LIVING LABS FOR SOCIAL INNOVATION

Living Labs are blossoming worldwide through a plethora of cross-sector partnerships between public, private and civil sectors in open and user-driven innovation processes. However, their actual impact in terms of empowerment and social innovation as well as specific contributions to systemic social change remain unaddressed.

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LIVING LABS: ORGANIZING MULTI-STAKEHOLDER COLLABORATIVE INNOVATION WITHIN INTERTWINED SOCIAL AND TECHNOLOGICAL SYSTEMS

Living Labs (LLs) take part of the worldwide movement involving a plethora of labs, hubs and think tanks with focus on societal needs and the generation of social innovations. Overall, Living Labs represent new models of organizing collaborative innovation processes by involving diverse actors, including users, communities, business, public and civil society sectors. In Europe LLs are seen as instruments to achieve greater citizen participation and social cohesion addressing the declining competitiveness, the reduction of welfare programs, and reforms in the provision of public services. In that sense, LLs are described in terms of the aspired benefit of greater participation by a diversity of stakeholders (communities of practice, users) in tackling current societal challenges [1].

The burgeoning and varied geography of LLs is currently observed at different scale and level of complexity in many sectors, such as digital and emergent technologies, energy, health, creative and cultural industries, agri-food, tourism, among others. LLs can be physical or virtual spaces and in many cases the term labs/hubs is used interchangeably; with many differences in their scope, organizational structures and configurations, size, purpose, type of actors and level of engagement by users and communities [2]. For instance, there are LLs created by top-down initiatives supported by public funding, such as the Central European Living Lab for Territorial Innovation while Corporate Living Labs are implemented by private capital in Multi-National Companies (MNCs) and large organizations. Living Labs are also implemented by private and public universities aimed to a better integration of sustainability goals and strategies into their organizational structures. Perhaps the most well-known examples are Urban and City Living Labs, which constitute novel forms of collective urban governance and experimentation to address sustainability challenges and opportunities in urban contexts through different types of partnerships [3]. Being such a heterogeneous phenomenon, in the praxis arena it becomes difficult to define what a Living Lab is and why it matters as potential source of social innovation and systemic social change.

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LIVING LABS: ORIGIN AND ROOTS OF AN EVOLVING CONCEPT

The origin of LLs is attributed to William J. Mitchell and his colleagues at the Massachusetts Institute of Technology (MIT) with the inauguration of the PlaceLab in 2004, an apartment equipped to observe and experiment with its inhabitants. LL was defined as the application of a user-centric research methodology for sensing, prototyping, validating and refining complex solutions in real-life contexts. This still prevalent approach to LL was also present in other pioneering initiatives in the 1990s in the USA and Europe. It is worth stressing that this model notably differs from other labs such as the Abdul Latif Jameel Poverty Action Lab (J-PAL), also established at the MIT in 2003. This lab was described as a platform to evaluate policy instruments for regional development involving a global network of governments agencies/institutions, donors, foundations, development organizations and research centers [1, 2].

Living Lab types	Other related terms that sometimes refer to LL configurations/structures	
Blue Living Lab	Blue Lab	Policy Innovation Lab
Circular Living Lab	Change Lab	Policy Lab
City Living Lab	Centre for Innovation	Public and Social Innovation Lab (PSI)
Co-creation Living Lab	Circular Lab	Public Lab
Corporate (social) Living Lab	Circular Talent Lab	Sandbox
Design Living Lab	City Lab	Social cluster
Digital Living Lab	Civic Lab	Social hub
e-Living Lab	Co-creation hub	Social Impact hub
Fab Living Lab	Co-creation Lab	Social innovation Lab
Green Living Lab	Co-design Lab	Social Innovation Park
IoT Living Lab	Co-Lab	Social innovation platform
Living innovation platform	Community Lab	Social Lab
Living Laboratory	Corporate Social Innovation Lab	Societal pilot
Living Laboratory for Sustainability	Corporate Social Lab	Social Space for Research & Innovation (SSRI)
Open Innovation Living Lab	Coworking space	Rural Lab
Open Living Lab	Design Lab	Social Science Park
Rural Living Lab	Do-tank	Tech-Lab
Silver Living Lab	Fab-Lab	Transition Lab
Sustainable Living Lab	Governance Lab	Urban Lab
Test-bed	Hackers space	Other
Transition Living Lab	Hive	
University Living Lab	Hub Impact hub	
Urban Living Lab		

