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Introducing Living Lab's Method as Knowledge Transfer from one Socio-Institutional Context to another: Evidence from Helsinki-Tallinn Cross-Border Region

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Abstract: The present article aims to describe the Living Lab's method as a method innovation in institutional activities and the problems of taking this innovation into use. Possibilities to transfer the Living Lab's method from one country, Finland, to other, Estonia, potential implementation fields and obstacles are studied. Considerations on the process of utilising the Living Lab's method in Tallinn are given. Living Lab's is a human-centric research and development approach in which new technologies are co-created, tested, and evaluated in the users' own private context. This method is coming into use in several countries among which Finland is in the forefront but is not yet in use in Tallinn, Estonia. The empirical part of the research is based on the analyses of fourteen interviews conducted among Tallinn and Helsinki city officials, representatives of technology enterprises, experts of the fields that are internationally most wide-spread Living Labs' testing grounds, using structured interviews and discussions. The article concludes by discussing possibilities to use the Living Lab's method in enhancing Helsinki-Tallinn cross-border co-operation and thus metropolitan regional integration.

Keywords: cross-border co-operation, Living Lab, Living Lab's method, open innovation, Helsinki-Tallinn Euregio, knowledge transfer, method innovation
Category: M.0

1 Introduction

Living Labs is a human-centric research and development approach in which new technologies are co-created, tested, and evaluated in the users' own private context.

In practice the Living Lab phenomena can be viewed in different ways, as a special environment for innovations, as a quite general approach and as a method. The process of taking it into use is a complex process with many stakeholders. In this paper, the perspective taken is Living Lab as a method with concrete characteristics. The method of Living Labs started to emerge around Europe in 2000. Presently, it is only in the process of formulation and hence listing of its main features and demands

proceeding from them requires additional separate work. The authors study how to transfer this complicated and developing method including different counterparts from one cultural environment to another and where the obstacles occur. As the phenomenon of transfer of innovations from one user (early adaptor) to another is vastly covered by literature since Rogers' classical surveys [Rogers 2003], transfer of innovations from one state or cultural environment to another is less studied, but still studies are available [Koren 2006, Chesbrough 2003]. The object of these studies is usually the spontaneous spread of innovation. In this article authors study the method's innovation under conditions where a special institution created to enhance cross-border transfer of knowledge – Helsinki-Tallinn Euregio - is in existence and is a part of the process of assisting in creation of such an environment. Rogers proposes that innovation phases include awareness raising, interest, evaluation, trial, and adoption. Helsinki-Tallinn Euregio aims at shortening innovation phases described by Rogers. The article concludes by presenting strategies and tools this institution could use to enhance the faster spread of Living Labs' method in Tallinn, Estonia.

Helsinki-Tallinn Euregio, a cross-border cooperation institution, has some experience in using the "triple-helix principle" in its cross-border activities, but the Living Labs' method has been inaccessible for the organization so far, as the method is well-used in Finland - in Helsinki there were registered 7 Living Labs in 2009 [Helsinki LL 2009] and not known in Estonia. Relying on the Finnish experience and studying the reasons for economic success of Finland it is visible that there has been consensus in Finland on goal-oriented innovation's environment development for about 10 years: well developed institutions, systematic development of innovation environment and attention to R&D [Hautamäki 2008] The authors presume that transfer of Living Labs' method to Estonia might open up innovation processes, facilitating user involvement and also facilitating citizens' democratic involvement in developing their living and working environment and services.

As the authors have long-time experiences in facilitating co-operation in Helsinki-Tallinn metropolitan region, suggestions for the utilisation of the Living Labs method in parts 5 and 6 of this article are based on the special research based on the interviews, but also on the authors' experiences and results from numerous other discussions with stakeholders.

2 Living Lab Phenomenon – Some Theoretical Considerations

According to Ståhlbröst [Ståhlbröst 2008], the concept of Living Labs started to develop in the late 1990s and one of the first institutions to mention it was the Georgia Institute of Technology, where the technology was developed for capturing a live experience from an educational situation and then provide it to users for later access and review [Abowd 1999]. By Veli-Pekka Niitamo [Nokia 2009] the term of the Living Labs was first used by Professor Bill Mitchell, MIT, Boston, around 1995. Other areas where Living Labs have been used as a concept have been in tests of new technologies in home-like constructed environments [Markopoulos 2000]. Since then, the concept has grown and, today, one precondition in Living Lab activities is that they are situated in real-world contexts, not constructed laboratory settings.

