

DELIVERABLE

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D2.2 Common Living Lab Approach

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Authors:

Bidatzi Marín (IAV)
Montserrat Dominguez (IAV)
Tim van den Dool (INN)
Marianne Dannbom (FVH)
Bram Lievens (IBB)
Hendrik Hielkema (AALTO)
Daan Velthausz (AIM)
Frans Glazener (Logica)
Saar De Zutter (Televic Healthcare N.V.)

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1. Introduction

As stated in the Description of Work Document (DOW) and in Deliverable 2.1 of this Work Package (“Requirements”), Work Package 2 within APOLLON clusters four Living Labs that focus on Health-related solutions. Two Independent Living Systems (ILS) are to be respectively transferred and piloted from one living lab to another (receiving).

Task 2.2 deals with the actual deployment and set-up of the experiments in the receiving living labs (Finland and Spain). Task 2.3 comprises the cross-border piloting of the experiments, after which Task 2.4 will cover the evaluation and recommendation activities.

Deliverable 2.2, thus, provides the basic operational framework under which the experiments will be run and the partners will interact and exchange data, results and analytic findings.

This document provides the common approach towards the research, data gathering and data analysis activities that will take place during Task 2.3 of Work Package 2.

The document covers the different topics that need to be addressed according to the logical sequence in which they are required for the activities of the project.

After this introduction, section 2 describes the ecosystem analysis that helps the SMEs gain knowledge of the relevant features of the new environments where the experiments will take place and also steer the actual focus/scope of the experiments themselves.

Section 3 of this document states the current action plan and schedule for the activities that need to be executed for successful deployment of the experiments.

Sections 4 to 6 frame the questions related to research (what are the relevant questions), data gathering and the subsequent analysis of it.

Section 7 provides the roadmap for conducting the complimentary networking activities to be carried as the experiments advance.

Section 8 of the document establishes the overarching feedback mechanism that will be used to analyze the actual benefits that the involved SME get from this kind of interaction with a network of living labs engaged in cross-border experiments.

For both ILS (Xtramira™ by Televic in Belgium and ADL by Innoviting in the Netherlands) the Requirements Identification (D2.1) establishes the transferring living labs (IBBT and AIM) as the main supervisors to monitor the overall work (Research coordination).

The local living labs are responsible for the local deployment and execution of the research plan (agreed between the partners). The deployment plans for each of the two experiments can be found on section 3 of this document.

The transferring living labs set-up the research framework and provide the local living labs with questionnaires, topic lists for interviews, etc.

The coordination of the local living labs will be steered by the transferring living labs but this will require a close cooperation and open dialogue between the partners.

The research set-up that will be applied in the living labs is a people-centered approach in which we will not only focus on the deployment of the service, but also investigate how various users experience the ILS in their daily lives. These user groups are not only the end users, but in the Spanish case the relatives and others who are providing home-care, in the Finnish case the investigation will include user groups such as the home care providing nurses, the Help desk staff and the management of the organizations that provide parts of the service.

This common approach for the activities in Work Package 2 will, of course, be in line and accordance with the guidance and instructions provided by Task 1.2 of Work Package 1 (APOLLON Methodology Framework) and specifically by Deliverable 1.1 (Catalogue of state-of-the-art concepts, existing tools and lessons learned from cross-border living labs networks) and Deliverable 1.2 (Research framework and investigation strategy). Deliverable 1.3 (Framework for Apollon evaluation and impact assessment, including KPI definition and Measurement) will be used for evaluation and KPI assessment.

In this sense, the activities encompassed by Work Package 2 fit with several stages (in bold below) of the Living Lab Networks Management Stages:

- Connect
 - LL network initiation
 - Objectives and goals
 - Roles and responsibilities
 - **Sub-networks and supporting parties**
 - Policy framework
- Plan and engage
 - LL network business model
 - IPR issues
 - Rewarding
 - **Technological Solutions**
- Support and govern
 - **Supporting services and tools**
 - Co-innovation
 - Solution development
 - **User interaction**
 - **Field experimentation**
- Manage and track
 - **Monitoring and assessment**

- Commercialization
- Potential and achieved
- **Impact assessment**
- Success criteria

In addition to the common living lab approach towards the piloting measurements and analysis, this document also includes the basic structure of the living lab networking activities in the area of health & wellbeing that will be conducted by the participants in Work Package 2.

