users of the services and products, to take active role as contributors and co-creators in research-, development- and innovation process (CoreLabs 2007). User and its active role are in the centre of this definition. But it also pays attention to living lab as the system of interactive players.

Bergvall-Kåreborn *et al.* (2009) define Living Lab as an environment in which people and technology are gathered and in which the everyday context and user needs stimulate and challenge both research and development, since authorities and citizens take active part in the innovation process. The underlying idea is that people's ideas, experiences, and knowledge, as well as their daily needs of support from products, services, or applications, should be the starting point in innovation (Bergvall-Kåreborn *et al.* 2009). Again the importance of environment and users is brought out.

From these definitions a starting point for living lab can be marked: close co-operation with shareholders, develop products and services from the point that users actually want and need, where living lab role is to combine and empower users so that they would participate in value creation. The main precondition for living labs is the development and testing takes place in real-life context, not in constructed sterilize lab. (Ståhlbröst 2008)

As mentioned, living lab can be seen as methodology as well as an organisation. Lama and Origin (2006) describe living labs as user-centric research methodology for sensing, prototyping, validating and refining complex solutions in multiple and evolving real life context. Here living lab is described as methodology. Whereas living lab is also being defined only as small organization that aim to capture users' insights, prototype and validate solutions in real life contexts. (Almirall 2008) Here living lab is narrowed down to organisation, and only the environment by real-life context is emphasised but not how users are involved in innovation process.

Van der Walt *et al.* (2009) has found that there are two different streams of thoughts regarding the living lab concept. For some living lab is pure "testbed" for innovative solutions while others see living labs as a pure means to conduct context research and co-creation with other users. (Van der Walt *et al.* 2009). Niitamo (2009) refers that testbeds and living labs should not be equalized as living lab is wider concept with uncontrollable elements.

From institutional perspective, a Living Lab can be defined as "a system based on a business-citizens-government partnership which enables users to take active part in the research, development and innovation process. Products and services are developed in a real-life environment in a human centric and co-creative way, based on continuous feedback mechanisms between the developers and the users". (Study on… 2009) The system perspective puts focus on the relation between the Living Lab as a whole and its interdependent parts.

Focus on one aspect leads to the biased concept, especially in practise. Living Lab should be seen as an integral part of the national innovation system.

Key-elements of the living labs approach and its importance for the country

In this part the key-elements and criteria of living labs are presented. Concurrently the level of organisation and economy are in focus. Following characteristics are precondition for more successful innovation in organization (firm, co-operation, etc.) as well creating innovative economy in general. Some possible spill-over effects are brought out. We suggest that the criteria set for organisations apply also on more abstract level.

Living lab should meet four criteria (Eskelinen 2009):
1) user-driven - the access to real end-users community and the involvement in innovation process;
2) open innovation way of thinking;
3) ecosystem – collaboration network of facilitators, service providers, customers and communities;
4) real-life environment for testing and validating.

The most distinctive feature of living labs is the engagement of end-users as the active stakeholders. Users have been transformed from passive objects to active subjects who contribute and acts as co-creator (Følstad 2008). User communities' activation and participation is the basis of user-driven innovation (Eskelinen 2009). The large number of users involved when trying out new ICT solutions is almost exclusively a characterizing purpose of the Living Labs; "Large numbers of users" being understood as several hundred or more (Følstad 2008).

User involvement could happen with different intensity. Niitamo (2009) refers to five levels of user engagement (figure 1): 1) users monitored/u-data simulation, 2) user participating, 3) user collaborating, 4) user designing and 5) user producing. If traditional market-research methods and tools are adequate living labs are not needed and instead traditional tools (e.g. questionnaire) could be used. One goal is to get insight of users needs and wants that they are not able or willing to reveal - decoding tacit knowledge of users. From the other end of the scale the more direct contribution in innovation creation and product-service development is expected.

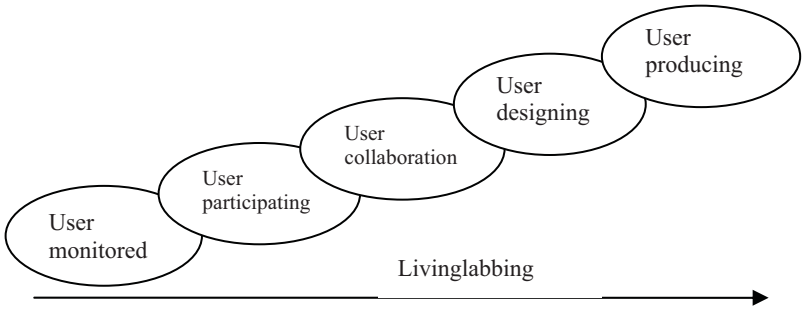

Figure 1. Levels of user engagement. (Niitamo 2009)

By users engagement Living Labs intrinsically create societal awareness (Almirall 2008) and make citizen more active. Almirall referring to Florida notes that this is relevant because the innovative capacity of a society depends also on soft factors, among them its perception of being innovative. (Almirall 2008) When users are aware of their influence they are more willing to contribute and generate spill-over effect where more people want to be important and acknowledged.[2] Living Lab is instrument for rising people activeness and creativity. Active and creative user communities are precondition of innovative society.[3]

Open innovation by Henry Chesbrough's definition is the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively (Chesbrough 2003). This paradigm assumes that firms can and should use external as well as internal ideas and internal and external paths to market, as they look to advance their technology. (Study on... 2009) It is crucial to co-operate with other organisations to sell, buy and licence innovations. For Living Labs the main elements of open innovation include open collaboration, open data, shared R&D activities and trade of results (Eskelinen 2009). All these aspects are important both levels for company as well for small country economy.

