# **Appendices:** The Defining Characteristics of Urban Living Labs (Steen & van Bueren, 2017)

Steen, K., & van Bueren, E. 2017. The Defining Characteristics of Urban Living Labs. *Technology Innovation Management Review,* 7(7): 21–33. http://timreview.ca/article/1088

**Appendix A.** Overview of definitions of living labs in the TIM Review

| **Referencing Publications** (Chronological order) | **Sources** | **Definition** | **Aspects Addressed** |
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| **Leminen, Westerlund, & Nyström (2012)**: Living Labs as Open-Innovation Networks | Westerlund & Leminen, 2011 | Living labs are…<br>"physical regions or virtual realities in which stakeholders form public-private-people partnerships (4Ps) of firms, public agencies, universities, institutes, and users all collaborating for creation, prototyping, validating, and testing of new technologies, services, products, and systems in real-life contexts" | • Physical regions or virtual realities<br>• Public-private-people partnerships<br>• Collaborating<br>• Creation, prototyping, validating, testing<br>• New technologies, services, products and systems<br>• Real-life context |
| **Almirall, Lee, & Wareham (2012):** Mapping Living Labs in the Landscape of Innovation Methodologies | Almirall & Wareham, 2008 | Living Labs are…<br>"small organizations that aim to capture users' insights, prototype and validate solutions in real life contexts, aim to contribute to both problems providing structure and governance to the user involvement and methodologies and organizations to filter and sense user insights" | • Small organisations<br>• Aim to capture users insights<br>• Prototype & validate<br>• Real life contexts<br>• Providing a structure and governance to the user involvement<br>• Providing methodologies and organisations to filter and sense user insights |
| **Katzy (2012):** Designing Viable Business Models for Living Labs | Almirall & Wareham, 2008 | Living labs are…<br>"intermediaries for collaborative innovation" | • Intermediaries<br>• Collaborative<br>• innovation |

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| **Schaffers & Turkama (2012):** Living Labs for Cross-Border Systemic Innovation | Own definition based on:<br>• Schaffers et al, 2010<br>• Budweg et al, 2011 | Living labs are…<br>"constituting a setting for collaborative innovation by offering a collaborative platform for research, development, and experimentation with product and service innovations in real-life contexts, based on specific methodologies and tools, and implemented through concrete innovation projects and community-building activities". | • Collaborative platform<br>• Research, development, experimentation<br>• Product and service innovations<br>• Real life contexts<br>• Specific methodologies and tools<br>• Implementation in concrete innovation projects<br>• Community building activities |
| **Schuurman & De Marez (2012):** Structuring User Involvement in Panel-Based Living Labs | Almirall & Wareham, 2008 | Living labs are…<br>"innovation arenas or "innovation intermediaries" because they build a *multi-stakeholder* ecosystem where users are subjected to a combination of research methodologies while they test new technologies that are still in development with the focus on accessing the ideas and knowledge of the users regarding the tested technology" | • Innovation intermediaries<br>• Multi-stakeholder<br>• Ecosystem<br>• Research, development, testing<br>• New technologies<br>• Focus on accessing the ideas and knowledge of the users |
| **Mulder (2012):** Living Labbing the Rotterdam Way: Co-Creation as an Enabler for Urban Innovation | Own definition | "The living lab approach is a research methodology for sensing, prototyping, validating, and refining complex solutions in multiple and evolving real-life contexts." | • Research methodology<br>• Sensing, prototyping, validating & refining<br>• Complex solutions<br>• Multiple and evolving real-life contexts |
| **Niitamo, Westerlund, & Leminen (2012):** A Small-Firm Perspective on the Benefits of Living Labs | Kusiak, 2007 | "The living labs approach: where technology is developed and tested in a physical or virtual real-life context, and users are important informants and co-creators" | • Development & testing<br>• Technology<br>• Physical or virtual real-life context<br>• Users as informants<br>• Users as co-creators |
| **Ståhlbröst (2013):** A Living Lab as a Service: Creating Value for Micro-enterprises through Collaboration and Innovation | / | "Among living lab researchers, it is common to view living labs as a specific research approach that supports user involvement and innovation processes carried out in real-world contexts (e.g., Bergvall-Kåreborn and Ståhlbröst, 2009; Leminen and Westerlund, 2012). A quattro-helix approach is applied, which involves four different types of stakeholders in innovation processes: researchers, companies, users, and public organizations. Thus, a living lab is an environment that has a defined approach to support its actions." | • Research approach<br>• User involvement<br>• Innovation processes<br>• Real-world contexts<br>• Researchers, companies, users & public organisations (4-helix)<br>• Environment with a defined approach |