During the set-up, piloting and evaluation stages (#s 2, 3 and 4 of the Steps within the vertical experiments according to DOW and D1.2) the team of WP2 will use several concurrent tools and methodologies. Some recommended by WP1 in D1.1 and some complementary to those:

- Online meetings with rich interaction capabilities (referred to as Rich Knowledge Meetings in the Laboranova toolset featured in D1.1 SWOT analysis). These are task-specific meetings that do not replace or supersede the monthly scheduled WP regular conference calls.
- Analysis elements such as “five-whys” and Ishikawa (fishbone) diagrams for deep analysis of issues that arise during the set-up and piloting stages (similar to those employed in the Nordic LL toolset)
- Project *diaries*: WP members will log (and share) their activities, experiences, challenges and developments along the different remaining stages of the project. This granular and informal logging method prevents the loss of useful knowledge that may not be registered in more structured documental frameworks.
- Mindmapping as a tool for non-linear planning, concept discovery and emergent relationships.

2. Ecosystem Analysis

Fulfilling the expectations of the participating SMEs and providing a context for the different research questions posed by the transferring living labs requires a wide analysis of the ecosystem that surrounds the experiments themselves, both in the local (i.e. receiving) and transferring living labs.

The following areas have been identified as significant and of specific interest for the partners in the experiments:

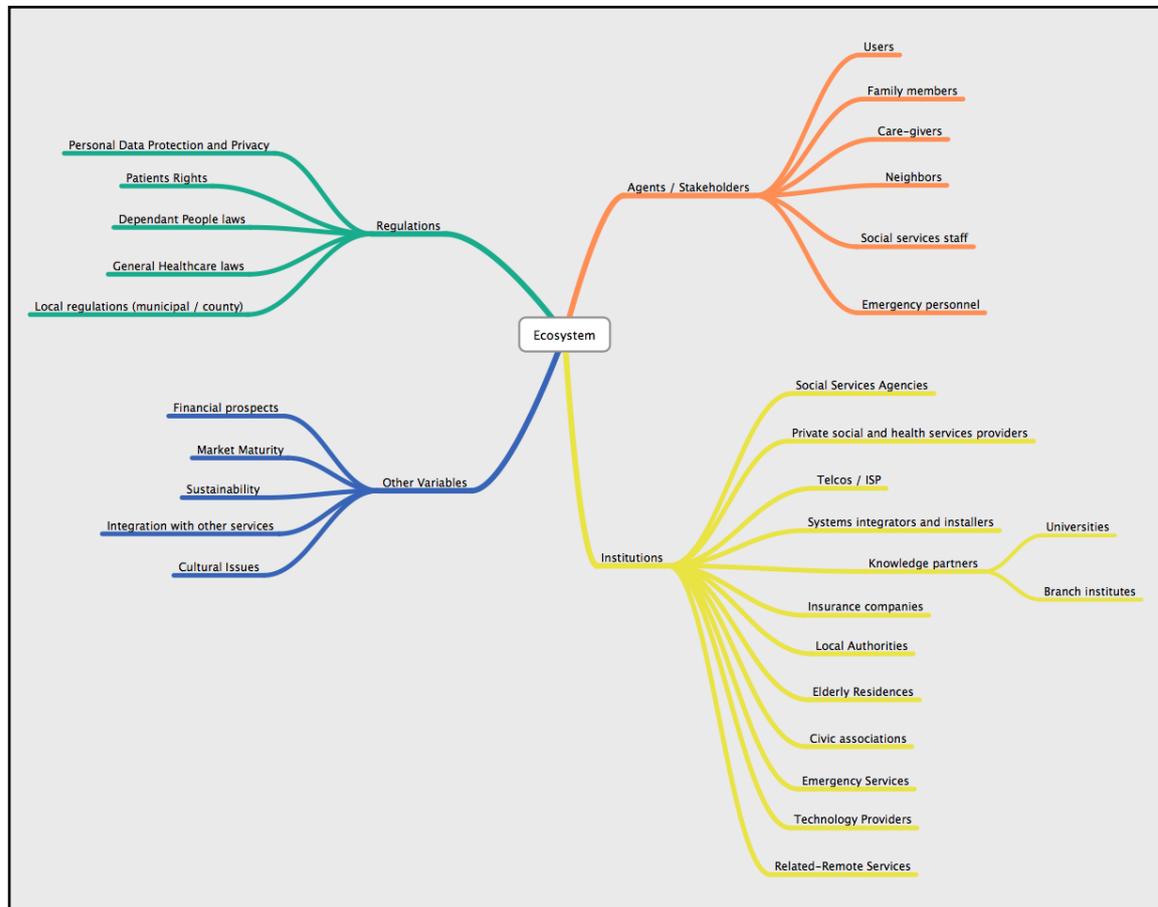
1. Agents or stakeholders:
 - Users
 - Family members
 - Care-givers

