

## LECCO INNOVATION LIVING LAB

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Lecco Innovation Living Lab is part of a long term strategy whose history is best explained in the report prepared for the signature of a memorandum of understanding with INAIL, the National Institute for Insurance against accidents at work (report in Italian).

## EXCERPTS FROM THE APPLICATION TO BECOME A MEMBER OF ENOLL (European Network of Living Labs)

The logo for the European Network of Living Labs (ENOLL) is a yellow speech bubble with the text "European Network of Living Labs" inside.

### MEMBERSHIP MOTIVATIONS

Lecco Innovation Living Lab is first of all a way to formalize a long-term strategy and an ongoing practice started in 2004 in the fields of rehabilitation and strategic approach to innovation. The time is ripe to turn this practice into a model, to enhance it and drive its evolution.

By becoming an ENoLL member, LILL will gain a wider international appeal for researchers and practitioners and the possibility to make contacts within a network with similar interests and aims. Ideally, facilitating new connections to work together on EU projects (Horizon2020, AAL). As for the values, the membership will spearhead an enhanced interest in a user-centric approach to foster wellbeing, maximize innovation and reduce costs. This goal is agreed upon and was made explicit by Regione Lombardia and Fondazione Cariplo, two of the main sponsors of the network's projects.

LILL can contribute to the development of an international innovation network in many ways: high technical and scientific expertise; a strong local network that includes all actors; EU contacts of its partners; contributions in policymaking; interest, willingness and assets to be a host for experimentation; a valuable consultant; and a receptive dissemination network.

LILL's interests perfectly fit in the Well Being and Health Thematic sub Group; other relevant themes are Social Innovation, Social Inclusion, Smart Cities, Future Internet, Internet of things and Future Internet, Living Labs and Social Innovation Convergence Work Group. LILL plans to become an effective ENoLL member in 2015.

### DESCRIPTION AND CHARACTERISTICS

LILL has two main relevant branches, often overlapping: health innovation and systemic approach to innovation. Health innovation is mostly focused on rehabilitation, with ten years of experience in strategic projects. The partnership has managerial, business, scientific, clinic and technical expertise on a wide range of topics. The projects are developed by a network consisting of Univerlecco, Politecnico di Milano sede di Lecco, four CNR (National Research Council of Italy) groups, two IRCCS (Research Hospitals) and a Rehabilitation Center. Their researchers and practitioners are supported by a number of well-equipped laboratories. Moreover, the partnership has clinical expertise and hosts clinical trials in its several specialized centers that work with all age groups (pediatric, adult, geriatric). Features of the process are the exchange and joint development of clinical protocols, tight collaboration between physicians and biomedical engineers, multicenter pre-clinical and clinical trials, neuroimaging and diagnostics, technical, clinical and scientific evaluation of

new therapies.

LILL's systemic approach to innovation is practically implemented through Univerlecco and its partners. The primary aim is to activate and interconnect the network as much as possible. An example of this approach can be seen in "Business to Research", a project launched in March 2014 that has seen many of the Living Lab partners involved as promoters or participants to the local network. The goal is to find shared interests between research institutions and companies and give researchers clues about which areas the local industry is more interested in. The same approach will be applied at an inter-regional level, on becoming part of a European network. The vision for the Lecco Innovation Living Lab is to become a single support and information interface for the whole system, which acts a distributed and externalized R&D laboratory. This will simplify and multiply relationships while dramatically decreasing costs and time to market. Experience shows that the Lecco economic fabric virtually allows to build, test and bring to market anything that is found through research.

This way of operating has already been validated several times on a local and National scale: a first time in 2013, when Univerlecco became coordinator for the Lombardy Regional Cluster "Technologies for the Living Environment" <<http://www.clustertav.lombardia.it>>. The Cluster is an aggregation of research institutions, universities, associations, caregivers, cooperatives, SME and Large Corporates. Its aim is the "development of knowledge, technological solutions, plants, highly innovative buildings and products. According to Ambient Intelligence and Ambient Assisted Living paradigms, these afford a redesign of the (living) environment in order to foster and encourage inclusion, safety, wellness, health and sustainability". The Lombardy Cluster is among the six founders of the National Cluster working on the same themes.