Living Labs types within the jungle of "labs & hubs" terminology

In Europe the living lab movement appeared in the 1990s and acquired visibility with the creation of the European Network of Living Labs (ENoLL), founded in November 2006 under the Finnish Presidency of the Council of the European Union. This network comprises about 170 LLs around the world, including federations of LLs like the Brazil Network of Living Labs (BNoLL), the Africa Network of Living Labs (ANoLL) and the China Network of Living Labs (CNoLL) and collaboration with international institutions like the World Bank, the Food and Agricultural Organization (FAO), the Europe Business Network (EBN), among others. ENoLL defines LLs as "user-centred, open innovation ecosystems based on systematic user co-creation approach, integrating research and innovation processes in real life communities and settings. LLs operate as intermediaries among citizens, research organisations, companies, cities and regions for joint value co-creation, rapid prototyping or validation to scale up innovation and businesses" [4].

EVOLVING FORMS AND TYPOLOGIES OF LIVING LABS

Hundreds of case studies enable to observe the evolution and co-existence of three generations of LLs, particularly in terms of different users' participatory roles and scope [5].

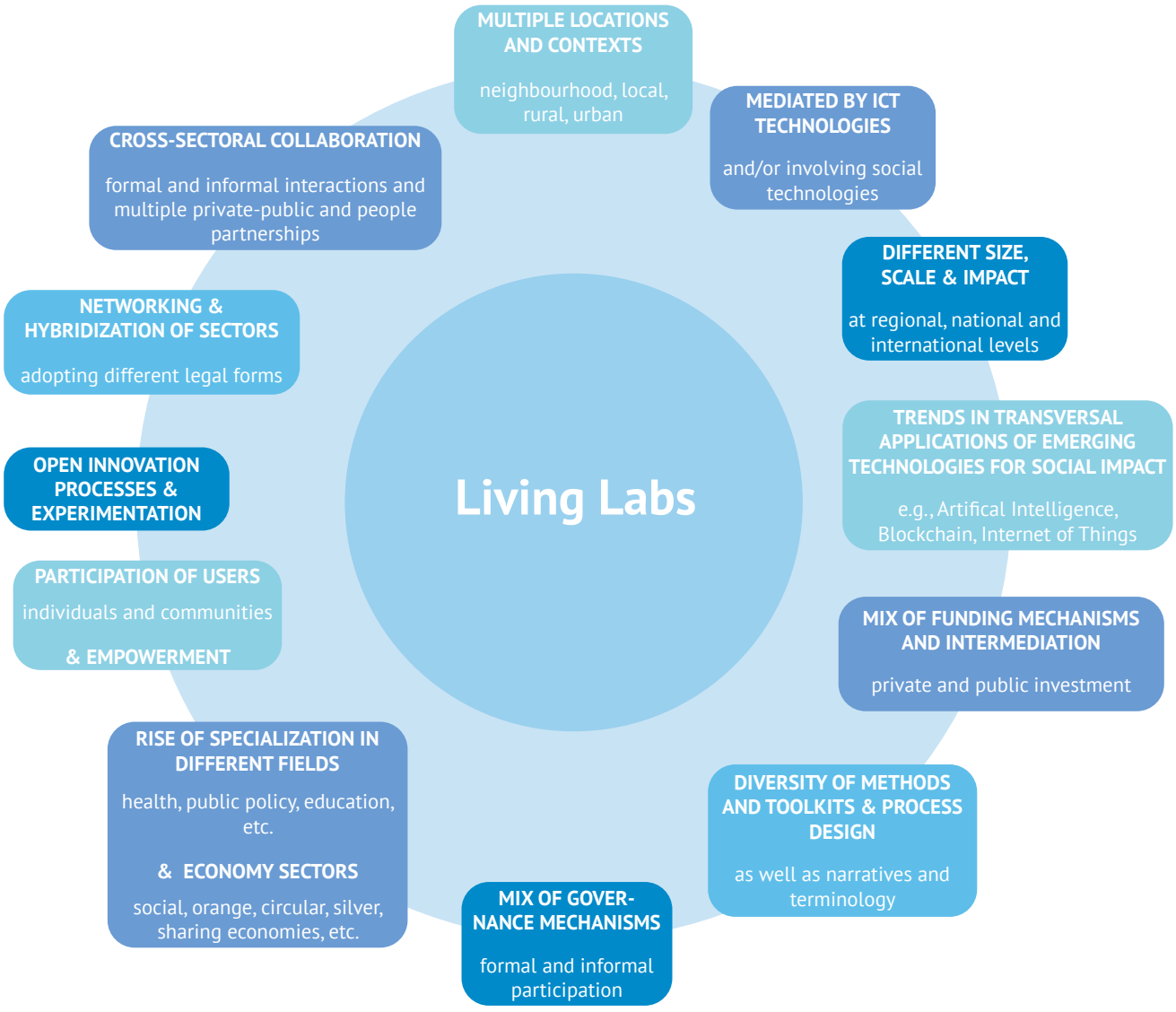
In the **first generation** the focus was on the physical structures created in research institutes or organizations with the purpose of developing innovation processes with the participation of customers and users as subjects of experimentation, moving research from in vitro to in vivo settings in simulated or real-life contexts, e.g., testbeds.

