Applying Living Lab Methodology to Enhance Skills in Innovation

Marlien HERSELMAN[1], Mario MARAIS[2], Mmamakanye PITSE-BOSHOMANE[3]
Meraka Institute, CSIR, P.O. Box 395, Pretoria, 0001, South Africa
Tel: +2712 8413081, Fax: +7212 8414720, Email: [1] *mherselman@csir.co.za,*
[2] *mmarais@csir.co.za,* [3] *mpitseboshomane@csir.co.za*

Abstract: The focus of this paper is to indicate how skills can be enhanced in innovation through the application of the living lab methodology. When users are part of the creation of innovation in real-life contexts it can have a positive effect on the enhanced and developed of their skills. This methodology allows for the user to be an active participant in the co-creation of knowledge and innovation. This allows for skills development where user's innovative skills can be enhanced and developed and which is also inline with the South African medium term strategic framework and the millennium goals of the Department of Science and Technology. Evidence of how the living lab methodology can enhance innovation skills was made clear during various visits to operational living labs in South Africa where communities are supported with skills development through their active participation as users in the co-creation of innovation.

Keywords: Living lab methodology, innovation skills, co-creation.

1. Introduction

Living Labs are open innovation environments in real-life settings, in which user-driven innovation is fully integrated within the co-creation process of new services, products and societal infrastructures in a regional harmonized context [1].

In recent years, Living Labs have become a powerful instrument for effectively involving the user at all stages of the research, development and innovation process, thereby contributing to enhancing innovation skills and growth.

The thinking and practice behind Living Labs has been developed over the last years especially in the EU, where the promotion and implementation of the approach has resulted in the creation of the European Network of Living Labs (ENoLL), which in 2008 has expanded also beyond European borders. Its mission is to help create first class innovation environments for ICT-based products, services and social innovations and facilitate innovation and collaboration between users, industry and research stakeholders [2].

The National Research and Development Strategy [3] as well as the South African Medium Term Strategic Framework [4] of the South African government motivates, firstly, for the adoption of and funding for new technology undertakings for the promotion of economic and social development. These include biotechnology, information technology, technology for manufacturing, technology to leverage knowledge from and add value to the natural resources sectors and technology for poverty reduction. Innovation is not equivalent to research and development, but it is the key process by which products, processes and services are created, and by which businesses generate jobs and wealth. Ngubane [5] indicates the importance of increasing the rate and quality of innovation in South Africa and

also highlights the role that the social sphere can play to create innovative environments where human capital can be build for the future knowledge economy.

The population of South Africa was close to 50 million at the last estimate in 2009, though many refugees are undocumented [6]. It also has a very large young population with 52% of the population under the age of 25. At least 45-50% of the population is considered to be living in real poverty, and at least 7.5 million adults are illiterate. In South Africa, citizens have so far not been seen as playing a particularly active or important role in the innovation system. Often, they are seen as passive and adaptive, merely utilising technology developed elsewhere or prescribed to them by experts external to their situations. On the other hand, the challenge of developing sustainable solutions that involve the disadvantaged sections of the population highlights the need to understand these user groups thoroughly. Innovation needs people who are well-trained, effective scientists, engineers and technologists, which are not produced satisfactory in South Africa. Thus we require interventions to strengthen the transformation of our science and technology capacity to achieve increased numbers of people working in key fields that are of importance to the future [3]. The role that living labs can play here is evident.

User-driven approaches could thus provide real value for developing and validating new concepts, services or products, allowing more rapid insights into how different users think, adopt, use and influence technology, thus enhancing innovation skills where people can harmonize their social and technical knowledge which is a sociological point emphasized by Giddens [7]. As a systemic approach, this could lead to empowering users to become active partners in RDI processes for the future.

2. Living labs and innovation skills

Innovation according to the Finland new national innovation strategy [8] is also an interactive process which is made possible through collective and collaborative processes involving a range of actors (firms, users, researchers, academics and communities) but at the heart of any innovation process is people. Without it, the world in which we live would look completely different.

The concept of Living Lab started to emerge in the late 1990s and the beginning of the 2000s [9], and the focus initially was to test new technologies in homelike constructed environments. Since then, the concept has grown and today one precondition in Living Lab activities is that they are situated in a real-world context. During the development of the concept, Living Labs has been defined as an environment [10; 11], as a methodology [12], and as a system [2].

This allows for a multi stakeholder engagement where the user is exposed to the creation of new knowledge (also referred to as innovation) sometimes.