- Neighbors
 - Social services staff
 - Emergency personnel
2. Institutions:
- Social services agencies
 - Private social and health services providers
 - Telco / ISP
 - System integrators and installers
 - Knowledge partners (universities, branch institutes)
 - Insurance companies
 - Local authorities
 - Elderly residences
 - Civic associations
 - Emergency services
 - Technology providers
 - Related remote services
3. Regulations:
- Personal data protection and privacy laws
 - Ethical board regulations and processes
 - Patients rights laws
 - Dependant people laws
 - General healthcare laws
 - Local (i.e. municipal / county) regulations
4. Other variables:
- Financial prospects
 - Market and product maturity
 - Sustainability
 - Integration with other services
 - Media
 - Cultural issues

The corresponding living labs will contribute a description of these elements for all four environments (Belgium, Finland, Netherlands, Spain). This valuable comparison of the different local ecosystems will provide essential information

for shaping and honing specific research questions to be assessed during Task 2.3 and Task 2.4.

The following mindmap includes all the currently identified topics to be addressed by all members of Work Package 2:



3. Deployment plan

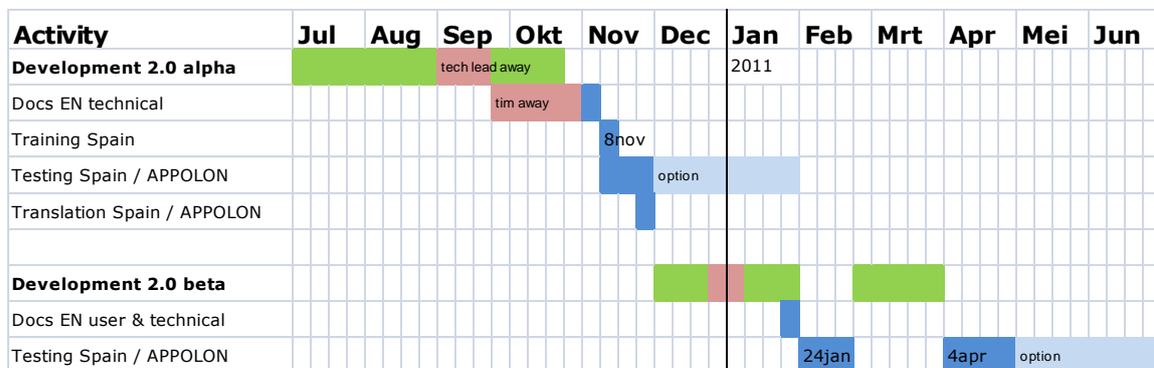
The set-up phase of the Innovating experiment is sequenced as follows. Along with the ecosystem analysis mentioned in section 2, several lines of action will be taking place:

- Functional testing and validation of the latest version of the service. Takes place at the local (i.e. transferring) living lab, but will include participation and input from the remote (i.e. receiving) living lab. Foreseen for M13 (Nov 2010)
- Localization work: staged in two phases: Dutch-English and English-Spanish, to be performed by the local and remote living lab respectively. All screen texts, system messages and information will be translated. Foreseen for M14 (Dec 2010)
- Technical training session: a technical representative from Innovating will impart a one-day training session at IAVANTE’s premises so that

the technology team at IAVANTE can learn how to maintain, deploy, troubleshoot and manage the remote installation of the system in Andalusia. Foreseen for M13 (Nov 2010)

