Stimulating Development through Transnational Living Labs: the Italo-Mozambican Vision

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Abstract: In this paper, we present the vision for Maputo Living Lab (MLL), which started in January 2011, as part of a network of Living Labs located in developed and in developing regions. The Maputo Living Lab has the purpose of activating a transfer of competences, innovation and education between Trentino (an Autonomous Province in Northern Italy), Mozambique and other developing countries. The tight connection between Mozambique and Trentino makes some characteristics of MLL unique in the Living Labs panorama and poses various challenges that we describe in this paper.

Keywords: living lab, maputo, ict4d.

1   Introduction

On November 12th, 2010, the signing of an agreement of technological cooperation between Mozambique and the Autonomous Province of Trento (Italy) officially initiated the experience of a Living Lab in Maputo, as part of a long time cooperation between the two regions lasting already for several decades[1]. The goal of Maputo Living Lab (MLL) is to use ICT to stimulate development in Mozambican districts and to create new business opportunities for the local community, start joint-ventures, and bring competences and international investments to the area.

MLL will initially focus on the rural region of Manhiça, due to its privileged position as a test bed in which several education and research activities are taking place, including the construction of the Maluana Science and Technology Park. The ideas and applications tested in the Manhiça area will however have a national scope.

The research areas of interest of MLL will include the range of scientific and technological competences of the Trentino and Mozambican systems, focusing in particular on applications targeted to rural areas in domains such as environment and natural disaster monitoring, healthcare, land management, education, tourism, agriculture, district government and governance. Public Administration will also be a key sector that will

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[1] News appeared on Italian Network on November 12, 2010.
   http://www.italiannetwork.it/news.aspx?ln=it&id=22166 (accessed on November 22, 2010)

benefit from the operations of the Living Lab, as the MLL initiative has been devised as a supporting activity of the country's e-Government Interoperability Framework [1].

MLL aims at applying the open innovation paradigm of Living Labs by involving the local community as a source for project ideas and as end-user group for the Living Lab's products. Furthermore, being located in a developing region, MLL will have the goal of fostering local development by working as a start-up incubator to promote local entrepreneurship, helping the execution of innovative projects that can contribute to the improvement of the quality of life in Mozambique.

One specific feature of MLL is its geographic distribution. This represents a major challenge as it imposes various design choices to guarantee coordination among activities being carried out in two different geographical areas. Our end goal is to create a network of researchers, innovators and businesses of the two countries, backed by an infrastructure to share ideas and competences (a "Marketplace of Needs, Competences and Ideas"), with the purpose of stimulating development and bi-directional innovation (from Mozambique to Trentino and vice versa). This paper discusses the design choices and our approach for the implementation of Maputo Living Lab, first presenting the set of high level activities that must be activated to promote Education, Research and Innovation and then outlining the operating model of the Living Lab.

The paper is structured as follows. We start by providing an overview of similar initiatives in Sub-Saharan Africa and in Europe (Section 2). We then discuss the goals and challenges of Maputo Living Lab (Section 3) and we present our approach and operating model for its implementation (Section 4). In Section 5 we present our long term vision of a "Transnational Living Lab" and we discuss our conclusions in Section 6.

2 Related Work

In this section we present some significant Living Lab experiences whose lessons learned could add value to the implementation of MLL and to the long term vision of a Transnational Living Lab.

Living Labs are organized in networks, the largest of which is the European Network of Living Labs (ENoLL), currently bringing together 212 labs located in Europe and in other continents[2] and of which MLL is already part. The Living Lab innovation model is also being applied in ICT for development practice in Southern Africa [2-5], where the LLiSA (Living Labs in Southern Africa)[3] is currently active as a network of 11 Living Labs. In this section we present two Living Labs of the LLiSA network established in two rural areas of South Africa and we introduce two transnational Living Lab experiences in the Mediterranean area and in Northern Europe.

2.1 Siyakhula Living Lab (Mbashe Municipality, South Africa)

The Siyakhula Living Lab (SLL) was commenced in 2005 by the University of Fort Hare and Rhodes University as a pilot of a holistic ICT for development project to support rural development in South Africa by developing and field-testing a distributed, multifunctional community communication platform [3]. SLL is located in the Mbashe Municipality, along the coast of the wild Eastern Cape Province of South Africa. The area is affected by a severe lack of infrastructure and services, widespread poverty and isolation.