Ecosystem is multi-partnered collaboration network of facilitators, service providers, customers and communities. Public-private-partnership is the basis but as users are involved as equal partners we can call it public-private-people-partnership. The network can vary from few firms and organisations up to hundred, but the number must optimal and accordance to the aim of activity and methods. Strong cooperation between different partners is one method of open innovation and it allows using resources more effectively. More abstract level collaboration creates trust in society.

Partnership and collaboration network can be created with long-period perspective but as Eskelinen brings out, the ecosystem might be temporary *ad hoc*-ecosystem. Although sustainability is one key-characteristic, some living labs and therefore

[2] Good example here is Ericsson where co-creation is in competition form.
[3] Ekselinen refers to so-called beta-testing culture in Finland.

ecosystems might me created only for projects. Følstad (2008) disagrees, and claims the innovation is not achieved through short and fragmented project initiatives but through long-term innovation efforts involving cycles of gaining new insight and gathering experience of implemented solutions (Følstad 2008).

One of most mentioned aspect of Living Labs is real-life setting for experimentation, testing and validation. Living Lab concept requires familiar context instead typical sterile laboratory. The aim is to create as authentic use situation as possible (Bergvall-Kåreborn 2009, Markopoulos et al 2000). Familiar contexts of use may be real-world contexts or simulations (Følstad 2008). The real-life testing validates the results more strongly.

The CEO of Forum Virium (Helsinki Living Lab) Jarmo E. Eskelinen emphasises that loose concept of living labs is not supported among well-functioning living labs. Strong concept of living lab should be the purpose when starting to create and develop a living lab. The aim should be the acceptance and trust among international partners and other living labs. All mentioned four criteria must be met. The case where user is engaged into innovation process but the testing still takes place in typical testing-lab, should not be called living lab. Still, it must be mentioned that many so-called "living labs" don't meet the main characteristics exists. (Eskelinen 2009)

To conclude why one (small) country should support this new methodology and use Living Labs as innovation policy instrument, four main subjects can be brought out. First, raising users the awareness and willingness to contribute as co-creators leads to testing and co-creation culture for more innovative and active society. Open innovation helps to improve allocation of resources. Multi-partnering ecosystem rises the trust in society and reduces double-spending on the same resource. The real-life context should be in favour to insure that the services created, perhaps on public sector demand, rise citizens welfare.

The rapid spread of living labs and European experience

The concept of living labs was developed in end of 1990s by W.J. Mitchell at MIT, USA. Through changes in Nokia product development processes Living Lab rapidly moved to Finland, where support and enthusiasm of Finnish Technology Fond TEKES has facilitated spread of living labs approach not only in Finland but in other Nordic countries. Due to the efforts of the European Commission the concept has found its place in the European innovation policy. (Niitamo 2009) In Europe, where social services are mostly provided by central or local governments the focus of living labs tends to be in the field of public social services. Thought, the fields of possible implementation sectors are not limited.

In 2006 the European Network of Living Labs (ENoLL) was founded and by the end of 2009 already 129 European living labs had joined with this network. Several industrial ICT Living Lab initiatives are represented in Living Labs Europe (LLE). Not all working living labs can be found at ENoLL or LLE, for example Finland has

its own local network and the number of living labs in the country exceeds 57 (Eskelinen 2009). Agreeing to Almirall's study, authors consider Finland to be the most active and effective country in using living labs. Finnish expertise is broad and the fact that Finns are open to share their expertise and knowledge about living labs should not be undervalued. Still, attention must be paid to the differences, e.g. in financing of social public services. By the specific field or forms of cooperation the best practises can be looked for also elsewhere in Western Europe. Almirall (2008) study brings out as following countries or regions: Sweden, Flandes (Belgium), Finland, Catalonia and Holland. Eastern Europe is still touching the ground and making its first steps in 2009-2010.

Distinguishing pattern occurs analysing the spread of living labs between academia, public and private sector. Living labs started from academia; through global corporation it gained interest and support from public sector. Public sector has its focus more to social services and SMEs. The concept has captured the attention on all levels.

As public sector, SMEs and global corporations act on different levels and with different goals the same methods of living labs can't be applied mostly. Big companies (e.g. Nokia, 3M, and Ericsson) have created their own real-life context labs, called as beta-labs, where similar concept is applied. The difference is that they don't need public sector as mediator. Having the resources the user-involvement can be taken to the highest level. For example Ericsson is having contests where users are programming applications, not just using and testing the existing ones (Ericsson). When it comes to public sector and SMEs such a level of co-creation should not be expected. Innovation policy must consider this aspect: although users' co-creation is one main pillar of living labs, there are different levels of users' engagement, and the adequate one should be expected from different living labs.

Types of living labs

A high level of heterogeneity occurs among existing Living Labs. Due to their various entities, it's not adequate to compare and evaluate all of them in the same basis and with the same indicators. Segregation and categorization is needed. Author studied information about 68 randomly chosen European living labs. Published information at ENoLL homepage about different living labs varies greatly, but abstract conclusions can be made.

Niitamo's (2009) "layers of living labs" can be used to divide living labs into four groups. Studying existing living labs author noticed two main dimensions characterizing a living lab: 1) the level of specialization and 2) the form/type/entity of living lab. Niitamo presents layers of living labs: human, usage, local and thematic level. Human level refers to neighbourhoods or self organising virtual Living Labs. Usage level includes testbeds and other trial platforms. On the local level the main actor is local innovation service provider. Thematic level is network of thematic Living Labs. These levels can be used if we have rather clear-cut living

labs, e.g. city as a living lab (Amsterdam) or it is specialized on mobile-sector but doesn't have certain region.

We noticed two main dimensions characterizing a living lab: 1) the level of specialization and 2) the entity of living lab. Based on introducing leafs, authors grouped Living Labs in these dimensions. The third dimension to add here would be the level of user engagement. Unfortunately, this information is not so easily accessible and must be studied separately. Therefore we focus on the two first ones.