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| | Ståhlbröst 2012 | "The living lab approach is based on five key principles, which guide the operations of the living lab: value, sustainability, influence, realism, and openness" | • Value<br>• Sustainability<br>• Influence<br>• Realism<br>• openness |
| **Schuurman, De Marez, & Ballon (2013):** Open Innovation Processes in Living Lab Innovation Systems: Insights from the LeYLab | Schuurman, Baccarne, Kawsar, Seys, Veeckman, De Marez & Ballon, 2013 | "the living lab infrastructure as a whole forms the centre of the living lab, with five general living lab characteristics depending on this infrastructure:<br>• Natural setting<br>• Multi-method<br>• Medium- to long-term<br>• User-centric<br>• Multi-stakehodler" | • Natural setting<br>• Multi-method<br>• Medium- to long-term<br>• User-centric<br>• Multi-stakehodler" |
| **Juujärvi & Pesso (2013):** Actor Roles in an Urban Living Lab: What Can We Learn from Suurpelto, Finland? | Westerlund & Leminen, 2011 | See previous | • See previous |
| **Femenías & Hagbert (2013):** The Habitation Lab: Using a Design Approach to Foster Innovation for Sustainable Living | Case: Habitation lab | Drawing on the collaborative and user-centred principles of recent definitions of living labs (e.g., Bergvall-Kåreborn et al., 2009; McPhee et al., 2012; Leminen & Westerlund, 2012), the Habitation Lab is an innovation platform that emphasizes co-creation and learning between end users, partners in the building industry and related areas, academia (e.g., researchers and students from architecture and other disciplines), and, by extension, governmental bodies (e.g., planning officials and policy makers). | • Collaborative principle<br>• User-centered principle<br>• Innovation platform<br>• Co-creation<br>• Learning<br>• End-users, private partners, academia and governmental bodies |
| **Leminen (2013):** Coordination and Participation in Living Lab Networks | Westerlund & Leminen, 2011 | See previous | • See previous |
| **Veeckman, Schuurman,** | Westerlund & Leminen, 2011 | See previous | • See previous |

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| **Leminen, & Westerlund (2013):** Linking Living Lab Characteristics and Their Outcomes: Towards a Conceptual Framework | Own formulation of building blocks | The building blocks of a living lab environment are:<br>• Technical infrastructure<br>• Ecosystems approach<br>• Openness<br>• User participation<br>• Lifespan<br>• Scale<br>• Real-world context | • Technical infrastructure<br>• Ecosystems approach<br>• Openness<br>• User participation<br>• Lifespan<br>• Scale<br>• Real-world context |
| **Hakkarainen & Hyysalo (2013):** How Do We Keep the Living Laboratory Alive? Learning and Conflicts in Living Lab Collaboration | / | "A living lab turns users from observed subjects to active co-creators of value, ideas, and innovative concepts – it is not only a testbed (McPhee et al., 2012). It gives an opportunity to embed complex product ideas and prototypes within an environment that closely resembles the context of the product in real-life (Pierson and Lievens, 2005)." | • Users as active co-creators<br>• Values, innovative concepts, complex product ideas, prototypes<br>• Environment that closely resembles the context of the product in real-life |
| **Veeckman & Van der Graaf (2015):** The City as Living Laboratory: Empowering Citizens with the Citadel Toolkit | Westerlund & Leminen, 2011 | See previous | • See previous |
| **Tukiainen, Leminen, & Westerlund (2015):** Cities as Collaborative Innovation Platforms | Westerlund & Leminen, 2011 | See previous | • See previous |
| **Franz, Tausz, & Thiel (2015):** Contextuality and Co-Creation Matter: A Qualitative Case Study Comparison of Living Lab Concepts in Urban Research | / | "Although projects and approaches to urban living labs differ widely, the benefits lie in user integration and the use of results to develop need-based products and services that can be implemented into the living environments of citizens." | • User integration<br>• Need-based products and services<br>• Can be implemented into the living environments of citizens |