Again, in 2014: Regione Lombardia<<http://www.en.regione.lombardia.it>> signed a memorandum of understanding with INAIL (National Institute for Insurance Against Workplace Accidents) and identified Lecco as the district where the research on behalf of victims of traumatic accidents and technopathics should take place. The following table and descriptions give an overview on the collaborative research projects the Living Lab partners have been working on as a network since 2004, with a focus on rehabilitation:

Project/activity Actor	Hint@Lecco	Spider@Lecco	Regional Cluster "Technologies for the Living Environment"	Design4 All	Think&Go	Riprendo @Home	Ability
Univerlecco	Lead	Lead	Lead	Consultant	Consultant		Consultant
IRCCS Medea	Partner	Partner	Partner			Consultant	
IRCCS INRCA		Partner	Partner		Consultant		PA
Politecnico di Milano sede di Lecco	Partner		Partner	Partner	Lead		Partner
Rehabilitation	Partner	Partner	Partner		Consultant	Consultant	Consultant

Center "Villa Beretta"							
CNR	Partner	Partner	Partner	Lead	Partner	Partners (3 CNR groups working together)	

**Hint@Lecco:** The research project aimed at creating a network of excellence in basic and applied biomedical research. Started in 2004; Budget: 5 million Euro; Sponsored by Fondazione Cariplo <<http://www.fondazionecariplo.it/en/index.html>>.

**Spider@Lecco:** A follow up to Hint@Lecco. A research project aimed at building a local ecosystem for rehabilitation to assist patient throughout the whole process in the Province of Lecco. Started in 2010; Budget: 4.5 million Euro; Sponsored by Fondazione Cariplo and Regione Lombardia.

**Regional Cluster "Technologies for the Living Environment":** Univerlecco becomes coordinator.

**Design4All:** In the frame of the National Cluster "Technologies for the Living Environment". A research, development and education project on software integration and complex human-machine interfaces in the field of designing for Ambient Assisted Living. Started in 2013; Budget: 10 million Euro; Sponsored by MIUR (Ministry of Education, University and Research).

**Think&Go:** Aims at transferring knowledge in health through expertise and generate technologic strategic approaches to rehabilitation. Funded in 2013, started in 2014; Budget: 4 million Euro; Sponsored by Fondazione Cariplo and Regione Lombardia.

**Riprendo@Home:** Development of innovative technologic personalized platforms for post-ictus neuromotor rehabilitation, with a focus on the upper limb and the use in a domestic environment. Started in 2013; Budget: 2.5 million Euro; Sponsored by Regione Lombardia.

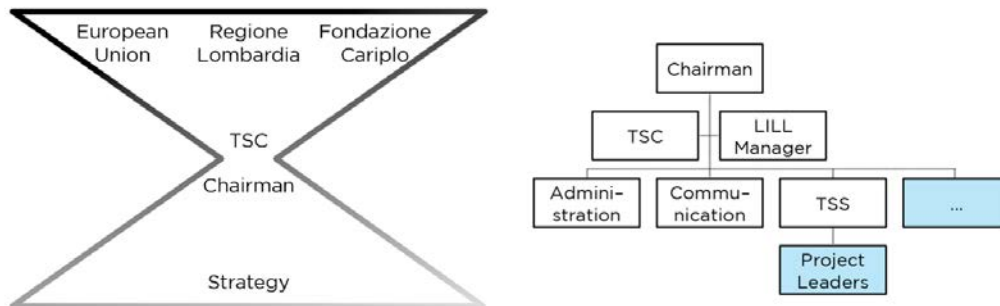
**Ability:** Development of an integrated platform enabling the remote delivery and control of physical and cognitive rehabilitation, and self management. Funded, not yet started; Budget: 4 million Euro; Sponsored by Regione Lombardia in the frame of the Smart Cities programme.

## ORGANISATION

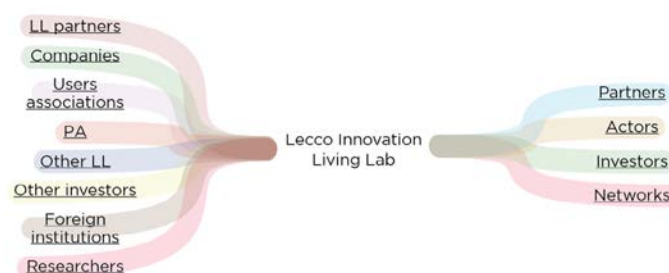
The Lecco Innovation Living Lab is wider than the network working on the research projects. It consists of Univerlecco, the Lecco Chamber of Commerce, the Municipality of Lecco, Politecnico di Milano sede di Lecco, four CNR groups (CNR IBFM, IENI, IPCB, ITIA), IRCCS Medea, IRCCS INRCA and the Rehabilitation Center "Villa Beretta".