In terms of specialisation, Living Labs have chosen different scope. Based on 68 randomly chosen European living labs authors were able to distinguish four different levels:
1) one specific focus – e.g. mobile-services
2) whole sector – mostly ICT
3) some areas, mostly not similar.
4) all sectors – no specialization, aim to create innovative environment.

About 30% of living labs concentrate on one specific area in ICT – for example on mobile-services, logistics, media, e-tourism or e-health. Yet 24% state their field something else, e.g. agricultural sector or automotive industry. Must be mentioned that in general ICT is the basis in every Living Labs; for many it is tool to develop other sectors, for some it is object. One-fourth of living labs operate in many sectors. And finally there are living labs aim to create general innovative environment where different services or products could be developed. About fifth of living labs have no specialization to concrete sectors.

Report "Study on the potential of the Living Labs approach" for European Commission brings out the rationale seems as following: in order to create business value for stakeholders, Living Labs should develop a specific set of knowledge, expertise and capabilities according to the specific stage of the value chain they want to play into. The report suggests that "un-specialised" Living Labs tend to have more difficulties in being successful. (Study on... 2009)

Another important aspect to know about living lab: how it is managed, the number of partners, the type of host organisation. Most but not all of ENoLL's members are public-private-partnership coming from academia or city innovation promotion agencies. Therefore they are relatively small organisations in coordinator roles between academia, users, companies and public agencies. (Almirall 2008)

This dimension could be called the type or form of living lab. The main types of living labs in Europe are (Study on...): single sector business association, open Innovation prone enterprise, policy-driven government initiative, network-oriented university spin-off, high-tech R&D laboratory, business services provider.

Authors have found seven groups; in the bracket the per cent of all studied living labs is given:
1) Business associations (SMEs) (15%),

2) public institutions/organisations (e.g. airport, hospital) (1%),
3) certain regions or towns (25%),
4) university projects and spin-offs (24%),
5) consortium of universities (6%),
6) clusters and Techno Parks (22%),
7) full-scale living lab co-operation and networks (7%).

These two segregations overlap partly.

One-fourth of European living labs aim to develop certain region or town. Although the co-operation behind different regional living labs might vary, mostly they are public-private-partnerships coming from city/regional innovation promotion agencies. As this group is distinguishing, it is justified to emphasise this type of living labs with this label.

About fifth of living labs regard themselves as clusters or techno parks. It is likely to become a trend to develop existing cluster, Techno Parks or Science Park towards living lab adding the user-driven innovation aspect to current operations.

Authors find it crucial to bring out one specific group of living labs – where living labs operate on full-scale. This means that Living Lab has strong stakeholders: industry partners, scientific partners, international research partners, national and regional research promotion agencies, national/local innovation agencies, and user groups who act as co-innovators. It can be argued that the other groups might have all these different stakeholders as well and function at top level. However, there are some living labs that stick out with stronger open innovation orientation and ecosystems. These partnerships and organisations operate on larger scale than the other types of living labs.

In the following Table 1 the distribution of living labs framed by specialisation and entity of living labs are provided. It clearly mirrors the heterogeneity of living labs.

Table 1. Types of Living Labs (per cent of all studied Living Labs)

The entity of Living Lab	**The level of specialization**			
	one specific field	**sector**	**many areas, mostly not similar**	**no specia-lization**
private firms	7%	4%	1%	1%
public institutions/organisations				1%
certain regions or towns	7%	3%	7%	7%
university projects, spin-offs	3%	7%	10%	3%
consortium of universities	3%	1%		1%
clusters and techno parks	4%	7%	6%	4%
full-scale	4%		1%	1%

Source: Authors calculations.

The question about preference for living labs type rises. Would it be more useful to establish living lab that has many universities as its partners and acts on many field or support private initiatives in the specific fields like mobile-sector? Or is it more useful if the cities and towns establish local living labs with certain regional partners?

Due to the lack of single widely accepted evaluation framework and existence of only few overall empirical studies so far, it is not fair to say that only certain type of living labs should be supported by state. All depends on the context and the aim of living lab. However, the report "Study on ..." refers that business services provider profile typically does not disclose a high number of successful trials, due to obvious confidentiality reasons (Study on... 2009).

Innovation policy should be supportive regarding to all types of initiatives. It cannot be said that some type of living labs are „wrong". It is wise to analyse every case separately: how they can prove their content, sustainability and ability to export the output. That doesn't exclude the possibility that state has its own preference and more financial support on some project or organisation, but the fact that other types of initiatives can also be successful and contribute to economy must be keep in mind.

Looking for best practises and perhaps role-models for possible establishment of similar living lab, close attention must be paid to some aspects. Variability and heterogeneity of living labs have a number of factors (Study on...):

1) Different interpretations of the concept
2) Different cultural and institutional contexts
3) Types of technological infrastructure available
4) A variety of business application domains/priorities
5) The nature and role of involved stakeholders

Hence, looking for best practises and role-models it must be studied closer how concrete organisation has interpreted the concept and what is the nature and role of involved stakeholders. Before establishing similar living lab cultural and institutional differences must be analysed, also if required type of technological infrastructure is available.

The choice of the areas for "livinglabbing"

Choosing the areas where apply living lab concept several aspects must be considered. There are some approaches to generate ideas and decide in which sector a living lab could be established or be supported more. We bring out steps to analyse potential fields. Additionally, a study was carried out among existing living labs to identify main obstacles occurred so far to obviate them establishing a living lab in Estonia.

Analysing fields where a living lab could be establish four groups of knowledge sources should be considered:

1. The public strategy and priorities for economic growth and development of certain sectors.
2. Global trends and recommendations by living lab experts and CEOs of functioning living labs.
3. Best practises from Europe.
4. Local existing co-operations/networks/product-developments that are "Living Lab-like".