- Technical validation: the IAVANTE team will first test the system in its own premises but under a realistic environment (a simulated elderly person flat which installed in IAVANTE’s simulation center in Granada). Foreseen for M13-M14 (Nov-Dec 2010)
- Selection of participants in the remote experiment according to local regulations and the profiles that Innoviting has expressed interest in (old people living independently). Foreseen for M14 (Dec 2010)
- Field trial: IAVANTE will perform an initial deployment of the system to test the whole framework in the field but under controlled conditions (small group of people to whom the IAVANTE team has more direct access). Foreseen for M15 (Jan 2011)
- Final deployment for piloting. This is the actual deployment with the selected users that will be participating in the experiment during the piloting phase (T2.3). This involves the physical deployment of the devices and sensors in the users homes, set-up of the communications lines, systems configuration and user training. Foreseen for M18-M20 (Apr-Jun 2011).

The following chart provides the planning for the activities mentioned below and some conditioning technical activities:



Recent developments, i.e. the introduction of Logica’s Message Board concept and active engagement offers th opportunity to, in addtioon to the already defined pilots, use the established eco-system to test and validate a new technology and service. For a brief explanation of the Message Board concept, see below.

The Message Board is a touch screen that runs various applications under the Android operating system. These applications provide support (reminders for appointments, birthdays, drug ingestion, contact information on care and

medication) and other activities (to send and receive text messages, order groceries, news, activities in the neighborhood). Together they form the message board. The Message Board will provide support to the elderly providing the services and social contact possibilities they need to continue living independently. In addition, the Message Board ideally can be linked to the relevant institutions. In this way information can be shared effectively and efficiently. Any alarms can be sent using SMS or email. The technology will be installed on a 15.6" touchscreen Asus running Android 2.1. Android was chosen as this provides the most open and cost effective platform for the deployment of these services. See below for a screenshot of the Message Board.



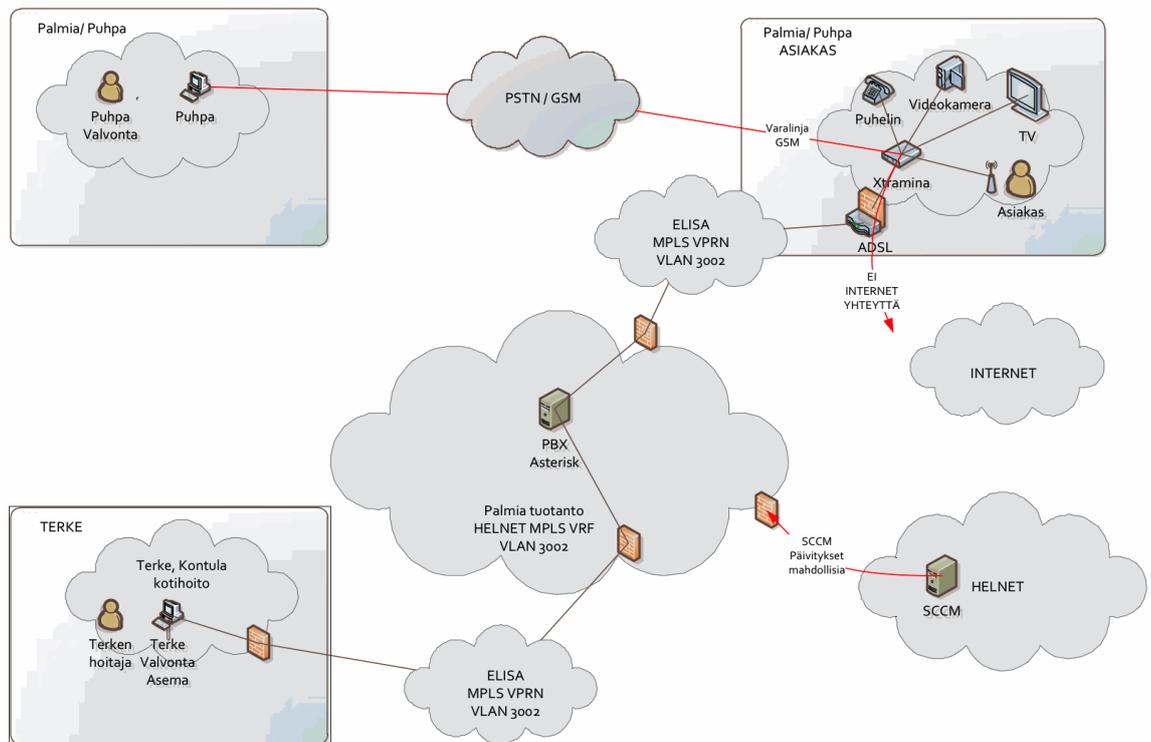
With the aging and a lack of people available in healthcare, the message board is an excellent solution for supporting older people so that they can live more independently with the necessary and desired care. They can also, without having to delve into mobile phones, computers and various programs, easily set up contact with family and friends. But also keep abreast of interesting news for them, simply contact healthcare workers if they have questions and simply order groceries at the supermarket. Besides being a great social tool for the elderly, it can also be used by the care takers in an effective and efficient way to communicate among themselves. By using the message board is everyone is always up to date on the situation and can act appropriately.