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| **Bergvall-Kåreborn, Eriksson, & Ståhlbröst (2015):** Places and Spaces within Living Labs | Bergvall-Kåreborn, 2009 | "A living lab is a user-centric innovation milieu built on every-day practice and research, with an approach that facilitates user influence in open and distributed innovation processes engaging all relevant partners in real-life contexts, aiming to create sustainable values". | • User-centric<br>• Built on every-day practice and research<br>• Approach that facilitates user influence<br>• Open and distributed innovation processes<br>• Engaging all relevant partners<br>• Real-life contexts<br>• Aiming to create sustainable values |
| **Leminen, Turunen, & Westerlund (2015):** The Grey Areas Between Open and Closed in Innovation Networks | Westerlund & Leminen, 2011 | See previous | • See previous |
| **Rits, Schuurman & Ballon (2015):** Exploring the Benefits of Integrating Business Model Research within Living Lab Projects | iMinds Living Labs | **"**The definition of a "living lab" is still an unresolved and largely semantic discussion (Baccarne et al., 2013). However, most definitions focus on: i) the collaboration between different stakeholders – including end users – during the innovation process and ii) combining technological research with user research."We share our experiences using a practical framework to implement combined research tracks at iMinds Living Labs". | • Collaboration between different stakeholders (including end-users)<br>• Combining technological research with user research |
| **Ståhlbröst & Lassinantti (2015)**: Leveraging Living Lab Innovation Processes through Crowdsourcing | Bergvall-Kåreborn, 2009 | See previous | • See previous |
| **Hakkarainen & Hyysalo (2016):** The Evolution of Intermediary Activities: Broadening the Concept of Facilitation in Living Labs | Own definition based on multiple authors | "Living labs are real-life experimentation environments in which new products and services are given shape through collaborative efforts of users and developers. They aim to extend co-design and open innovation activities from mere concept design and ideation to design-in-use, which is often requisite for co-realizing the true value points of new technologies and services (Botero & Hyysalo, 2013; Hartswood et al., 2002; Hillgren et al., 2011; Hyysalo, 2010; Leminen et al., 2015; Voss et al., 2009)". | • Real-life experimentation environments<br>• New products and services<br>• Collaborative efforts of users and developers<br>• Aim to extend co-design and open innovation activities to design-in-use |

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| **Georges, Schuurman, & Vervoort (2016):** Factors Affecting the Attrition of Test Users During Living Lab Field Trial | European Commission, 2009 + Schuurman, 2015 | "A living lab environment is defined as "a user-driven open innovation ecosystem based on a business–citizens–government partnership which enables users to take an active part in the research, development and innovation process" (European Commission, 2009). In addition to this active user involvement, a multi-method approach and real-life interventions make up the three central characteristics of the living lab approach (Schuurman, 2015)." | • User-driven<br>• Open innovation<br>• Ecosystem<br>• Business-citizens-government partnerships<br>• Research, development and innovation processes<br>• Active user involvement<br>• Multi-method approach<br>• Real-life interventions |
| **Schuurman & Vervoort (2016):** The Impact of Living Lab Methodology on Open Innovation Contributions and Outcomes | Westerlund & Leminen, 2011 | See previous | • See previous |
| **Juujärvi & Lund (2016):** Enhancing Early Innovation in an Urban Living Lab: Lessons from Espoo, Finland | Friedrich et al, 2013<br>Almirall & Wareham, 2008<br>Franz et al, 2016 | "An urban living lab has been defined as a forum for innovation that integrates residents and other stakeholders to develop and test new ideas, systems, and solutions in complex and real contexts (see Friedlich et al., 2013)". "Referring to Almirall and Wareham (2008), it can be seen as a specific type of open innovation network that acts as an intermediary between residents, public organizations, and private organizations to capture and codify user insights in their living environments."<br>"In this article, we focus on socially oriented urban living labs, which are characterized by citizen participation, strong collaboration with local stakeholders, and the aim to create concepts and methodology that can be transferred into other contexts (see Franz et al., 2015)" | • Forum for innovation<br>• Integrating residents and other stakeholders<br>• Development and testing<br>• New ideas, systems and solutions<br>• Complex and real contexts<br>• |
| **Buhr, Federley, & Karlsson (2016):** Urban Living Labs for Sustainability in Suburbs in Need of Modernization and Social Uplift | / | "There is no generally accepted definition of living labs (Leminen, 2015; Westerlund & Leminen, 2014), but they are frequently described as consisting of elements of co-creation, exploration, experimentation, and evaluation (e.g., ENoLL, 2015). Rather than repeating previous reviews of various definitions, we explain below how two key ingredients of urban living labs – citizens and innovation – were operationalized in the context of this research". | • Co-creation<br>• Exploration<br>• Experimentation<br>• Evaluation<br>• Citizens<br>• Innovation |