With limited resources, a country has to choose in which sector contribute more; it is easier if national strategy is stated. If the knowledge about living lab is rather small within country, it is wise to listen to international experts who have worked for living labs and have seen closer which sectors might benefit more and where it might be too complicated to implement living lab concept. Many international experts (Niitamo, Eskelinen etc.) see the future of living labs in welfare, health and sports. In the healthcare the emphasis seems to be more in the preventive work rather than in the treatment. The main areas of Living Labs potential are suggested as following: wellbeing (including eHealth), eServices in Rural Areas, ICT for Energy Efficiency, eMobility and Transportation, eParticipation and eGovernance (Study on... 2009).

Another approach could be to adapt ideas which seem to function very well. One advantage in adapting best practises is the knowledge and experience these living labs already have. The diffusion of knowledge can lead to growth of the sector/area that is not the priority of the state. Studying existing living labs and their activities is good way to generate new ideas and possible directions for local living labs. We can look the countries that are role-models for Estonia, for example Finland and Netherlands. In Netherlands the focus of living labs is on following sectors: health and well being, energy and durability, mobility and workplace, regions-cities (Amsterdam, Leidem Rotterdam etc.) (Niitamo 2009).

Authors of the paper see potential also in the existing cooperation-networks, in so-called "Living Labs-likes", and upgrading their content towards to living labs. It is important to analyse the current situation in real life and find cooperation and innovation processes where many aspects and features of living labs already occur. The analysis should start with experts suggested areas and studying existing living labs and their activities. The reason to look for Living Lab-like" situation lies in the risk that always follows innovations, including methodological innovations.

Following selection steps must be analysed when choosing the concrete field for establishing a living labs in Estonia:

1. Global trends
2. Importance for Estonia
3. Competence and resources
4. Network of potential stakeholders
5. Potential for export, drive for selling

1. Global trends determine also the potential for export. Trade of results of innovation outcome should be one of main goals for the living lab. Therefore global trends and growing needs give evidential direction. Aging population is becoming the serious issue in industrialised countries, which brings healthcare and well-being sectors into focus. Concerning health the use of ecological food is growing trend. The development of ICT sector and people's expectation for convenience put pressure to public services to become quicker and easier to use. In above mentioned areas the feedback from the end-users seems to be useful source of innovation and living labs should be established. It could be also connected with the attempts to solve digital divide problems – living labs could help to understand barriers for elderly people in using e-solutions.

2. The importance for Estonia can be seen from different levels: importance for economy and international reputation or importance for local society. Whereas global trends must be followed, it is also important to pay attention to local needs. Living Lab is instrument to improve welfare of local citizens by providing better services and products.

3. By competence and resources we mean mainly competence and resources in ICT-sector. The specific ICT areas where Estonia has advantage should be exploited. Essential resource for living labs is end-user community. Here Estonia has advantage – Estonians are used to comfortable public services through ICT.

When it comes establishing a living lab it must be noted that innovation is output of knowledge process that requires learning. Introducing and implementing new innovation system and way of thinking takes time and learning. In general, the radical innovation means more risks whereas incremental innovation is seen as way to implement new changes step-by-step and by that reducing the risk. To gain experiences and expertise and to realise the deeper meaning of the concept, it seems reasonable to start with current potential – analysing existing networks and co-operations, bring out their weaknesses and „loose" aspects, and developing it towards strong living labs.

4. Living lab brings together different stakeholders: business sector, academia, public sector and end-user community. Beforehand different forms of living labs were brought to show the heterogeneity of living labs. One reason of heterogeneity of living labs lies in the variability of stakeholders and host organisation. Although a living lab could combine few up to hundreds of organisations or firms, it is clear that system only can work if concrete organisation is responsible for the coordination of living lab. This is likely to be the organisation that most benefits from the outcome or is most interested that living lab is operating. We see here the producer or service provider who is directly interested in turnover and profit. In terms of public social services local government or local or national innovation agency could be that responsible host organisation.

5. The success of Living Lab can be determined by how many new products and services are created and successful in the market. The effort put in innovation

process and living lab system must result with innovation. For Estonia, or any other small country, it is rather crucial that created products and services would be internationally tradable.

Critical issues in the process of implementing living labs

Authors of the paper carried out short study to identify main obstacles when establishing and operating a living lab. Structured written interviews were carried out among existing living labs, members of ENoLL.

Following obstacles were brought out (look Table 2 as well):

- Overall confusion what is essence of the Living Lab as a scientific methodology. Different approaches to concept and therefore different expectations.
- How to find long-term funding, i.e. a stable business model.
- How to motivate users.
- The feedback and contribution of end-users is not taken into account by the companies.
- How to keep the system together - having user community on one side and having real commitments from partners working in the Living lab on the other.

In table 2 we bring out the possible action to obviate these problems.

Table 2. Obstacles in the process of implementing living labs and possible actions to prevent them

Obstacles	Examples of actions to prevent these problems
Confusion with the concept	Extensive and intensive introduction of the concept and debates over the potential fields and establishment.
Long-term funding	Developing business model suitable for living lab.
Users' motivation	Engage users that are already motivated, establish living lab in a field where active user-community exists.
Feedback and users' contribution is not used	Involve producers who want to benefit from living lab in that sense.
Management of the system (collaboration)	Determine the responsible host organisation, transfer knowledge from other living labs.

We can conclude that for successfully functioning living lab there must be:

1) interest from stakeholders and willingness to contribute;
2) feedback system;
3) ability to change products and services.

Niitamo (2009) and Eskelinen (2009) bring out following critical issues: public procurement, the size of market, IPR issues, financing and mis-use of the concept. We explain these issues briefly.