The main difference between the Living Lab approach and traditional user involvement processes is the precondition that the user involvement activities should take place in real-world contexts [14]. This means, for example, that potential users are involved in their own private context all day round. Hence, when a Living Lab approach is applied, the aim is to create as authentic a use situation as possible. In traditional user involvement processes, users can be asked to use a system or device in a so-called field study. In these processes, the user is requested to use the device in a context in which the researcher, or developer, can observe users' actions and how the technology impacts them [14]. Hence, the use situation is not fully authentic. Another difference between the Living Lab and systems development approaches is the focus on the vertical value chain in which customers, producers, and suppliers are involved, with the objective to create new businesses [15]. This all links very closely with the

definition of developing e-skills from the European e-skills conference [16] where it distinguish between three types of e-skills development which are the ICT user skills, ICT practitioner skills and e-business skills. All of these are important but for the purpose of this paper the living lab methodology focus more on the first two types, which include [16]:

- **ICT user skills**: the capabilities required for effective application of ICT systems and devices by the individual. ICT users apply systems as tools in support of their own work, which is, in most cases, not ICT. User skills cover the utilisation of common generic software tools and the use of specialised tools supporting business functions within industries other than the ICT industry.
- **ICT practitioner skills**: the capabilities required for researching, developing and designing, managing, the producing, consulting, marketing and selling, the integrating, installing and administrating, the maintaining, supporting and service of ICT systems.

Følstad [17] explains that Living Lab literature has served to identify two aspects that may be used to discriminate between Living Labs that comply with the general definition:
- *Contextualized co-creation:* Living Labs supporting context research and co-creation with users
- *Testbed association:* Living Labs serving as a testbed extension, where testbed applications are accessed in contexts familiar to the users.

In any of the above two types of Living Labs it is possible to involve users and to stimulate their innovation skills as well as develop their ICT user skills and practitioner skills as are referred to in the e-skills definition above. The context in which the users might find themselves thus allows for richer observations and greater quantity of collected data that increases the reliability of the resulting analysis [18].

Living Labs is a way to tap into the creative potential of the potential users of the innovation. Instead of being recipients of the outcome of innovation and development, users may be engaged in co-creative innovation processes of a Living Lab [17]. Co-creation typically is seen as creative collaboration between users, developers and stakeholders. Fostering innovation skills requires novel approaches and strategies based on active learning approaches such as creative problem solving, discovery, learning by doing, experiential learning, critical thinking and creativity [18].

Living Labs can thus effectively support these novel approaches and reinforce innovation capacities, mainly because Living labs challenge us to examine new technologies in everyday contexts as used by people to achieve their goals. In this context, people from different areas of life explore innovative tools by interacting with them and discovering new ideas to expand their knowledge and to explore ways of acting [19].

The Living Labs approach can also be associated with insights in Community Informatics and Development Informatics with which it has considerable conceptual overlap [20]. Gurstein [21], who is widely cited in Community Informatics, recently suggested that Community Informatics involves a sophisticated user-focused understanding of Information Technology; and applied social leadership, entrepreneurship and creativity. Community Informatics is a type of social-technology theorization and practice that promotes social change and human development in conjunction with technology. Community Informatics is thus a specific form of research and implementation at a micro-level of society, directed at local communities and even smaller collectivities in them (community organisations, families, informal groups, village micro-enterprises). Its theories and practice are based on fields as diverse as information systems, management systems, library sciences, program evaluation, and community development, and these bring a particular nuance to working with

communities on the ground whether in Western or developing countries. The link between community informatics, living lab research and innovation skills development is thus obvious and also needs attention as these all relate to the South African medium term strategic framework which support the skills development of communities [4]. This framework aims to focus on community development through the support of technology and development of skills sets to create new knowledge and innovation with technology. Also central to future progress is the building of an enduring partnership informed by the shared interests of all social partners and society at large. In other words, what is needed are complementary and mutually-reinforcing activities among all social actors, including the state, the corporate sector, workers, communities and households.

3. Methodology

As flexible ecosystems, Living Labs can provide a demand-driven 'concurrent innovation' approach by iteratively engaging all the key actors across the phases, and putting the user in the driver's seat. The ability to interact with the users in that space is what distinguishes the Living Lab approach from other cross-disciplinary approaches. Living Lab research can be seen as the place where both fundamental research and pure applied research meet as is explained below in figure 1 in yellow, it embraces user-inspired innovation research [22,23]. The involvement of the user through the different research strategies is reflected in the figure below as well as the different research approaches which can be evident between the user involvement (orange) and the business-citizens-governmental layer (blue) in order to fill the gap/chasm between these two layers:
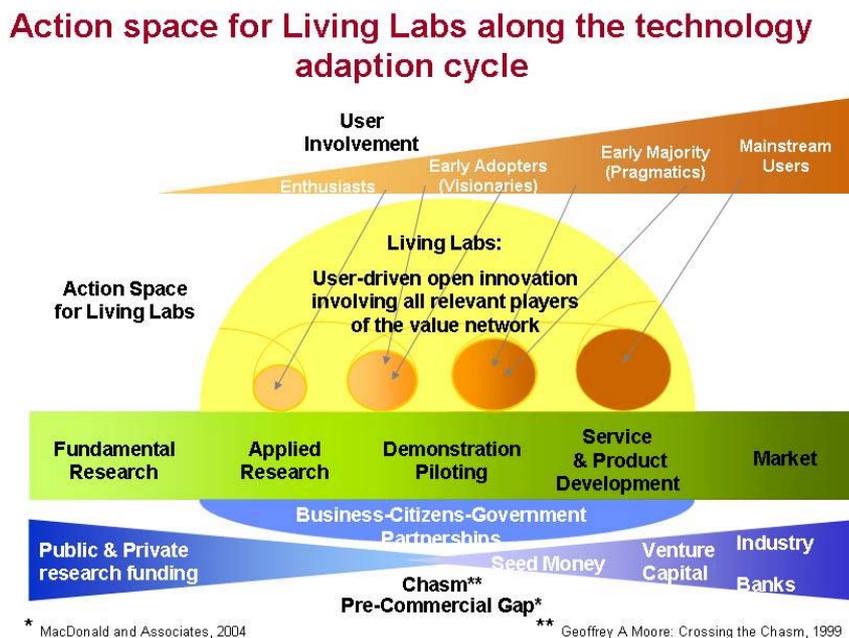