We will be enhancing the cross-boarder experiment with the Message Board concept and are currently investigating the most suitable and effective way without delaying or hampering the current foreseen experiments. The new activities and experiments will be documented in Deliverable 2.3.

For the Xtramira™ experiment, the deployment (set-up) plan is as follows:

- Functional testing and validation of the latest version of the service has taken place by Palmia. Palmia is a company owned by the City of Helsinki and will conduct the pilot together with City homecare. They have had one unit for testing.

- Localization work: Aalto has done localization work from Dutch to Finnish including all screen texts and system messages relevant for the client user. Televic has built a new software version including the Finnish translation. Televic also translated technical, usage and training manuals and the online configuration portal from Dutch to English. The translation of other material, such as the manual, user guide, and other documents will be done by Palmia.
- September 20-21 a meeting between Palmia and Televic was organized to clarify open technical issues and to discuss the milestones and deployment plan. To enable the functionality of the system. Elisa, a Finnish Telco Provider will provide a secure environment between the Xtramira™ boxes at the clients' houses, the home care facilities and the Palmia service desk.
- The local technical set-up looks like this:



- An Ethical permission for the research has been submitted during September to the Terveyskeskus Home care organization. Some additional information has been requested several times and the final (positive) decision has been granted in December. The Ethical permission also includes the request for support from the Home care providers.
- During December and January the City homecare has selected the participants according to profiles determined by main stakeholders. The decision has been made to work with two groups of clients, both 10 clients each. The first group consists of elderly people in various

stages of dementia, they prefer to stay in their own home rather than going to a nursing home but they do need regular contact with the home care providers. The second group consists of Alcohol or Drug Addicts who are suffering from memory loss and concentration problems of such severity that regular supervision is also required.

- The final deployment starts in march 2011 and will run for 8 months. This involves the physical deployment of the devices in the users homes, set-up of the communications lines, systems configuration and user training. Palmia will be responsible for the actual installations, training of the users and give the technical support for the homecare nurses, using the information provided by Televic.
- The interview rounds with the Nursing staff, the Clients and the other involved parties will start mid-february. The interviews and focus group discussions will be repeated at the end of the actual experiment. All interviews will take place in Finnish and will be translated into English. Aalto is the partner responsible for the interviews and the data analysis.

4. Research Set-up

The user research to be conducted by Work Package 2, as documented in D2.1, has very similar goals for both experiments.

Specifically, for the Xtramira™ case (Belgium to Finland transfer) the main research goal is to explore:

- The contextual difference between the local and remote LL.
- The user experience of the device / applications.
- The remote ecosystem and business opportunities for the ILS. This will be addressed mainly by the ecosystem analysis mentioned in section 2 of this document and from the evolving analysis performed during the piloting and evaluation phases of the experiments.

Similarly, for the Innoviting case (Netherlands to Spain transfer) the main research goals are:

- The contextual difference between the local and remote locations: upfront with the items mentioned in section 2 of this document and afterwards with the evaluation of more practical feedback from the pilot itself.
- We want to be able to address the outcomes of the local experiment and enhance it at national level if possible, i.e. by generalizing findings for the specific region in south of Spain to country level of Spain.
- Gain knowledge of the healthcare market in other countries; culture, finance, competition, i.e. Spain: Mainly upfront information; only cultural issues can be gathered from the user questions, because the other points are not essentially user-related.