- Public procurement. The problem of public procurement occurs in most of European countries, as well in Estonia – public procurement sets limits for innovations in public services. Two solutions have been brought out: 1) clearly state what needs to be done and in which order; 2) to figure some ceiling of the budget, which is allocated to the creation of innovative products. Firms might need extra financing to participate in the public procurement, this extra financing needs to be created in Europe. (Niitamo 2009)
- The size of markets. Living Labs includes open innovation and aim of living lab is to export created products and services. Despite of open-market in EU, hidden protection of local ICT sector can occur. Therefore the market can be rather small. This is the challenge for the whole Europe – to find mass-market right away, e.g. Brazil or China, to scale-up and earn back the investments. EU member states still find a way to say "no" and put-off other countries' developments, to create more work for local companies and ICT sector. Nordic-countries are more liberal in this term. (Niitamo 2009)
- IPR issues. The study on the potential of the Living Labs approach (2009) finds that the management of IPR issues is still in an experimentation phase. The study shows that only handful of living labs offer a wide range IPR related services and most define their IPR policies on a case-by-case basis. It is key-factor to raise awareness of IPR inside Living Las, among researchers and small entrepreneurs who do not have knowledge about legal aspects concerning innovation. (Study on... 2009)
- Financing. The issue of financing lies in question: who should pay for the innovation, for example in health-care? Although most European countries have innovation-agencies or technology funds, they don't have the funds and responsibility to develop healthcare in the country. As Eskelinen refers in Finland TEKES is not the one with the budget, the money comes from social/health ministry. Here again the issue of public procurement becomes obstacle for new creation of innovative services and products.
- The lack of researches and misuse of conception. The main threats concerning the rapid spread of living labs, is the possibility that created living labs are biased. The term or label "living lab" is rather popular in Europe, but the misuse and overuse can result in disappointment in the concept. As mentioned earlier, practitioners don't support the loose concept with missing parts, as this rather won't result in successful innovation.

Conclusion and recommendations for Estonia

So far Estonia has been rather passive and the enthusiasts who have tried to develop and implement living lab concept here have faced negative attitude from public sector. There are many different ways and directions for implementation of living labs. These different types and directions and evaluation of living labs needs further research and studies. Based on the previous analyses about the most promising areas

for living labs and identification of possible obstacles following general recommendation could be presented. The first recommendation for innovation policy builders is to use living labs as demand or user driven innovation policy instrument. Report made for European Commission states that user-driven open innovation should be acknowledged as a fundamental component of the EU and Member State /Regional R&D and innovation policies (Study on... 2009). As living labs have already spread quickly over Europe, Estonia should at least try to speak the same language in innovations with Europe.

Estonia has advantages as well weaknesses to establish living labs. Estonia has advantage in creating, improving and testing ICT services. Estonians are used to use different e- and m-services; they are conscious of those solutions and represent therefore rather demanding group of end-users. The use of living labs as the instruments, which provides access to users and their motivation may give huge and needed advantage. Smallness of Estonia and hence the flexibility is also mentioned (Niitamo 2009) meaning e.g. that new e-services could be applied quicker in wider scale. The smallness and possibility to attract almost whole population to testing, is the main advantage. This advantage, yet one pillar of living lab, should be exploited. It means that the whole country could be used as the test-bed for several e-services (e-voting, e-tax system, e-prescriptions in drug-stores etc.

One of the weaknesses is the overall passivity about new concept so far. It has been brought out that so far public sector has had strong confrontation about creating living lab in Estonia. (Katri-Liis Lepik 2009) The similar situation has been in most of Eastern Europe. But Niitamo suggests that "livinglabbing" could take place even without labelling and public support. Additionally there is certain confusion about the concept itself among existing living labs and over-realistic expectations and interpretations could lead to the disappointment about the concept. There is a need for wider introduction for living labs and further debate about best possible implementation. Innovation awareness is the starting point.

Eskelinen (2009) sees Estonia as very quickly developing country that takes over and adapts new ways providing services. Democracy and flat-society are the preconditions for user-driven services and service-driven societies. Eskelinen suggests that Estonia should look Finland, but with notion how cities and towns have the responsibility for most of social services. (Eskelinen 2009) However, we must remember that every country has added living labs to its unique national innovation system. The differences in NISs must be analysed before copying any successful living lab. As Estonia lacks of knowledge about living labs and establishing one, international best practises and experts should be used.

From global trends we see three areas to which Estonia should pay closer attention: healthcare and well-being, ecological food, public services through ICT. All these areas becoming more important globally, therefore having more export-potential, as well are relevant also on the local level. Estonia current competence appears to be best in public services- e.g. E-Tax Board, e-banking, m-parking, m-ticket, e-receipt, e-school. There are already many e-services that show our strong competence in this

field. Concerning ecological food, Estonia has a major resource – plenty of arable land, which is saved from fertilisers last 20 years, but lack of knowledge is problem so far. This is another area where living lab is a potential instrument for development and source for innovation. Healthcare and well-being is wide sector, we must find specific niche to exploit best our competence and resources as well the needs on international market.

Estonian potential and competence in ICT sector shows the direction for the future. Estonian Development Fond's (EDF) report EST_IT@2018 has stated the strategy in ICT sector until year 2018. According to EDF report EST_IT@2018 the sectors where Estonia must focus in ICT are following: education, healthcare, industry, energy/energetic, finance services and ICT security. Where the first four are important societal and economical challenges and in two latter ones Estonia has higher level of competence. In terms of financial services the ICT competence in Estonia is high, higher than in other sectors. (Tiits *et al.* 2009) The same report states the plan to implement living lab by spring 2010 in Tallinn, focusing and specialising on financial services.

We can find many Nordic Living Labs whose activity could be also applied in Estonia, e.g. in mobile-service, tracking people' moving / positioning. As well we can find many regions or towns that act as living labs. This practise can also be applied to Estonia, e.g. in Tartu or Tallinn. From the previous practises one interesting idea can be brought out – airport as the living lab. Lennart Meri Tallinn Airport is small but one of the most innovative airports in Europe/world, but creating a living lab there is again rather radical yet doable.