In Living Labs the activities go around the clock, since the user involvement process is situated in users' real-life everyday context [Eriksson 2005]. With such an

approach, it follows that users are involved actively in development processes in their own context; hence, the users are facilitated to communicate their needs and requirements on the basis of their everyday experiences. It is assumed that the development and innovation process should be open for all relevant and interested stakeholders. This is influenced by the open innovation approach posed by Chesbrough [Chesbrough 2003], and by the emerging Web 2.0 approach, aiming to facilitate creativity, information sharing, and, collaboration among users [Dearstyne 2007; Leibs 2008; Walters 2007].

Another important aspect of a Living Labs environment is the "living" aspect - people involved in any development project live with the process and constantly check how the process proceeds. Eriksson and others [Eriksson 2005] define Living Labs as a research and development methodology whereby innovations, such as services, products, and application enhancements, are created and validated in collaborative, multi-contextual empirical real-world settings. This definition implies that humans are considered as the collaborative sources of innovation, not merely involved for testing and validating products and services. Inherent in this definition is the assumption that the involvement processes should be carried out in real-world settings and in close connection to research. In this definition, the perspective of Living Labs is that it is a methodology.

Living Labs are considered as a new character in a chain of open innovation. Open innovation needs different mindset and company culture than traditional or closed innovation. In Nokia presentation [Nokia 2005] the end users are considered as co-creators, and user-driven innovation is understood as human-centric innovation. According to Salmelin [Salmelin 2007] the object of Living Labs is societal innovation with technological innovation which indicates that the content is not testing any technological solution in any social environment, but to initiate change in social environment using technological means.

Today, Living Labs are "functional regions" where enabling actors have settled down PPP (Public-Private Partnership) of companies, public entities, universities, institutes and individuals. All these actors cooperate for the creation, prototyping, validation and testing of new services, products and systems in real-life environments. These environments may be towns, districts, villages or rural areas, as well as industrial zones. According to the study by Estonian Institute of Futures Studies [EIFS 2008] just a PPP is too narrow, the suggested expression is *public-business-citizen partnership* or *public-private-civic partnership.* A Living Lab is a system for building future economy in which real-life user-centric research and innovation will be a normal co-creation technique for new products, services and societal infrastructure. A Living Lab offers services which enables the users to take active part in research and innovation.

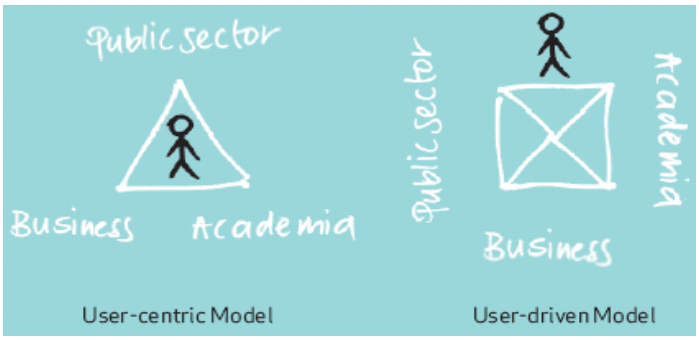

Figure 1: From user-centric to user-driven model (Helsinki LL 2009)

Living Lab is often related to the creation of technological systems for usage in urban environment and redesign of urban environments and the role of the public sector, namely the city government, is very important in this connection. The typical list of actors in the implementation of the method includes: communities as end-users of innovation processes, companies interested in innovations, especially technology enterprises, universities, research institutions and city government as the main goal setting partner in the process and an organiser. The Finnish experience shows that those technology enterprises that are interested in participation of working out new solutions in order to gain from multiplying them at a later stage are ready to contribute with their own financing if the environment and partners are motivated. Due to this fact, development costs are not too big for the city and the cooperation is useful to both sides. The city government and city departments have a strategic position in the implementation of the method in public services. If the city government is in the position of an initiator, they need to suggest the idea and provide financing for the process. A focused task and a well planned goal are the key success factors here and the technology enterprises (TEs) should not start working on random ideas.