The first project developed by SLL in 2006 was an eCommerce platform in Dwesa to promote tourism and advertise local crafts, arts and music. Researchers from the two universities visited monthly the community to promote and field-test the initiative but also

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[2] http://www.openlivinglabs.eu/aboutus (accessed on February 10, 2011)
[3] http://llisa.net/ (accessed on February 10, 2011)

to teach computer literacy. This resulted in a synergy between technical expertise and understanding of the local context [4].

Currently, SLL conducts research directly inside the community by first promoting computer literacy, then demonstrating the value of ICTs through use and finally by involving the community in the development of ideas.

2.2   Sekhukhune Rural Living Lab (Mpumalanga Region, South Africa)

Sekhukhune Living Lab is part of the Integrated C@R Project (www.c-rural.eu) financed by the 6th Framework Program of the European Union. The Rural Living Lab (RLL) is located in the economically active Mpumalanga region. The project of the RLL follows the traditional Living Lab paradigm and Collaborative Working Environments to boost SMMEs incubation.

The objectives of the Living Lab include reaching a state of sustainable trusted innovation in a user centred co-design process, boosting the collaboration amongst SMMEs via a collaborative incubation mechanism and introducing an extended collaborative service bundle that will offer amongst others mentoring support, business management tools and business development services.

The project identified several service-oriented, collaborative scenarios for SMME incubation, including procurement & logistics, management & eCommerce, knowledge sharing and spatial analysis support [5].

2.3   Mediterranean Living Lab for Territorial Innovation – MedLab

MedLab's[4] objective is to apply the Living Lab approach from the demand side of regional policy, building on concrete pilot projects to construct a governance network that brings economies of R&D scope, social innovation and policy coherence to all levels, from the local community to the transnational scale. MedLab networks several partners from different Mediterranean countries: Greece, Cyprus, Slovenia, Italy, France and Spain.

MedLab has a 24-month workplan in which transnational R&D and local strategies to meet specific development needs are linked. All the partners apply and validate the Living Lab approach in the fields of inno-SME networks, rural development, coastal zone management, participatory strategic planning and tourism. The aim is to test roles in articulating "innovation demand", involve local citizens and businesses in co-design processes, and identify R&D priorities.

Starting from a transnational pilot partnership, MedLab developed into a permanent trans-Mediterranean governance structure that increases the competitiveness of the area.

2.4   Living Labs in the North (LILAN)

Nordic countries have been a place for many global companies to test and evaluate their products and services, because Nordic citizens are known to be early adopters and quick to start and follow trends. The Baltic countries have been following (and partly surpassing) the Nordic countries in this matter [6]. For this reason, a Living Lab established in one of such countries can benefit from a greater response from the local community.

The "Nordic-Baltic Living Labs – the creation of a Nordic-Baltic Programme" started in 2007 and is financed by NordForsk under the NORIA-net programme. The project, led by VINNOVA with the collaboration of partners from seven Baltic countries (Denmark, Finland, Iceland, Latvia, Lithuania, Norway and Sweden), has adopted the acronym LILAN (Living Lab in the North).

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[4] http://www.medlivinglab.eu/ (accessed on November 30, 2010)

The LILAN program aims at connecting people and making a cross-border network of Living Labs, creating opportunities for organizations with similar ambitions to share experiences and best practices. Furthermore, the program gives access to the partners to shared and combined resources, thus increasing the strength of the group and its possibility to influence the whole Living Lab paradigm.

The long term goals of the program are:

- Stimulate quality of life and sustainability – including environmental, societal and economic growth.
- Strengthen the attractiveness and competitiveness of the Nordic-Baltic region.
- Strengthen the innovation system.
- Strengthen the research in living labs and user-driven innovation in the Nordic-Baltic region.

The first call for proposals for LILAN opened on December 18th, 2009.

3   Goals and Challenges

More specifically, the goals of Maputo Living Lab are:

- Promote specific Education, Research and Innovation (ERI) activities in order to build capacity and improve the quality of research in Mozambique in the field of ICT for development. These activities will take advantage of the transnational setting of MLL, namely the opportunity for knowledge transfer from the Italian partners to effectively improve local competences in ICT.
- Promote local entrepreneurship and international investments. Maputo Living Lab will seek opportunities to transform projects that address local needs into spin-offs, thus working as start-up incubator. Being located in the Manhiça region, a fast-growing rural area located 70 kilometres north-east of Maputo, the Maputo Living Lab will have to catch the opportunities offered by the development needs of the population and the technological know-how of the partners. The projects activated by the Living Lab will thus have to be strictly connected to the needs of the local community also to promote entrepreneurship in the country and to facilitate industrial/research partnerships between Mozambique and Trentino.
- Devise and implement a replicable ERI model to foster development in a transnational setting. By using the living lab itself as an organizational test-bed, we intend to acquire the know-how and insights to be able to reliably and consistently replicate the MLL experience to other territories.