LILL has a light governance model in order to be more flexible and efficient. It has a Technical and Scientific Committee (TSC), formed by representatives of all partners. Through a constant interaction and understanding of its potential sponsors (Regione Lombardia, Fondazione Cariplo, EU), partners and actors, it provides the Chairman with insights, which will ultimately result in a strategy involving the whole partnership

(scheme below, left). The Chairman, coordinating with the LL Manager, will activate management and communication resources, as well as a Technical and Scientific Secretary (TSS). The Secretary will work with the partners and other actors to create an effective connection and team and appoint an appropriate project leader. More generally, other resources (in blue) will be activated only when needed (scheme below, right).



Univerlecco acts as a coordinator and catalyst throughout the whole process, offering strategic planning, managerial support, identifying research themes and goals, driving the dissemination. Moreover, it is a bridge between research and business. Politecnico di Milano sede di Lecco, CNR (IBFM, IENI, IPCB, ITIA), IRCCS INRCA, IRCCS Medea and Villa Beretta offer expertise on identifying research themes and goals, writing projects, local, national and international networking and partnerships through their networks, carrying out research and developing prototypes. Additionally, IRCCS INRCA, IRCCS Medea and Villa Beretta are devoted to working with patients and validating prototypes and experimental therapies through clinical trials. The Lecco Chamber of Commerce and the Municipality of Lecco have expertise in policymaking and problem-solving, knowledge in current legislation themes. Respectively, they support businesses and citizens.



LILL interaction: The Living Lab resources will be activated selectively. On the one side users or institutions will come (or will be asked to come, whenever funding is available) with a question, a problem, a theme (input). Upon evaluation carried out by the Living Lab personnel and its partners, the most appropriate resources will be identified and the connection will be created on the industry and/or technical/scientific side. Alongside, to support the operation, additional management resources will be called in to help with problem solving, budgeting, patenting and any help they may require to reach their goal (output). These output

may be a systemic local or international research or R&D project, creating a product, service, etc.

## OPENNESS

The idea of sharing resources and spaces, meeting and teaming up is one of the key elements to make the best use of what is available in Lecco. Already in 2007, Politecnico di Milano sede di Lecco and CNR with the support of Univerlecco signed an agreement to share their research facilities. In Think&Go, started in April 2014, ten research grants were appointed to young researchers that are shared among the partners, to act as bridges and carriers. Another aim of the same project is mapping and indexing all of the available assets and expertise to facilitate the identification of the right resources and potentially attract foreign investors.

Currently, IRP issues are addressed separately on each project. Several systemic projects focused on the development of products, services and platforms supplied valuable information for the future debate on the development of shared policies. A first step can be seen in the inclusive approach of the network, validated by the partners. Anyone who has a proven interest in driving and supporting innovation is welcome to join, with a stress on helping and supporting SME, an important actor to generate socioeconomic value for the local area. The approach has been tested by the partnership working on neurorehabilitation and the Regional Cluster “Technologies for the Living Environment”. In particular, the Cluster will be an advocate and an interface with the Regional administration on the management and funds support needed for the development of themes that are relevant to the local actors. These experiments acted as a testbed and are a reference for current and future policies.

To be more inclusive and maximise the potential of the network, new online resources are being developed to complement old ones. A shared platform for the Living Lab partners will provide information and support and facilitate connections and ideas inside and outside, showcase what is available and give a chance to browse through it to locate a specific partner, product or service.

## RESOURCES

What is most essential is a flexible infrastructure, policies for coordination, and the knowledge of what is available for an effective matchmaking, in order to minimize costs and maximize opportunities. Within that framework, actors can work with different roles and responsibilities to ideate, develop and deliver research results, prototypes, products, services, etc. The most labour intensive and risky activities are management and laying out project proposals. These can be carried out by any partner of the Living Lab, as anyone has skills, experience and proven track record. Usually, the Univerlecco staff provides the basic support needed, and the number of people involved in the process varies greatly from project to project, depending on the need, will and restrictions. As described in section 4, part of this model is already self-sustained, the goal being becoming more self-sufficient through commissions and support for enterprises needing the Living Lab and funds coming from projects and sponsors. These revenues can be used to fuel the innovation process.

In terms of international contacts, the partnership was born and has grown and strengthened at a local level, since that was a primary requirement to develop a long-term



systemic approach. In the meantime, individual institutions –especially Politecnico di Milano sede di Lecco and the four CNR groups,– and enterprises kept working also in international contexts on a number of projects and maintaining a high percentage in terms of products/services export. Recently, the partnership as a whole started to expand and work with international contacts. Relevant experiences include several members of the Cluster “Technologies for the Living Environment” collaborating with the EIP AHA on four work tables: A2 - Specific Action for Falls, B3 - Specific Action for Integrated Care, C2 - Specific Action for Independent Living and D4 - Specific Action for Age-friendly buildings, cities & environments. Moreover, in Think&Go (2014), the third action in the project concerns two high profiles researchers from Grenoble and the MIT coming to Lecco for an exchange and a training period for young researchers. Additionally, Regione Lombardia is coordinating the National network for the participation in the KIC programme. Several LILL partners work in the team. Finally, SensibiLab in the Politecnico di Milano sede di Lecco is coordinating “Pegaso”, a European FP7 that involves CNR IBFM, another partner of LILL, in an international consortium of 17. The project aims at engaging teen-agers in the adoption of healthy lifestyles for the prevention of obesity and related co-morbidities.