3 Living Laboratories as Special Kind of Innovation

Living Labs are created in order to work out some innovations, but at the same time living labs constitute an innovation in working methods and in the system of cooperation of various stakeholders compared to the earlier methods in the field. Thus, it is possible to presume that obstacles that must be overcome when implementing the method are close to other innovations that are tackled in the framework of innovation theory.

Rogers [Rogers 2003] proposes that adopters of any new innovation or idea can be categorized as innovators, early adopters, early majority, late majority and laggards, based on the mathematically-based Bell curve. The introduction of an innovation goes through the following phases: awareness, interest, evaluation, trial, and adoption. Using these categories provides a common language for innovation

researchers. In our case of Living Lab in Tallinn we can position ourselves between the awareness raising stage and the interest. The Living Lab method's innovation is more complex than a product, technology or any other type of innovation as in Living Labs the technology and life-style are interwoven. Special institution like Helsinki-Tallinn Euregio serves in this case as a supporting institution for innovation cross-border transfer and speeding the process of moving from one innovation phase to the next one. The broader positive context includes the general Estonian-Finnish (Tallinn-Helsinki) knowledge transfer and exchange of experiences, which has given positive results in several fields and is generally valued well.

The method is still in development and this status of progress becomes especially important in case of transfer. Not only technology, but also ideology, knowledge, institutional cooperation experiences, and ways of thinking and acting need to be transferred. It also requires political support and enhancement of social networks.

4 Study of Living Lab's Method's Transferability and Implementation Peculiarities

After the study visits and seminars of leading city officials, politicians and ICT specialists aiming to introduce Helsinki and Finnish experiences of using the Living labs' method, the necessity for a study of the prerequisites and implementation potential in Tallinn arose. In the first half of 2008 a special diagnostic methodology was worked out that concentrated on the following main questions:

What could be the general presumptions in Tallinn to become a ground for implementation of the Living Labs method?

Which are the public service sectors in Tallinn where the living lab method could be adopted?

Which areas are considered as potential Living Lab environments?

Is there any potential and motivation of domestic technology enterprises and universities, technology parks and research institutions start to participate actively in potential Living Labs?

Do we find representatives of the local authorities in Tallinn ready to initiate and support the creation of Living Labs?

Can we count on the readiness of Tallinn citizens for active participation as the essence of the method presumes?

The study method was a semi-structured interview. (Annex 1) The interview program consisted of several blocks that contained main and additional sub-questions. The methodology enabled to change the sequence of the questions. It was presumed that the researchers can later classify the answers given to the questions, e.g. to differentiate more perspective fields of use from less perspective, differentiate the existence of preconditions from lack of preconditions to using the method. At the same time the aim of interviews was not only to get answers to the questions but to

stimulate the respondents to develop their own ideas and suggestions how to use the Living Labs method in Tallinn.

14 persons were interviewed, out of which 5 were representatives of high-level municipal officials, 9 were well-known experts of the ICT sector, most of them had had earlier co-operation with public sector, included municipal sector. The interviewees were in addition to the authors of the current article Ms Kyllike Tafel and Anna Murulauk from the Estonian Institute of Futures Studies. Interviews were recorded. An average length of the interview was 60 minutes.

In the following, we present the generalised answers to the before mentioned six questions and we also bring out these questions that generated more problems and interpretation options. We presume that bringing out communication difficulties, difficult questions, consciousness of researchers helps to understand the thinking schemes and clichés of the stake-holders and can be beneficial for researchers in the future.

The interviewees were generally optimistic considering Tallinn's suitability to use the Living Labs' method. As positive preconditions it was considered that in several communal fields it is possible to take the next step from existing "yesterday's and the-day-before" solutions to new "tomorrow and after-tomorrow" solutions, just omitting today's solutions. An exception here are ICT companies as Tallinn has acquired quite a leading position in this field. This might be a promising possibility for technology companies who could gain experience in scaling new solutions in several municipalities. It was brought out that city districts in Tallinn are very different which enables to test different systems.