Figure 1: Action space for Living Labs [23]

4. Living Lab in Southern Africa (LLiSA) network supporting transfer of innovation skills

In South Africa the Living Lab network of Southern Africa (LLiSA) which is similar to EnoLL is hosted by the Meraka Institute, CSIR. The purpose of the LLiSA network is to create capacity for understanding, establishing and developing Living Lab activities, support

pilot projects in SA and to facilitate local and international collaboration and linkages. It will link interested developers, research organizations, industry and government bodies together for advancing regional Living Lab initiatives [24]. A key aspect of the LLiSA network is to ensure constant collaboration across Living Labs as well as a sharing of lessons learnt, contacts with industry partners and recognition. A regional, national or Southern African-wide network of Living Labs strengthens the opportunities to integrate innovations skills with technological innovations on a wider scale that contributes to socio-economic dynamism and end up adding to regional, national or Southern African wide global competitiveness, growth and job creation. Thus LLiSA can be seen as large-scale experimentation platforms for new service, business, technology, or even market and industry creation [24].

Most of the ten existing Living Labs in the LLiSA network has evidence to provide on how they each with their own uniqueness are busy with capacity building of communities and with the enhancement of innovation skills with the communities they work. Most of these living labs are operational in the rural communities scattered throughout South Africa in most of the provinces. The Living Labs in this network is evidence of how e-skills were developed and where the users are part of the process of creating innovation. One good example is the Reconstructed Living lab on the Cape Flats where users in the community are part of the process of innovating themselves through the reconstruction of their own lives. This Living Lab explains themselves as [25]:

> *"A Reconstructing interaction space for collaborative design, creation, dissemination and application of knowledge for empowerment, upliftment and development of people and communities in or headed for tension through the use of innovative ICT solutions."*

In adopting a community-based research approach, social-technology projects are ethically engaged with interested parties for community problem-solving. This can be best perceived through the incorporation of community-based action research techniques into social-technical projects [26].

We argue that such joint community-oriented research and action results in evidence to support the proposition that it is not the isolated agency of a technology or artefact that makes a difference in social-technical projects but rather, its instantiation or enactment, embedded in a social-technical web [27], or network [28, 29], within the larger framework of complex social and political order [7] where innovation skills can be enhanced and developed through the application of the Living Lab methodology in community projects.

Developing new forms of skills development (teaching, training and research) that will allow for a more inclusive engagement of all sectors in the emerging information society is the focus in the Living Labs that engage with various communities.

The Living Lab process is thus also intended for self-reflection and conceptual theory building about the relationship between technology and grounded social intervention decisions, benefits, and impact. Research and action in conjunction with the communities is also a significant opportunity for original research and activity that supports social justice and an opportunity for previously 'unheard voices' [29] to be heard in order to support the communities of South Africa through ICT research, development and innovation.

5. Conclusions

The consequences of a lack of innovation are severe and economic performance directly reflects this. A South African example: in the 1960s, South Africa represented 6% of world GDP. Today this figure is less than 0,5%, but year-on-year South Africa's economy has never shrunk. South Africa has simply been out-innovated by others who read the signs and acted

fast. Today half of America's economic growth comes from products that barely existed a decade ago. The degree to which this happens has become a key measure of a nation's success. Innovation has become the economic religion of the 21st Century, and it is no longer enough to differentiate you from 'the bunch', but outshine the competition. To thrive in modern economies, you need radical innovation. South Africa has not yet adopted this religion en masse, but there are exceptions. It is about real people who take risks. These are people who set themselves outrageous goals, almost impossible odds.

Living Labs as a methodology, system or approach therefore allows for an opportunity to contribute to the transfer of innovation skills through the LLiSA network.

Beyond innovation lies disruptive innovation, which actually changes social practices (the way we live, work, and learn). Really substantive innovation (the telephone, the copier, the automobile, the personal computer, the Internet) is quite disruptive in the way it drastically alters social practices [30], which is something the living lab methodology can provide to researchers in South Africa.

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