- The way cultural differences can modify the use of the same base technology. Does the “export” affect the evolution of the system in ways not detected in the originating pilot? This will be addressed by using common questions about the usability of the systems in both pilot cases (Netherlands and Spain). This will have to be addressed carefully, because in addition to the change of geographical and cultural context, there will also be a change of use-context in the transfer: whereas the Dutch pilot was focused on the use of the ADL system in elderly residences and institutionalized care facilities, the Spanish piloting will take place in a home-use and family environment.
- User experience. What functions are filling the needs of the elderly and the caregivers?
- What is the added research value provided by the operation in a network of living labs from different places with a common living lab methodology?

The transferring living labs (AIM and IBB) will be appointed as the main supervisors to monitor the overall research work. They coordinate both the local and remote activities.

Single points of contact are defined for each living lab, as planned in the identification of requirements in D2.1, thus forming the user research taskforce:

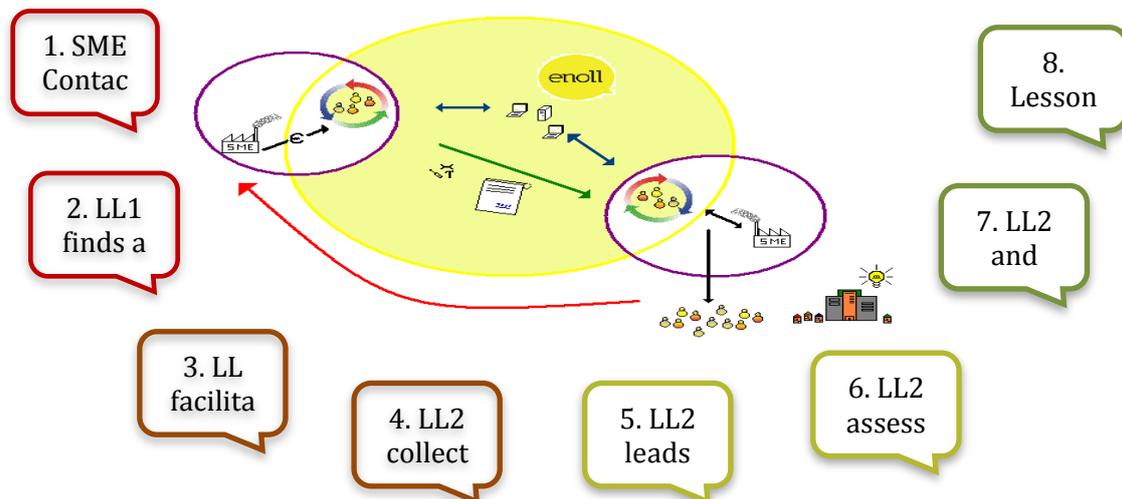
- IBB: Transferring Living Lab -> Bram Lievens
- AIM: Transferring Living Lab -> Daan Velthausz
- FVH: Receiving Living Lab -> Marianne Dannbom
- IAV: Receiving Living Lab -> Bidatzi Marin Bastida

In general terms, the research set-up will follow the Apollon Research Framework as described in D.1.2:

Activities/Outputs	Build	Evaluate	Justify	Generalize
Constructs	What are the variables that you study?	What are the elements that you measure?	How do you decide best practices across the experiments?	How do you filter pilot specific elements out?
Model	What are the basic assumptions, causalities and outcomes that you perceive?	What measures do you use to evaluate the validity of the assumptions?	What are the success criteria that you use?	How do you assess the wider applicability of the model?
Method	What is the process for	How do you evaluate and	How do you justify the use	How do you ensure the

	validating the assumptions?	adjust the validation process?	of selected methods?	scalability and wider applicability of the methods?
Installation	Who are the stakeholders at your experiment?	How do you evaluate added value for each stakeholder?	How do you justify the selected collaboration model?	How do you compile recommendations for sustainability model?