Interviewees were of different opinion on the general innovativeness of the citizens as the precondition for using the Living Labs method. Those who were positive about the innovativeness of the citizens, pointed out that the Tallinn citizens are generally very positive about ICT-based solutions, also, the citizens have gone through big changes in employment and life-style, thus their level of innovativeness and trust towards new things cannot be low. Those who were negative pointed out that citizen from Central and Eastern Europe are less active in social interference than in for example Northern Europe and a significant part of younger, more active and successful citizens have moved out of the borders of Tallinn due to urban sprawl. Thus, perspectives for creating new systems lay in the hinterland new settlements rather than in traditional city districts.

Concerning the potential of different fields of Tallinn city life to use the Living Labs method, the viewpoints of interviewees was quite similar. Clearly, two fields were considered more potential: first, transportation and logistics, and second, media. A bit less was represented tourism management and providing security. All other fields were mentioned just once or twice. In transportation and logistics possibilities like creation of intelligent cross-roads, but also regulating movement on the main roads were favoured. In media (multimedia as means of communication, but also the traditional media and interactive new media) television and television based services were favoured by interviewees. New solutions suggested were massive mobile TV, Tallinn tagging, interdisciplinary solutions like new media festivals, new arts, new participatory methods in film producing, audiovisual performances to enlighten specific social/environmental problems and solutions.

Analysing the arguments of respondent preferences about the aforementioned fields we may conclude that they were based on the potential of achieving breakthrough using the Living Labs method rather than indicating that this field is problematic in comparison with other fields in Tallinn. This indicates that prioritising the fields was seen through the prism of perspective and usable technologies, i.e which high-tech companies exist in Tallinn/Estonia and how active they are. The most perspective technology for using the Living Labs method was overwhelmingly ICT (in some cases IT, in some cases info and telecommunication technologies were stressed). In some cases, also electronics and precision mechanics (different measurement and identification systems and optics) were indicated.

Technology experts tended to consider as the LL environment as a technology city or technopark type of environment: the Ülemiste Technology City where it is attempted to concentrate high-technology companies and connected service-companies was mentioned in the first place; or the Tallinn University of Technology Technology park, not fully understanding that solutions created in specific conditions of a technology city may not be multiplied in other districts. City officials tended to consider as the LL environment either functional systems like traffic magistrates or certain types of city districts or certain places where people gather in great numbers like business streets or centres.

Analysis of the protocols of the interviews indicates that there exists 8-9 different interpretations of LL environments: physically limited new city space (under construction) or settlement under reconstruction, already existing city district that is distinguished by concentration of certain type of citizens like ecologically orientated, older or younger than the average etc., some functional sub-system from the city space like the transportation system with main transportation channels and cross-roads; concentration of technology creators (individuals and companies), for example in a technology city, or some other criteria, like high number of visitors or by creative industries in densely inhabited city districts, or so-called virtual communities of certain people.

Concerning before mentioned questions, we may state that the respondents had clear-cut and coinciding opinions. This is definitely not the case concerning the next question about potential concrete living labs' environments: which physical space might be turned into a living lab. Firstly, the concept of an environment was problematic, it was possible to interpret it in different way, secondly, the understanding of the environment differed greatly as understood by municipal officials or representatives of technology companies.

Concerning municipal departments it is possible to state that some departments showed interest. Several respondents pointed out that the possibility to solve their problems using the LL method exists, still, strong motivation was not visible. During the interviews several factors that diminish interest, were mentioned. First, because of the very strict rules of the public procurement process, it is difficult to organise LL type of flexible cooperation as underbidding mechanisms are not applicable here. Second, the leaders and leading specialists are overloaded with current work, implementing the LL method demands great dedication. It is not clear where additional working time can be found. Third, there are limitations due to current budgetary situation. In the interviews with departments' leaders it was noted that they were informed about the Finnish LL experience, but it was difficult for them to

understand their own part in a cooperation mechanisms of the LL type. As the practical experience was lacking, attempts were made to find analogues with used financial schemes like public-private partnership. This kind of analogies may not work in all cases. Interviews were followed by group works: roundtables and seminars.

In conclusion we should mention that the topic of the LL was quite new to most of the interviewees. It was possible to think in terms of a field or technology, but not in terms of concrete environments that should be created for the LL. Formation of this type of concrete ideas presumes quite deep understanding of functioning mechanisms. Concerning the potential of domestic high-tech companies, general opinion was that the potential is big in ICT companies, but not enough high for other firms whose number is too limited. A bigger problem than the number of high-tech companies is their size: the majority of Estonian high-tech companies is very small and financially weak. This is a problem: in richer countries like Finland the companies are able to invest into development of an idea that may not bring money back immediately and this is extremely important considering the Living Labs. Companies invest money in the future scaling perspective. For Estonian high-tech companies this kind of investment is usually not available. Concluding, there may be interest and potential, but it is difficult to agree on the financing mechanisms with the municipality.