These goals inevitably involve several challenges. Geographic distribution could represent a major challenge, considered that the committee responsible for the organization of MLL itself is not co-located. The creation of virtual teams to work on projects is expected to be initially hindered by a gap in competences between Mozambique and Italy. Likewise, the involvement of external stakeholders (i.e. companies, academic institutions and funders) from both countries will greatly depend on the ability of MLL to build capacity in a relative short period. For this reason, its initial activities will be focused on education.

Another challenge resides in the identification of the needs of the local community. MLL projects will have to be at the crossroad of three main requirements: have a significant impact on the target communities, scalability up to the national level and possibility to result in business opportunities.

Maputo Living Lab will also have to deal with the relatively short term funding from the Autonomous Province of Trento. In fact, MLL is expected to be self-sustained by the end of 2013. To achieve this goal, MLL will have to build a network of partners with which it will seek funding from international agencies for projects relevant to the development of

Mozambique and Sub-Saharan Africa in general. Project proposals and execution will be one of the core activities of the "Transnational Living Lab" once it will be active.

4 Approach and Operating Model

Maputo Living Lab aims at establishing a set of five actions related to strengthening the scientific and technological collaboration between Trentino and Mozambique. Such actions include the support to building the physical and technological infrastructure of the Maputo Living Lab and the definition and development of common research and innovation projects, including the definition of support actions to favour the participation of SMMEs to the Living Lab. This section first describes the approach of MLL by presenting its five characterizing macro activities and it then discusses the operating model of the Living Lab.

4.1 Approach

As described in the previous section, MLL will coordinate Education, Research and Innovation activities to foster development. Figure 1 displays the activities of MLL, organized as a stack based on a common technological infrastructure.
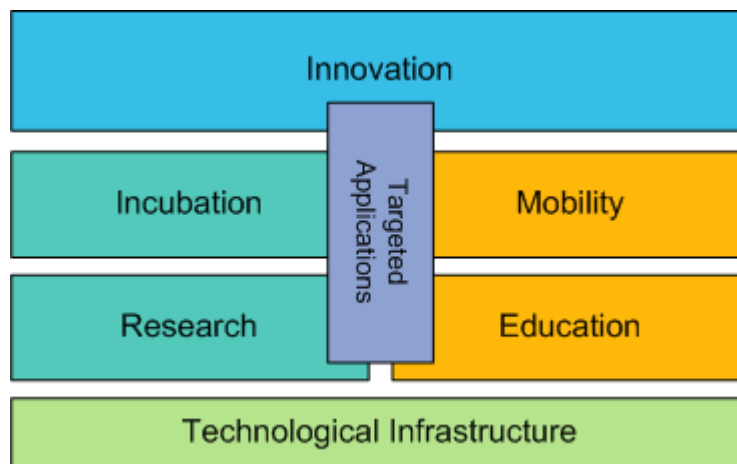

Figure 1: Characterizing activities of Maputo Living Lab.

The activities of MLL will require the integration of the following five areas, all supported by a shared physical and technological infrastructure:

- Research: following the Living Lab paradigm [2], MLL will identify projects to address the needs of the rural community of the Manhiça region. The development of such projects will be for the most part conducted on the field and directly involving the target community.
- Incubation: ideas developed by researchers and developed by MLL are expected to present opportunities to become successful businesses in the local community. MLL will provide support to ICT start-ups using the know-how of all its partners, thus not only providing new companies with access to MLL's infrastructure, but also giving them access to the international network of the Living Lab.
- Education: this includes training and development of Mozambican human resources, including activities coordinated with the local universities and the University of Trento. Every year, 8 Mozambican students will be selected to participate to internships at MLL itself, at local companies or at partners (in research or industry) located in the Province of Trento. Intensive educational activities will be organized periodically to train students that could potentially become members of the Living Lab and to increase the computer literacy of the general population.