Looking for "Living Lab-like" organisations in Estonia, mobile-sector is frontrunner. It has been claimed (according to Helsinki Mobile Monday) that Estonia has already become mobile development lab in Europe. Whereas network of six partners work under mKlaster, there are crucial problems with the export of innovations when it comes to open innovation. The paradox in mKlaster lies in the fact that in spite of many world leading m-services and m-solutions are created – the export of those services to other markets is very limited (Tõnisson 2009). Mobile-services in ICT are one of potential sectors in Estonia. Still it has many obstacles, as many countries try to protect and develop their own mobile-sector; from the positive side there are many examples to learn from in term of living labs.

Aiming the establishment of living labs to be most efficacious in long-run, the focus should be on societal and economical challenges, both on local as well on European future problems. On the other hand, in order to reach higher export propensity of innovations from living labs Estonia should pay attention to the areas, where it has already shown its competence. As an example the ICT competence in financial services is high in Estonia and living labs in this field could help to increase international tradability of those services.

The precondition for the wider use of living labs is the promotion of cooperation between firms, public sector and consumers. Those measures should be more visible

among the list of innovation policy tools used by Enterprise Estonia, the major promotion organisation in Estonia. In Estonia the attention should be paid to national strategy and priorities, the living lab will be created to „green-field" from the scratch - in this case more research needs to be done to justify the investments and effort and the use of living lab concept. It must be said that living lab is still immature-maturing concept that has not been studied thoroughly yet. However, to speak the same language with Europe in innovation policy, new innovation strategy must be supported along supporting the creation and diffusion on living labs.

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KUIDAS INNOVATSIOONIPOLIITIKAS ELUSLABORITE *(LIVING LABS*) KONTEKSTIS EUROOPAGA SAMA KEELT RÄÄKIDA?

Ave Lepik, Urmas Varblane
Tartu Ülikool

Käesoleval kümnendil on innovatsioonipoliitikas toimunud metodoloogiline innovatsioon – uus innovatsioone käsitlev kontseptsioon on leidnud laialdast rakendust praktikas ning tunnustust paljudes Euroopa riikides.

Eluslabori (*living lab*) mõiste võib tähistada nii teatud metodoloogiat innovatsioonisüsteemi käsitlemisel kui organisatsiooni, mis seda praktiliselt kasutab. Eluslabori sisuks on lühidalt kasutaja-põhine avatud innovatsioon reaalse elu keskkonnas. Lõppkasutaja kaasamist aktiivse kaas-loojana innovatsiooniprotsessi nähakse eeldusena Euroopa üldise innovaatilisuse ja konkurentsivõime tõstmisele. Seetõttu kogub platvorm järjest enam toetust ka Euroopa Komisjonis ning leiab rakendust uutes riikides (olenevalt riigist ka struktuurifondide toetusel) ning valdkondades.

Artikli eesmärgiks on anda soovitusi eluslabori kontseptsiooni rakendamiseks Eestis või mõnes teises (väike)riigis, kus senine praktika selles valdkonnas puudub või on ühekülgne. Eluslabori põhijoonte tutvustamine ning põhikriteeriumite välja toomine annab üldpildi, millises suunas innovatsiooniprotsess peaks liikuma. Eeskujude leidmiseks antakse ülevaade eluslaborite kontseptsiooni levikust Euroopa riikides ning kategoriseeritakse erinevaid eluslabori vorme. Samuti analüüsitakse võimalike valdkondade/sektorite eelistamist ning lähenemisi eluslabori loomisele. Lisaks soovitustele tuuakse välja ka peamised piirangud, mis võivad esialgset elulabori kasutamise entusiasmi jahutada. Artikkel tugineb kahele autorite poolt läbi viidud uuringule: 1) 68 Euroopa Eluslaborite Võrgustiku (ENoLL) liikme kohta kättesaadava info põhjal viidi läbi eluslaborite kategoriseerimine; 2) peamiste probleemide ja takistuste tuvasatmiseks viidi läbi küsitlus/intervjuud kõigi 128 EnoLLi kuuluva eluslabori seas. Lisaks viidi läbi intervjuud ENoLL presidendi Veli-Pekka Niitamo ja Helsinki Virium Forum tegevjuhi Jarmo Eskelineniga.

Eluslabori mõiste ja alustalad

Eluslabor on avatud innovatsiooni keskkond päriselu elementidega, kus kasutaja-põhine innovatsioon on koos-loome protsess uutele teenustele, toodetele ja sotsiaalsele infrastruktuurile. Eluslabor peab vastama neljale kriteeriumile: 1) tegelike tarbijate kogukonnale ligipääs ja nende kaasamine innovatsiooniloomesse ehk kasutaja-põhisus; 2) avatud innovatsiooni mõtteviisi kasutamine; 3) multi-partnerluse suhetesüsteemi arendamine; 4) reaal-elu keskkond uuenduste katsetamiseks. Kõige eripärasemate joontena võib välja tuua lõppkasutaja kaasamise aktiivse osapoolena ehk tarbija kui objekt muudetakse subjektiks. Samuti asjaolu, et kogu protsess, mil tarbija innovatsiooniloomisesse on kaasatud (katsetamine, tagasiside andmine jne.), peab toimuma reaalse elu kontekstis, mitte tüüpilises laboris.