Following this trend, many new opportunities opened with the Horizon2020, COSME programme. Currently the partnership is striving to write its own policies to be able to activate single partners or small partnerships to team up with foreign institutions and enterprises to work on European projects. Formalising the common values and effort by becoming a Living Lab member of the ENoLL network is an important step in the process.

On the systemic innovation side, Univerlecco developed the “Business to Research” project, mentioned in section 1. Nine years before that, in 2005, the “Educate Foreign Students” project started. As of today, it counts over 1600 foreign students, most of them with full bursaries, graduated in Master’s in Engineering at Politecnico di Milano. In a long-term vision, they become “ambassadors of our territory” once back in their home-lands. Again, in “EcoSmartLand”, promoted by the Lecco Chamber of Commerce with a wide partnership. It is a strategic territorial project to take advantage of the 2015 Expo to build values that will last beyond the event. In this frame, Univerlecco coordinates the Lecco Innovation Lab. It involves all of LILL partners and projects to work on innovation and health and inclusion themes.

## **USERS AND REALITY**

Users’ needs are highly valuable and key for the development of the Living Lab. They are reminded of the role of the Living Lab through its dissemination network, with online and offline communication, events, initiatives, vouchers for innovation (when available). They express their needs to the Living Lab team that will help and support them in finding the right resources, partners and information to reach their goals. The structure of LILL is agile and flexible by design, so that users and actors can get in touch and propose their own project, ask their questions, or talk about their peculiar need and find help, support or connections at any time during the process.

Currently, the real-life environment for testing is provided by the Rehabilitation Center “Villa Beretta”, IRCCS Medea and IRCCS INRCA through clinical trials run by their multidisciplinary teams. Typically, these are carried out with the collaboration of patien-

ts and families –as end users– and valuing their feedback as useful insight for directions and improvements. By becoming an ENoLL member, LILL commits to enhance user involvement and user-centered practices.

## VALUE

As part of the Think&Go project (2013) and long-term strategy, the Living Lab is currently mapping all the assets and resources available to index them and make them available to their partners and users of the Living Lab, and to attract potential investors. Moreover, there is the need to fully understand to what extent the value generation within the Lab can be enhanced and shared, and how. This topic is part of the ongoing discussion mentioned in sections 5 and 7.

Some of the laboratories already mapped include: Robotics, Robotics for Rehabilitation, Advanced Materials, Advanced 3D prototyping, Novel composite structure for disabled patients, Bioengineering, Neuroimaging, Muscular physiology, Signal processing, Virtual and Augmented reality, Ergonomics and Design, Health organisation and market analysis, Digital application, Human factors evaluation, Biomedical Engineering for the integration and analysis of multimodal biomedical images, Pathophysiology of the physical exercise, Biomechanics, Free radical determination, Analysis and processing of biomedical signals, images and data, Gait&Motion Analysis Lab, ICT & Management Observatories.

The Living Lab partners produced significant advancements in the field of rehabilitation in terms of knowledge and prototypes. However, the most difficult part is still transferring what is found with research into everyday tools. The Living Lab supports almost every phase of the value chain and beyond, from generation to use. Nonetheless, a critical aspect in health related products, services and platforms is the certification that comes after the clinical trial, and that cannot be internalized. One of the important goals of the Living Lab will be creating strategic partnerships to bridge the gap between research and the industry also at a legislative level. This will raise the rate of products that go onto the market and speed up the process. The result will be lower costs for manufacturers and providers and, eventually, end-users.

## DIRECTIONS AND PLANS FOR THE FUTURE

As underlined in sections 2, 5 and 6, all the actors in the value chain are already involved with the Living Lab. The challenge is developing strategies and policies for a shared model, in order to overcome critical points in partnering up different actors and bridging research and the industry. The most delicate aspects to deal with are the laying out of shared IRP and NDA policies; balancing them with openness and the need to develop shared tools and a shared language; validating at an operative level the sustainability of the Living Lab as a single interface for all the actors involved in the process; understanding and developing policies for international project that require no more than 3 entities coming from the same Country; overcoming the difficulties of achieving a certification through strategic partnerships.