- Mobility: MLL will have a central role in mobility activities coordinated by the academic and research institutions involves. We envisage exchanges of researchers, students and ICT practitioners between the two countries as a way to transfer competences and personnel both for education and project development purposes.
- Targeted Applications: MLL will focus its R&D activities on real-world applications relevant to the Mozambican context. These applications will be coherent with the priority areas identified by the Government of Mozambique, particularly focusing on services for rural areas (e.g. eAgriculture, land management, mBanking, eHealth).

4.2 Operating Model

The identification of the components of MLL provides a partial specification since it does not describe the operating model, namely how these components integrates in a coherent set of activities. The operating model of MLL is based on the implementation of a marketplace of needs, competences and ideas ("Marketplace of Ideas" for short), on the supply of training in the ICT field via the organization of yearly Summer Schools of ICTs and on the activation of project initiatives involving SMEs as well as educational institutions from the two countries. MLL will also stimulate entrepreneurship by working as an incubator for solutions that could be transformed into successful businesses.
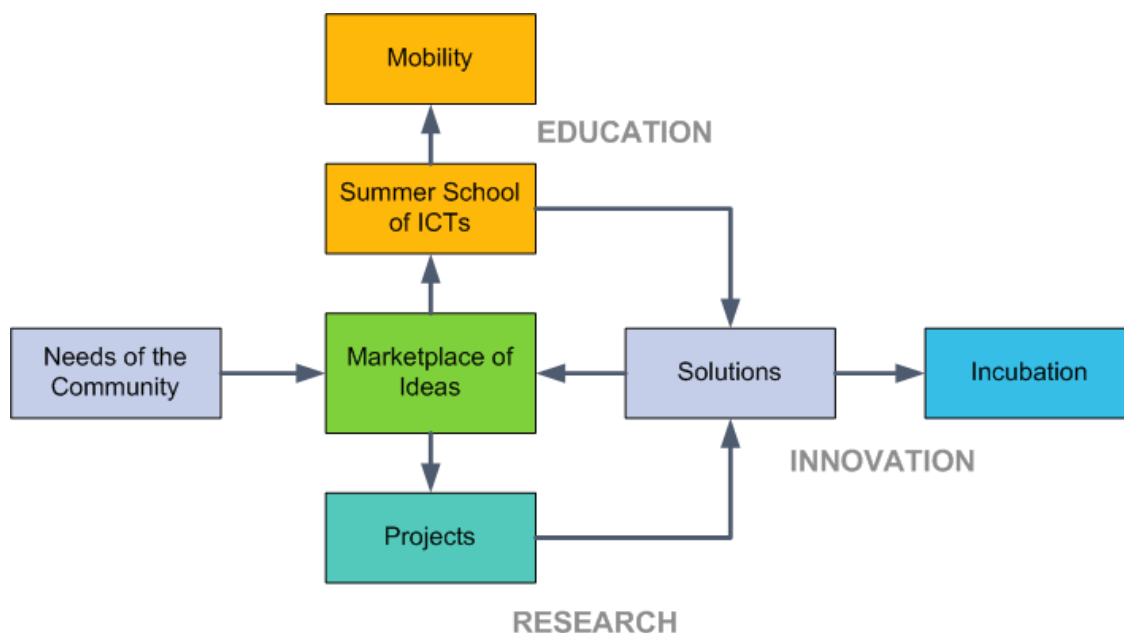

Figure 2: Operating model of Maputo Living Lab supported by a "Marketplace of Ideas"

MLL activities will be supported by a technological platform that will include an intranet infrastructure for sharing internal resources and a website for dissemination of materials and tools. The "Marketplace of Ideas" will be part of this technological platform and it will act as a funnel for needs coming from the local community, ideas to address such needs and projects that will ultimately lead to solutions.

We propose a portal organized as a social networking website, through which registered users will be able to post their needs and proposals, similarly to what happens with micro-financing. Subscribers will then be able to comment and vote for ideas that will then be evaluated by the MLL committee, possibly resulting in them being funded and new projects activated.

The Living Lab Committee will have the task of forming distributed "virtual" teams, connecting people with the required competences, choosing among its partners in the two countries (or introducing new partners) and allocate resources.

The same social-networking portal approach can be used to establish connections and foster collaboration among the partners of the Living Lab, including the local companies and prospective entrepreneurs. This is planned to be further integrated with the ICT4G SIB initiative by the European Alliance for Innovation[5].