In addition, for each of the experiments we describe the flow of engagement between the parties involved, adapting the basic scenario of Work Package 1 (Apollon Deliverable 1.2) illustrated below and will describe the roles of the involved stakeholders (SMEs, Living Labs, industry partners and supporting partners)



For the innovating case the flow is as follows:

1. Innoviting contacted Amsterdam Living Lab.
2. Amsterdam Living Lab contacted IAVANTE.
3. IAVANTE investigated to see what local partners, i.e. SMEs and other organisations could benefit from the experiment.
4. IAVANTE acts as main local stakeholder in Spain.
5. Interactions between IAVANTE, Innoviting and Amsterdam Living Lab take place to prepare the experiment.
- 6,7,8. Ongoing (Task 3.3 and Task 3.4).

During this process, the engagement of Amsterdam Living Lab with Logica has provided another cycle in the flow. Amsterdam Living Lab contacted Logica. Logica and Innoviting have discussed the linkage of the Messenger Board to

strengthen the Innovating's solution. Amsterdam Living Lab are discussing the possibilities with the involved Living Labs, i.e. IAVANTE, but will do that also with IBBT and Forum Virium.

The Belgium-Finland case also demonstrates the need of a local partner Living lab. The original contacts from IBB and Televic were with Forum Virium, who investigated the ethical issue, contacted and engaged with the SME (palmia), contacted the Home care provider and maintains a managing role in the setup of the experiment.

During the initial phases of the project, the Connect phase and the Plan & engage Phase, the role of Aalto as academic partner has been to support the process, the translation of the device interface and the setup, including the process of getting the required permission of the research aspects of the experiment.

5. Data Collection & Sharing

This section describes the research questions and approach to be deployed during the piloting stage (Task 2.3).

For what concerns the data collection we will use three methods: in depth interviews both individual as well as focus group, survey and logging.

5.1 In depth interviews

The goal of the in-depth interviews is to get rich data about the main topics of this study. Interviews will be done with the following actors:

- the responsible of the care organisation
- the operators / technicians
- the users
- the SMEs

The topics within these interviews will focus on the evaluation of both the deployment process and the service itself. Also we will discuss more on the business proposition of the solution as well as towards the eco-system in which this pilot is executed. From the local Living Labs and current projects the used topic lists of the different interviews will act as a starting point.

5.2 Questionnaire

Within the user-centered approach of the project it is necessary to have a good interaction with the different stakeholders for whom the end-users are playing an important role. To collect the user feedback a small questionnaire will be used. The objective is that these interviews are conducted by the persons who already have close bonds with the users. We will therefore hand them the questionnaire with some oral and written instructions. This approach also allows us to investigate to what extent this method could be used in case of a large test population as it is more pragmatic and convenient.

5.3 Logging

It is important that we can match the results of the interviews with objective data of the real behavior of the service. The logging will be limited to non-contextual data such as the amount of use, the duration... Logging is a necessity for a better reporting and to provide a better understanding of the actual use of services and could be used for the optimization of the services through the analysis of certain patterns. The logging can be foreseen on the application, the device and on the network level. Within the project both services are a server-based solution. The logging will therefore only be foreseen on the server level.

6. Data Analysis

The evaluation of the cross-border pilots will be done on the level of the pilot itself and on the level of the collaboration. This will be guided by the framework as presented in section 4. The focus will be on the methods used, the implementation as well as the gained results.

Further we will focus in the two mentioned levels:

- Analysis on the level of the pilot itself: Here we will analyze the experiment specific data. The objective of this analysis is to evaluate the service with regard to the usage, experience, attitudes... First of all this will be done based on the logging data. For each of the applications we will investigate the specific usage of the service (length, frequency...). This data will generate certain hypothesis that will be checked with the data of the more qualitative research activities (interviews...). The data sets will be analyzed from different actor perspectives: the end-user, the professional user, the operator...
- Analysis of the cross-border collaboration: Here we will analyze the various data with regard to the lessons learned and the Apollon methodology framework (as developed within WP1). For this we will use the different 'diaries' that every partner have used to keep track of its activities and lessons learned. The analysis will be done based on the four levels of the overall Apollon framework: connect, set boundaries & engage, support & govern and manage & track. We will especially focus on the experiences of the SMEs: what are the experiences, impact on the organization, added value...