5 Design of the Method Transfer and Perspectives of a Cross-Border Living Labs

After getting findings of the study, generalising and discussions on next steps for process design were taken: several roundtables and seminars were organised. In group discussions it was concluded that the logic of implementing the LL method should be as follows:

First, there must be a clear statement from Tallinn high-level leaders, preferably the mayor's level that Tallinn has decided to begin to use the LL concept. Second, as there are several areas where using the LL concept is possible, the next step is to figure out departments and areas where implementing the method might be a perspective. As Helsinki's example shows, the content of the LL can vary on a very large scale from online photo project in a kindergarten to a whole neighbourhood for elderly citizens. Third, a decision must be made on high level which problems should be solved via LL, and start with not only one, but rather with two to three LLs. The process of creating LLs should be the joint activities of city departments with possible stakeholders. The high-level decision should also state the financing schemes. Thereafter, it may be relevant to create an umbrella organization that brings along (high)technology companies. It occurred that immediate implementation was difficult.

The findings indicated that basic preconditions for implementation of the method in Tallinn were existing, still the study indicated several weak elements in the implementation potential. There was a danger of a deadlock: to go on with the process presumed from the City Government and especially from the Heads of those City Boards where the LL method was a perspective, great effort had to be taken to work out exact tasks to start the project and involve the citizens. Instead of a general comprehension, this formed realistic ideas that were necessary for city development

and attractive to domestic technology companies. This was thus a precondition that the process is serious and companies and people just do not waste their time. At the same time, there was a lack of certainty about the amount of technology invested by companies which were motivated and financially able to invest in city development processes. It was also difficult to estimate how big the workload would be for key officials to initiate and supervise this type of projects, and it was also unclear which cooperation model between the city government and technology companies, and city government and involved people should be used. In other words, to continue the innovation process, it was necessary to move from the awareness raising phase to trial phase (by Rogers). There was a large number of unanswered questions, even with the Finnish experience available.

Under these conditions the idea of creating a LL not just in Tallinn and with Estonian counterparts, but attempt to create cross-border, Estonian-Finnish LL became very ambitious: there is a need to transfer not only method, but also people who have experience using the method. Unlike several other forms of open innovation, LL is considered as strongly connected to the region. It presumes strong contacts between the involved citizens as co-authors of the service and understanding of the certain city districts' possibilities by technology companies. Generally, it is an obstacle to operate other country's LL. Different lifestyles and cultures are also hurdles.

In the Tallinn-Helsinki case, cross-border LL seems promising:

- geographical proximity, everyday contacts possible, if necessary;
- culturally close-knit countries, with intensive contacts over the last 20 years;
- several Finnish high-level technology companies with LL experience.

Unlike Estonian companies, the Finnish companies have financial coverage for participating in technological innovations and ability to multiply the solutions worked out in the LL. Several Finnish companies have daughter companies in Tallinn which made participation in the LLs even less complicated.

In the diagnostic study Estonian experts were pessimistic about the motivation of foreign companies to participate in an Estonian networks of innovation, included LL. It was stated that the motivation of foreign companies to participate in local initiatives is low and they are supposed to act in accordance with the mother company's strategy. This criticism is relevant only until we speak about contacts with daughter companies, our aim is, vice versa, to involve mother companies in Finland and get them interested to involve local daughter companies in Estonian LL.

The reputation of Finland as a technology country and of Finnish technology companies is high in Estonia. Finnish participation in Tallinn LLs not only increases the capacity of the LLs, but also guarantees a positive attitude of the stakeholders and all citizens. For Finnish companies Tallinn were a good test ground: East-European cities are specific markets for new technologies and new ways of organising citizens life. Developing new solutions which are different from the Finnish ones and involving citizens of Tallinn and multiplying them later in Central- or Eastern Europe or in other places, is a promising business idea, which is useful to Tallinn at the same time.