In the **second generation** this model evolved to a physical or virtual structure/platform with a more open conception of users' participation, who actively participate with other agents in the experimentation and co-creation of new solutions, innovating in products, services, business models,

etc. These LLs are characterized by the introduction of new collaborative social practices by cross-sector interactions and partnerships (the so-called fourth helix between firms, academy, government and civil society). Many LLs are adaptations of Research & Development (R&D) living labs placed in research institutes and universities that 'reconverted' their strategies and activities to improve their answer to societal demands. Their distinctive characteristic is the more or less active role of customers and users (individual or communities) as co-creators in the innovation process, from user-centered to user-driven or user-led perspectives. They focus on the diagnosis of needs and test prototypes, in some cases as policy instruments to support and integrate technological and social innovations to improve local or regional development [5].

In the emerging **third generation** LLs constitute 'labs of labs', i.e., LLs as 'innovation ecosystems' with a focus on structuring and organizing networks of innovation stakeholders and their articulation at local, regional, national and international levels. They share resources and organize collaborative networks between their stakeholders, relying on representative governance, participation and open-standards. Implementing a diversity of innovation activities and methods to gather, create, communicate, and deliver new knowledge, validate solutions, these LLs aim to reinforce innovation and the production of broad social impact through the generation of economic, social and/or environmental values.

In sum, LLs have common elements but may have multiple different implementations, there is a certain consensus in recognizing LLs from the broad perspective of 'ecosystem' but also as a specific environment/context, a platform/support structure and a methodology or set of methodologies according to the specific economic sector [1, 2].