Igapäevaselt eluslabori juhtimisega tegelev Jarmo E. Eskelinen, Helsinki Forum Virium eluslabori tegevjuht, rõhutab, et niiöelda „lõdva eluslabori" kontseptsiooni kasutamist praktikud ei pooldata. Seega tuleb eesmärgiks võtta kohe „tugeva" eluslabori loomine, et saavutada usaldus riigi eluslaborite vastu rahvusvaheliselt ning aktsepteerimine välispartnerite poolt. Täidetud peavad olema kõik neli kriteeriumit. Olukorda, kus tarbija on rohkem kaasatud kui varem, aga peab näiteks uut toodet proovima tüüpilises katselaboris, ei saa nimetada eluslaboriks. Artiklis on välja toodud teisedki eluslaboreid iseloomustavad vajalikud võtmeelemendid ja aspektid, mis tuleb eluslabori loomisel põhjalikult läbi mõelda ning paika panna.

Eluslaborite kiire levik ja Euroopa senine kogemus

Euroopasse jõudis USAs 1990ndate lõpul esmakordselt kasutusele võetud metodoloogia 2000. aastal läbi Nokia tootearenduspoliitika muutumise. Tänu Soome Tehnoloogia Fondi TEKESe toetusele ja lobby-tööle on kontseptsioon saanud ka Euroopa Komisjoni poolehoiu osaliseks. Euroopas, kus sotsiaalsed teenused on enamasti riigi või kohaliku omavalitsuse vastutusel, on eluslaborite rakendamise suund samuti eelkõige avalike sotsiaalsetel teenustel. Samas ei ole need selle valdkonnaga loomulikult piiratud. 2006. aastal loodi ametlik Euroopa Eluslaborit Võrgustik (ENoLL), kuhu 2009 aasta lõpuseisuga, enne neljandat ühinemisvooru, kuulus 129 Euroopa eluslaborit. Eeldatakse, et neljanda ühinemisvooruga lisandub topeltarv uusi eluslaboreid kui kolmanda ühinemisvooru ajal.

Riikidest võib eluslaborite loomisel eeskujuks võtta eelkõige Soomest, samas tuleb arvestada erinevusi näiteks sotsiaalsete avalike teenuste finantseerimises. Soome on eluslaborite rakendamisel ilmselt kõige aktiivsem ja efektiivsem riik, omades kõige laiapõhjalisemat kogemust. Samuti on jõutud eluslaborite arenemisel faasi, kus riigis toimib kohalike eluslaborite võrgustik. Vähem tähtis ei ole ka asjaolu, et soomlased on avatud oma tegemistest rääkima ja teadmust eluslaboritest jagama. Vastavalt valdkonna spetsiifikale või koostöövormile võib parimaid praktikaid otsida loomulikult ka Lääne-Euroopast. Ida-Euroopa teeb 2009-2010 aastal alles esimesi samme.

Tutvudes erinevate Euroopa eluslaborite tegevusvaldkondadega ning tegutsemis-vormidega, ilmnes, et need on väga eripalgelised ning võrdlemine ja hindamine ühtsetel alustel ei ole adekvaatne. Eluslaborite kategooriaid ei ole varem esitatud, seega on artiklis esitatud kategooriad autori nägemus, mis on vaid üks võimalik liigitus. Vaadeldakse kahte dimensiooni: 1) spetsialiseerumise tase (kas eluslabor on keskendunud ühele kitsale valdkonnale või tegeleb paljude suundadega); 2) eluslabori tegutsemisvormi (nt. eraettevõte, ülikoolide konsortsium, linn või regioon jne).

Tekib küsimus, millist erinevat eluslaboritüüpi eelistada: kas võimalikult paljude partneritega ülikooli juhitud konsortsiumit erinevates valdkondades või eraalgatust väga konkreetses valdkonnas või hoopis linna soovi arendada kõikvõimalikke sotsiaalseid avalikke teenuseid koostöös teatud hulga partneritega? On raske luua

ühtset hindamisalust kõigi eluslaborite edukuse mõõtmiseks ja öelda mis tüüpi eluslaborit eelistada. Hindamisel tuleb arvestada konteksti ja eluslabori eesmärki.

Autor on arvamusel, et riikliku innovatsioonipoliitika tasemel, ei tohiks karme piiranguid seada ning avalikult eelistada ja toetada vaid teatud tüüpi algatusi. Ei saa öelda, et mõnda tüüpi eluslabor oleks „vale". Pigem tuleb analüüsida igat juhtumit eraldi, kas algatus suudab tõestada oma sisu ja potentsiaali eksportida innovatsiooni väljundit. Loomulikult võib riik seada oma prioriteedid, kuhu ise rohkem panustada, kuid samas võib majanduslikult väga edukas olla mõni teist tüüpi algatus.

Rakendamise suuna valimine

Kuigi eelmises punktis leiti, et ei saa öelda, et ühte tüüpi eluslaborid on kindlasti edukamad ja kasulikumad, siis teatud erinevad lähenemised, mille põhjal analüüsida eluslabori valiku suunda, võib siiski välja tuua. Autori arvates on kolm peamist viisi kuidas valida, millises sektoris avaliku sektori poolt eluslaborit luua ja toetada. Esiteks võib lähtuda riigi prioriteetidest majandussektori valikul, teiseks eluslaborite ekspertide ja praktikute arvamusest ning kolmandaks reaalses elus toimuvast ehk kus ollakse juba kõige lähemal eluslabori sisule.

Eesti puhul on riigi prioriteetseks suunaks, ka eluslabori loomise plaan olemas 2010 aasta kevadeks, finantsteenuste arendamine. Välisekspertide arvates on kõige olulisem valdkond heaolu, tervishoid ja sport. Ühe suure projektina on välja toodud Tehvandi spordikeskuse potentsiaali eluslaborina. Kolmanda suunana soovitab autor pöörata suuremat tähelepanu juba olemasolevatele koostöövõrgustikele ja nende sisu arendamisele. Näitena võib tuua mobiiliteenuste arendamise Tartus, samuti Euregio senised pingutused eluslabori loomisel.