7. Network activities

The network activities within the homecare and wellbeing domain have the following objectives:

- Bringing together the different Living Labs active in the domain of Homecare and Independent Living with their stakeholders to exchange the lessons learned and validate the results and experiences from the pilots performed with the other Living Labs;

- Guiding and supporting the SMEs in further exploring business opportunities in the participating countries;
- Explore the feasibility to set-up real cross-border pilots between the participating Living Labs and their stakeholders.

In order to meet these objectives we will address the following levels:

1. On a more international Living Lab level. Here we will organize specific activities in which we want to address the whole Living Lab community. For this we will collaborate with on the one hand the EnoLL as well as with national networks of Living Labs.
2. On a more local, thematic level where we mainly target the organizations, SMEs... that are performing R&D activities in the domain of homecare, wellbeing and eHealth. The approach here is to connect with existing initiatives, conferences within the domain of eHealth.
3. On the SME level where we focus specifically on SMEs and their specific requirements with regard to a cross-border organization. This will be done through more local organized initiatives in which the pilots within Apollon are being used as case-studies to demonstrate the opportunities of cross-border Living Lab initiatives.

This will be done through the following activities:

1. In each of the participating countries, the Living Lab will organize a local network event
2. On the level of the Living Labs itself we foresee some key-activities with the Living Lab community itself. The objective of this type of events is threefold:
 - a. Share experience of the cross-border activities within Apollon;
 - b. Explore the requirements for a network of Living Labs focused on eHealth and homecare. Here a special focus on the eco-system that is required for establishing this;
 - c. Identify new collaboration opportunities by applying for joined research proposals.

For the network activities we will work in close collaboration with the Network of Living Labs, especially with the eHealth thematic domain.

8. Benefit Analysis for SMEs

The benefit Analysis for SMEs will be done looking both at the activities done in each of the pilots that are influencing the SMEs and at the assessment of the common approach to cross border network of living labs operating in the field of eHealth.

For the SMEs the benefit analysis focuses on the improvements in:

- ⇒ Development of Platform for SME involvement with Living labs in cross border cooperation
- ⇒ Increased involvement of SMEs with Living Labs
- ⇒ Access to new markets beyond the home market
- ⇒ Access to new ecosystem partners and business opportunities
- ⇒ Expertise in Pan-European user testing to ensure more user-oriented services and products and higher user acceptance at European level.
- ⇒ Support of competitiveness because of enlarged scale and faster deployment of novel services and processes.
- ⇒ Easy access to all local relevant stakeholders via a single point of access.
- ⇒ Access to tools, applications, services and infrastructure of the different living labs as well as the other partners related to the living labs.
- ⇒ Lower thresholds to engage in cross-border research, development and innovation;

The results of both the pilot projects will be analyzed along these dimensions. The benefits for the SMEs are important for both the Living Labs involved and the SMEs themselves.

The analysis of the benefits of the cross-border network in eHealth Living labs is going to focus, among others, on the contextual factors; how the pilot specific factors influence the outcomes of the project and how these factors contribute or inhibit the results. Issues such as language, customs and cultural aspects are serious obstacles in cross border experimentation.

Eco-systems can be used as a metaphor for analysis of the context, both before and during the pilot phase an exercise will show the opportunities and challenges for SMEs in the different environments in Europe. The lessons learned from the pilots will be of help in setting up the support structures that the network of eHealth labs needs to provide to be of relevance to its customers.

For the evaluation of the eco-system a standardized model demonstrating the main actors in the ecosystem and the functions that these perform in providing the service is used. This model is filled in for the situation before the start of the project and for the situation during the project. With the different eco-systems described the changes can be visualized and qualified.

9. Conclusion

In essence, this document (D2.2) constitutes the fundamental roadmap that will help the involved partners conduct a successful set of experiments. It also provides the necessary guidelines to govern the interactions and exchanges between all the involved parties (partners, stakeholders, users, etc.).

Having taken into account all the contributions provided by Work Package 1, we will be able to provide significant and meaningful feedback from the field back to

Work Package 1 in terms of methodology, network activities and the living lab approach itself.