Chapter 9
The Role of Urban Living Labs in Entrepreneurship, Energy, and Governance of Smart Cities

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ABSTRACT

Urban living labs (ULL) are a new concept which involves users in innovation and development and are regarded as a way of meeting the innovation challenges faced by information and communication technology (ICT) service providers. The chapter focuses on the role of urban living labs in entrepreneurship, energy and governance of smart cities, where it is performed the relationship between innovations, governance, and renewable energy. The methodology proposed will focus on content analysis and on the exploration of some European examples of implemented ULL, namely Amsterdam, Helsinki, Stockholm and Copenhagen. The contributions of the present research should be the consolidation of knowledge about the impact of ULL on innovation and development of smart cities regarding the concepts of renewable energy, smart governance and entrepreneurship.

INTRODUCTION

Nowadays, cities can be characterized as places of great transformation facing challenges at multiple levels. As Johannes Hahn said (European Union, 2011, p. III): "Cities are places where both problems emerge, and solutions are found. They are fertile ground for science and technology, for culture and innovation, for individual and collective creativity, and for mitigating the impact of climate change. However, cities are also places where problems such as unemployment, segregation and poverty are concentrated."

Throughout recent decades, the term smart cities has been generalized to define cities with a set of characteristics that differentiate them from traditional cities. The concept of a smart city is not consensual for all researchers and, depending on their research area, different characteristics are highlighted

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(Caragliu et al., 2011; Chourabi et al., 2012; Gil-Garcia, 2015; Hollands, 2008). However, it is possible to identify some common denominators in the various definitions proposed in the literature, namely: ICT; sustainability; citizens' welfare; quality of life; collaboration; development; and competitiveness (Caragliu et al., 2011; Cebreiros & Gulin, 2014; Chourabi et al., 2012; Gil-Garcia, Pardoa & Nam, 2015). The concept of a smart city leads to a new conception of services which are offered to contribute to citizen welfare. In fact, there are new functionalities in cities which comprise services with more efficiency and collaboration between public and private producers of services.

In recent decades, associated with the concept of smart city, the urban living labs approach has emerged as a way of providing real-life research with the cities' multiple stakeholders involved in co-innovation activities in order to face a variety of social, economic, environmental and technological challenges.

The first living labs were created in the area of smart/future homes (Eriksson et al., 2005:4). Living labs include digital interaction, with innovation and research and development (R&D) activities, such as cooperation with technology and application providers, technology availability, vertical co-operation in the value chain, openness and neutrality, public involvement, user involvement and research involvement (Mirijamdotter et al, 2006, p. 26).

The use of renewable energy in smart cities is the next step in sustainability. Therefore, it is used in buildings, with mobility, low carbon emission and biodiversity constituting important variables to study eco innovation, eco technologies and new processes of production. Consequently, urban living labs comprise an increase in initiatives of entrepreneurship and involvement of citizens in the welfare and resolutions of cities' problems, including problems related to sustainability and renewable energies. The involvement of citizens in cities' decision-making process and in the resolution of problems is one of the main aspects of smart cities' governance (Bernardo, 2017).

Considering the emergent private-public initiatives in smart cities, the proposal of this present chapter is to present the results of the research about the impact of urban living labs on innovation and development of smart cities regarding the concepts of renewable energy, smart governance and entrepreneurship. This research raised the follow questions:

- How could urban living labs promote the production and use of renewable energies in smart cities?
- How are urban living labs contributing to entrepreneurship and citizens' involvement in smart cities' governance?

The answer to the research questions was achieved through accomplishing the research objectives:

1. To consolidate the concepts relevant to the study based on a literature review of the topics: smart cities; urban living labs; renewable energies; and smart governance.
2. To identify the role of urban living labs in the production and use of renewable energies.
3. To identify the role of urban living labs in entrepreneurship.
4. To identify and select some urban living labs to include in the case study
5. To analyse the role of the urban living labs in the production and use of renewable energies, entrepreneurship and citizen's involvement in smart cities' governance.

This chapter is organized into six sections, including this introduction to the research questions and main objectives. In the second section, "Background", the relevant concepts to this study are presented and discussed. The third section, "Methodology", deals with the methodology adopted to achieve the

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