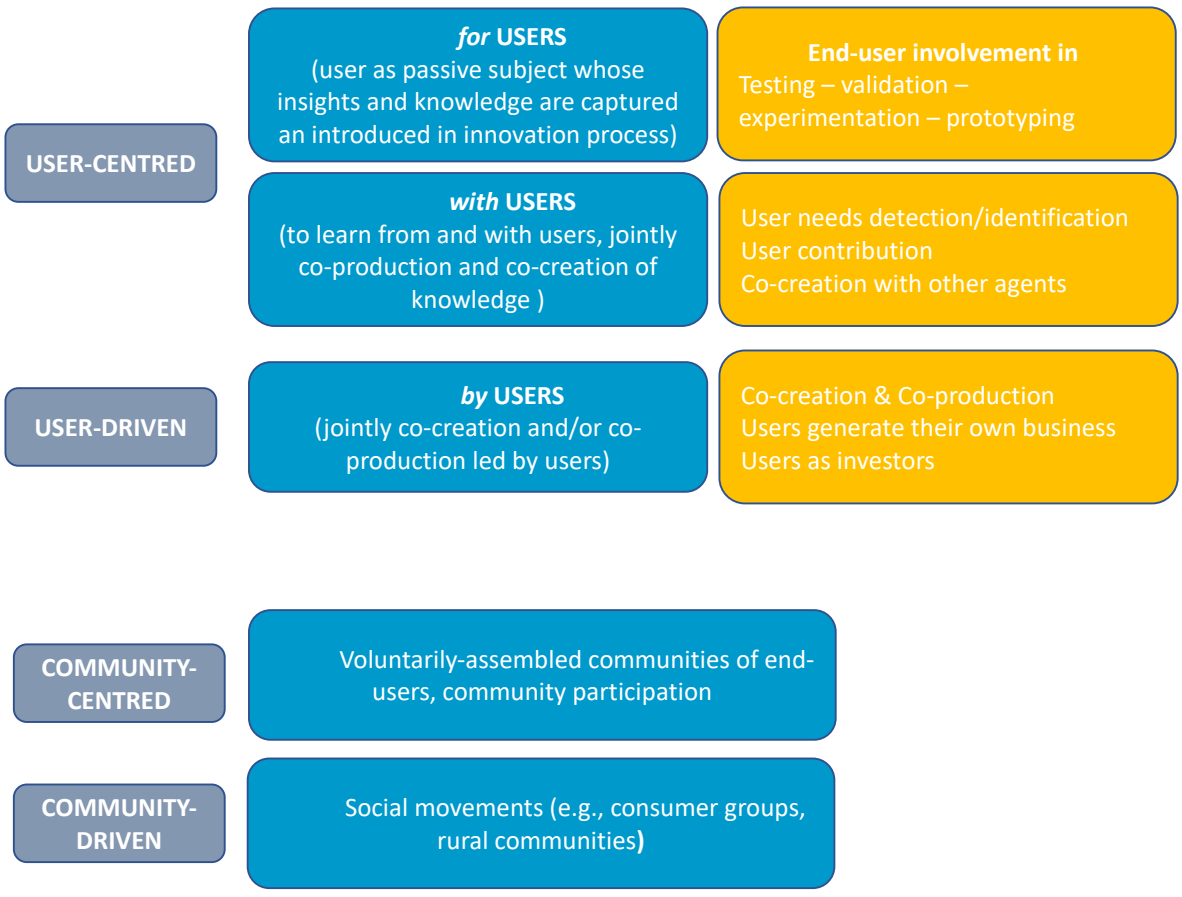
Characteristics of Living Labs, some of them overlapping with other social innovation-oriented labs and hubs

Taking into account the funding and supporting mechanism together with the type of partnerships and objectives, the European Association of Living Labs makes the distinction between research living labs, corporate living labs, organizational living labs, intermediary living labs and time-limited living labs. One recent trend is the creation of Corporate (social) Living Labs by MNCs and large firms or in public entities such as universities as exercise of Corporate Social Innovation. They are generally implemented in similar way to social business units and corporate social incubators and platforms/hubs for social impact, mainly driven by social intrapreneurs and with different level of users' engagement. Additionally, LLs are increasingly linked to incubation and acceleration programs, operating as intermediary platforms among citizens, research organizations, companies, cities and regions for joint value co-creation, rapid prototyping or validation to scale up innovation and businesses.

Overall, Living Labs are characterized by their strong background and orientation to the development of technological products and services addressing societal needs. Some projects developed in the Living Lab context are strongly oriented to the development of technological solutions to a social problem with a low level of user and/or community participation, without changes in social practices or generation of a significant social impact. Moreover, there are many differences with regard to the involvement of users and communities, from playing a passive role to active user co-creation. Thus, the analysis of participatory and empowerment processes 'who' and 'how' and 'to what extent' participate in co-creating knowledge- is crucial in analyzing the generation of social innovations in living labs, which greatly differs if they are user-centered, user-driven or user-led [1, 6].

CONCLUSION

LLs offer a unique research context to study social innovation since they assign a distinct role to citizens as users and co-producers of knowledge in innovation processes. They are built to respond to meet and solve societal needs and take advantage of opportunities for transformative action in order to modify social practices and social structures. Nonetheless, they raise both theoretical and empirical challenges. One crucial aspect is the distillation of LLs profiles for their recognition and roles in social innovation ecosystems. As they come from different sectors and embrace



Different participatory roles of users and communities in Living Labs

different institutional logics, the 'rules of the game' to collaborate may strongly influence both the agency and structure of collaboration and the specificity of social innovation outcomes. Many aspects are still scarcely investigated, in particular the contribution of LLs in creating disruptive and radical social innovations. But the central aspect that remains unaddressed is empowerment and capability building, since they constitute a requirement to create win-win contexts for collective action and genuine social innovations towards the social transformation to a sustainable society.

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