Creation of a cross-border LL is institutionally a complicated task that presumes assistance and intermediating. Helsinki-Tallinn Euregio's mission is to enhance (Lepik, Trames) knowledge transfer between two metropolitan regions and has longstanding experience in the area. First negotiations between Helsinki and Tallinn, initiated by Euregio, have proved interest from both sides in this idea. The usage of a LL to work out solutions for TwinTV, Caring TV, TV-based services, intelligent traffic cross-roads, innovative services for elderly are under discussion. Institutional forms of these LLs are under discussion, one option might be a joint stock company with stakeholders from Tallinn and Helsinki.

6 Discussion and perspectives for future research

Empirical evidence presented in the article is based on the experience in Helsinki and Tallinn metropolitan regions, but as creating of the LL in Tallinn is still in process, it is impossible to conclude whether the method is transferable within this region or not. Still, as the authors are of the opinion that findings and conceptions of this research may be of wider interest, we suggest two possible research directions that might be developed.

First, the results of our diagnostic research concerning the obstacles and favouring factors of creating LLs and on transferability of the LL method from one socio-cultural environment to another may indicate a more general character and may be valid in wider context than Tallinn/Estonia. This means that it may be expedient to study if these factors are valid in other East-European cities. Still, it is not clear if our research methodology is repeatable in this type of study. In our case it was presumed that the interviewee is at least to some extent informed about the essence and functioning of the LLs. This was the case in Tallinn, as several events for introducing the method had taken place, but this presumption may not be in force with many cities. One solution may be to improve the interview methodology in a more operational direction towards greater formalisation so that it is possible to ascertain with an interview or questionnaire the findings of the potential elements of an implementation (for example availability of a high-tech company, cooperation experience between the authorities and the companies, innovation potential of citizens, potential activity in seeking solutions to environmental problems etc.), even in the case when the respondent does not have information about the LL method or implementation potentials. In this case an important element is missing: interest of potential users. Interest occurs with knowledge about the method's potentials.

We set a hypothesis that part of the factors found in the study may be even more general and valid than in cities with post-soviet history, but transfer takes place from a region with higher technological or institutional level to lower. In literature the creation of LLs is interpreted as a process that is going on within the borders of the same country. It is presumed that information spreads from one country to another, but the LL operates in cooperation of one and the same city government and technology company from the same country. Our article states that a combination of conditions opens other opportunities. If this presumption is proved in practice, it will open up new perspectives of developing cross-border clusters of technology companies. Due to this, an additional hypothesis should be set to define which combinations of basic factors might be relevant for the creation of LLs. In case of

Helsinki and Tallinn, cultural and geographical proximity are definitely fostering factors, but it is possible to build combinations based on other basic factors.

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Annex 1

Guide for Conducting Interviews to Investigate the Usage of Potential of Living Lab Method in Tallinn

We address you with this interview as we consider you to be a person who has previous knowledge about Living Lab method and its usage in Finland and/or other countries. As Living Lab method is quite complicated and its implementation cases vary we would like to start with specifying if we have a similar understanding of the term Living Lab method. [In case the respondent claims that he/she needs additional clarifications, then additional short instruction by the interviewer follows according to the prepared explanatory materials.]

For the beginning one should ask generally if Tallinn has needs and prerequisites for using the LL method in the near future. If so, then the respondents should explain why he/she thinks so.

In which urban areas would it be reasonable to use this method in Tallinn and what are the justifications?

[Questions 1-2 about the most potential implementation areas.] How do you envision the implementation of this method in the particular urban area? What kind of new solutions would be reasonable to try to create with this method? How do you envision the so-called lab environment in this particular case?

Is there a critical mass of local technology enterprises that could participate in such activities? Can you name concrete companies that could be interested? What could prevent those companies from participating? Could universities and technology parks be interested in participating? In what way?

Reputedly one of the features of the Living Lab method is the participation of clients (in this case citizens, people working in the city or visiting it) in creation of new products, systems or environment. Can we presume that Tallinn's citizens could be active participants in future Living Labs? In which cases? Why do you think so? What could be the motives for participation?

[A question to the respondent from a city department.] Do you think that top city officials are motivated and ready to take up the leading role in the from the city's side in the future Living Labs? Are there problems in addition to the lack of information about the method that could prevent it? Which problems could occur?