Innovatsioon on teadmusprotsessi väljund ehk eeldab õppimist. Samamoodi ka ühe võimaliku innovatsioonisüsteemi ja -mõtteviisi juurutamine – see võtab aega ning tuleb arvestada õpikõverat. Ei saa unustada et radikaalse innovatsiooniga kaasneb enamasti suurem risk järkjärgulisi muutusi on kergem ellu viia. Kogemuse saamiseks ning kontseptsiooni sügavamaks mõistmiseks, tundub igati mõistlik alustada olemasolevate potentsiaaliga ettevõtete, organisatsioonide, võrgustike analüüsimisest ning nende nõrkade või puudulike aspektide arendamisest.

Nende kahe dimensiooni kombinatsioonidest saab erinevaid suundi eluslabori valdkonna ja loomise-arendamise valikul. Kõige suuremat muutust ja poliitilist otsust nõuaks ilmselt EnoLLi presidendi Veli-Pekka Niitamo välja pakutud Tehvandi idee Soome suusatunneli eeskujul. Eesti mõistes oleks see radikaalne suund, mis hetkel ei ole ka riigi prioriteediks. Kuigi tegemist on väga huvitava ideega tulevikuks.

Eesti tugevused ja nõrkused eluslabori rakendamiseks

Kui hinnata Eesti valmisolekut eluslabori kontseptsiooni rakendamiseks, siis esimesena tuleb peatuda neljal „must" kriteeriumil. IKT teenuste arendamisel ja

katsetamisel on Eestil eelis – inimesed on e- ja m-teenuste suhtes teadlikud, nõudlikud ning on harjumus erinevaid teenuseid kasutada. Seega ligipääs kasutajatele ning nende motiveerimine annavad suured eelise. Eesti positiivsete külgedena tuuakse veel välja paindlikkus.

Peamiseks nõrkuseks on olnud senine passiivsus, eluslabori kontseptsiooni tutvustav esimene ajakirjanduslik artikkel ilmus ajakirjas HEI septembris 2009 ning ettekannetega tutvustus mõtete tekitamiseks väiksemas ringis 18.detsember 2009. Vastuseis Eestis livinglabi loomisele on peamiselt avaliku sektori poolt.

Piirangud ja ohud ning kriitika eluslaborite kohta

Eluslabor eeldab avatud innovatsiooni ning üheks soovitud tulemuseks on teenuste-toodete eksport, siis teiste riikide bürokraatia ja oma ettevõtete kaitse võivad seada tõsiseid takistusi selleks. See on väljakutse kogu Euroopale – leida kohe massturg, nt Brasiilia või Hiina, et investeeringud tagasi teenida. EL liikmesriigid leiavad ikka ettekäändeid kuidas tekitada tööd oma kohalikele arendajatele ja IKT sektorile. Põhjamaad on siiski selles suhtes liberaalsemad.

Peamiseks ohuks eluslabori kiirel kasutusele võtmisel on puudulike osadega eluslaborite teke. Mõiste on Euroopas populaarne, kuid selle vale- ja liigkasutus võib tekitada lõpuks pettumust kontseptsioonis. Nagu eelpool mainitud, ei poolda praktikud puudulike osadega eluslaborite teke, mis ei vii innovatsioonideni.

Küsimus on selles, kes peaks maksma innovatsioonide eest näiteks tervishoius jne. heaolu-tervise valdkonnas. Ka Soomes ei ole peamine rahastamisallikas mitte TEKES või mõni muu innovatsiooniagentuur, vaid selleks on Sotsiaal/tervise-ministeerium. Aga siinkohal tekivad mitmed takistused, mis takistavad neil võtmast riski innovatsioonide ergutamisel teenuste vallas.

Sarnaselt Eestiga on riigihangetega seotud probleem takistuseks ka teistes riikides. Kui riigihangetel võisteldakse hinna alusel, siis ei pakuta uusi innovaatilisi lahendusi. Lahenduseks pakutakse välja: 1) kõigepeal vaja kindlaks teha, mida on vaja saavutada, ja siis tellida see; 2) panna konkreetne osa eelarvest uute innovaatilistele toodetele. Ettevõttele võib olla vaja lisafinantseerimist, et saaks riigihangetel osaleda. See lisafinantseerimine on vaja Euroopas luua.

Kokkuvõte

Senini on Eesti olnud passiivne ning eluslabori kui uue innovatsioonisuuna entusiastid on avaliku sektori poolt kohanud pigem vastuseisu. Ei tohi piirata mõttega, et olemas on ainult üks õige tee eluslaborite loomiseks Eestis, eluslaborite rakendamisel on mitmeid võimalusi ja suundi. Need erinevad tüübid ja suunad ning eluslaborite hindamine vajab veel edasist uurimist. Eluslaborite toetamine peab olema majanduspoliitiline otsus, sest Eestis on juba aastaid koostöös Helsingi LivingLabiga midagi teha, aga ei ole kohalikku toetust ja Nokia arendusdirektori sõnul hakkab entusiasm otsa saama.

Eesti puhul tuleks tähelepanu pöörata nii riiklikele prioriteetidele, mis võibolla eeldavad täiesti tühjalt kohalt eluslabori loomist – sellisel juhul tuleb veel põhjalikumalt uurida, kas investeeringud ja energia kulutamine on õigustatud. Järkjärgulise metodoloogilise innovatsioonina näeb autor olemasolevate eluslaboritele lähedasemate suhtevõrgustike ja ettevõtete arendamist. Kuigi tuleb tunnistada, et tegemist on veel pigem ebaküpse kontseptsiooniga, mida ei ole jõutud põhjalikult uurida. Siiski tuleks ka Eestis selleks, et suudaksime innovatsioonipoliitikas Euroopaga sama murret rääkida, toetada eluslaborite teket ja levikut.