Maputo Living Lab will also organize education and mobility activities. Part of the operations is based on a Summer School of ICTs that will be take place on a yearly basis, starting in 2011. During the Summer School, selected students from Mozambican Universities will be delivered specific training in ICT and will develop solution prototypes to address pressing problems of the country. We intend to target an increasing number of students (starting with 40 in the first year and reaching 160 by the third year) and to involve internationally recognized professors from different participating institutions.

The Summer School will have the goal of identifying promising solutions that could be transformed into real Living Lab projects and of increasing the local competences in ICT. In order to do this, MLL's mobility program will award the best students of the school with scholarships at the University of Trento and internships at companies in the Province of Trento.

In the longer term, the co-organization of schools in the two territories will help facilitate direct contacts between the students of the two countries and help foster development and innovation independently from the MLL.

5 Long Term Vision

The various activities of the Maputo Living Lab will be based on the creation of a "virtual", transnational structure. The ultimate goal is that of being able to effectively share the Education, Research, and Innovation systems of Italy and Mozambique, using the Living Lab as the focal point.

This will be achieved by acting at the organizational level and at the technological level. From the organizational point of view, the lab will be directed by a joint committee of six people, three of whom will be from partner institutions in Trentino (TasLAB, FBK and UNITN) and three of whom will be from partner institutions from Mozambique (UTICT, Eduardo Mondlane University, and Maputo's Business Innovation Center). The creation of this joint committee will be associated with the creation of two working groups in the two countries that will cooperate in the implementation of all the projects of MLL and especially in the transfer of know-how. The two working groups will form distributed virtual project teams responsible for the coordination and implementation of the activities of MLL. These will include the involvement of local SMMEs, other research centres as well as the organization of the Summer School of ICTs and other education related activities.

In the longer term, we expect to extend the model summarized in Figure 1 to other countries and Living Labs. This will allow us to create a privileged network based on Education, Research and Innovation to foster development in a cross-continental environment. We claim that replicating the model in Figure 1 (although with possibly different implementations) in multiple regions is not only feasible but it will also be crucial for the creation of such network and the formation of "virtual" distributed project groups. These groups will bring together different types of competences to achieve the goals of a specific project targeted at one of the participating communities. However, their results will not be limited to the target community of the project but they are expected to generate value

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[5] http://www.eai.eu

in all the involved regions in terms of new competences, business opportunities and collaborations.

6 Conclusion

In this paper, we presented the approach, the operating model, and the long term vision of Maputo Living Lab. We presented the idea of a transnational Living Lab spanning multiple continents and based on a replicable organizational model whose characterizing activities are focused on Education, Research and Innovation.

Maputo Living Lab presents several opportunities as well as specific challenges, particularly that of geographic distribution. As suggested in [2], "the […] Living Lab paradigm can be implemented by exploiting the synergies existing between Public Administrations, Regional Development Agencies, Industry and Citizens, which have complementary objectives that can be fulfilled by such an initiative. […] All these stakeholders can provide what is needed in terms of resources to guarantee the sustainability and the success of a Living Lab's operations". Maputo Living Lab differentiates itself from other Living Lab initiatives by supporting Open Innovation with research, incubation and education activities, thus improving ICT competences in Mozambique through knowledge transfer. This will contribute to making Mozambican researchers and entrepreneurs more competitive internationally and it will create the opportunity to form distributed project groups to address ICT4D problems.

However, while MLL will count on the resources of two regions, the development disparity between Trentino and Mozambique can represent a significant challenge to sustainability and the risk for MLL of not being able to rely on its own resources by the end of the three-year agreement. Besides sustainability, on a shorter term the risk is that of a non-equivalent participation to the activities of MLL by the Italian and Mozambican parties. A lack of involvement by Mozambican prospective entrepreneurs and academics, as well as a lack of involvement of Italian businesses could seriously hinder the operations of MLL.

On the other hand, the agreement between Trentino and Mozambique represents a great opportunity for knowledge transfer, thus making the development effort in Mozambique a collaborative one and actually improving the competences of the local entrepreneurs. Such entrepreneurs will be advantaged by the international network that MLL will be able to provide to startups and the partnership opportunities with businesses in Trentino. In the same way, MLL can contribute to the internationalization of the companies located in Trentino, providing them access to a new market and new potential partners.

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