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| **Schuurman & Tonurist (2017):** Innovation in the Public Sector: Exploring the Characteristics and Potential of Living Labs and Innovation Labs | European Commission, 2009<br>Westerlund & Leminen, 2011<br>Schuurman, 2015 | "Living labs refer to user-centered, open innovation ecosystems based on a systematic user co-creation approach integrating research and innovation processes in real-life communities and settings (Ballon & Schuurman, 2015). Leminen (2013) defines living labs as: "physical regions or virtual realities, or interaction spaces, in which stakeholders form public–private–people partnerships (4Ps) of companies, public agencies, universities, users, and other stakeholders, all collaborating for creation, prototyping, validating, and testing of new technologies, services, products, and systems in real-life contexts. This definition is complemented by Schuurman (2015), who sees living labs as an organized approach (as opposed to an ad hoc approach) to innovation consisting of real-life experimentation and active user involvement by means of different methods involving multiple stakeholders, as is implied in the public–private–people (PPP) character of living labs". | • User-centered<br>• Open innovation<br>• Ecosystems<br>• Systematic user co-creation approach<br>• Integrating research and innovation processes<br>• Real-life communities and settings<br>• Physical regions, virtual realities or interaction spaces<br>• Public-private-people partnerships<br>• Collaboration<br>• Creation, prototyping, validating, testing<br>• New technologies, services, products and systems<br>• Real-life contexts<br>• Organised approach<br>• Experimentation<br>• Active user-involvement by means of different methods |
| **Leminen & Westerlund (2017):** Categorization of Innovation Tools in Living Labs | Westerlund & Leminen, 2011 | See previous | See previous |
| **Coorevits & Jacobs (2017):** Taking Real-Life Seriously: An Approach to Decomposing Context Beyond "Environment" in Living Labs | / | / | / |
| **Coenen & Robijt (2017):** Heading for a FALL: A Framework for Agile Living Lab Projects | / | / | / |
| **Brankaert & Den Ouden (2017):** The Design-Driven Living Lab: A New Approach to Exploring Solutions to Complex Societal Challenges | / | / | / |

**Appendix B.** Defining characteristics of (urban) living labs mentioned in living lab literature

| **Publications** (containing living lab definitions) | **Aims** (mentioned as defining living lab characteristics) | **Activities** (mentioned as defining living lab characteristics) | **Aimed at Products** (mentioned as defining living lab characteristics) | **Participants** (mentioned as defining living lab characteristics) | **Contexts** (mentioned as defining living lab characteristics) | **Subject Matter** (mentioned as defining living lab characteristic) |
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| **William Mitchell (MIT) (ca. 2003)**<br><br>**Niitamo, Kulkki, Eriksson & Hribernik (2006)** State-of-the-art and good practice in the field of living labs<br><br>**Ballon, Pierson & Delaere (2005):** Test and experimentation platforms for broadband innovation: examining european practice.<br><br>**European Network of Living Labs (2006):** What is a Living Lab?<br><br>**Schaffers, Cordoba, Hongisto, Kallai, Merz & Van Rensburg (2007):** Exploring business models for open innovation in rural living labs.<br><br>**Kusiak (2007)**: Innovation: The Living | **"research methodology"**<br><br>**"sensing, prototyping, validating and refining complex solutions"**<br><br>"A broad regional **development program"**<br><br>"indicate future systemic **innovation** needs"<br><br>"**innovation** process"<br><br>"integrating **research** and **innovation** processes"<br><br>"**open innovation"**<br><br>"open and collaborative innovation"<br><br>"…where **technology is developed and tested"**<br><br>" systemic innovation approach" | **"sensing, prototyping, validating and refining"**<br><br>"**testing**, **developing** and **validating"**<br><br>**"co-creation"**<br><br>"four phases in a living lab: **contextualisation**, **concretisation**, **implementation** and **feedback**"<br><br>"living labs are **cyclic** by nature"<br><br>"**designing**, **developing**, **testing** and **evaluating"**<br><br>"**Research**, **development** and **innovation** process;<br><br>"based on **systematic user co-creation** approach"<br><br>"**Co-creation**, **Exploration**, **Experimentation**, **Evaluation**."<br><br>"users are important informants | **"complex solutions"**<br><br>"new **products** and **services**"<br><br>"**communication technologies** and **services"**,<br><br>"co-design by **users** and **producers**; **utilizers** and **enablers** are also involved"<br><br>"**technology"**<br><br>"**Product**, **service** or **application"**<br><br>"**Services**, **businesses** and **technologies"**<br><br>"new **technologies**, **services**, **products**, and **systems"**<br><br>"**technology** development and innovation" | "**users**"<br><br>" interdisciplinary **experts**"<br><br>"**firms**"<br><br>"by involving (early) **users"**<br><br>**"university"**<br><br>**'public actors"schaf**<br><br>"Living Labs place the **citizen** at the centre of innovation"<br><br>"**user-driven**"<br><br>"Public-private-people partnerships'<br><br>"research institutes"<br><br>"public actors" | **"**multiple and evolving **real life contexts**"<br><br>"The "living lab" is a specific type of test and experimentation **platform** (TEP). The latter indicates **all facilities and environments for (joint) innovation"**<br><br>"**ecosystems"**<br><br>"in **real life communities and settings"**<br><br>"implementing **live** scenarios within **communities of users"**<br><br>"A living lab provides a **concrete setting**, unlike the other forms of open and collaborative innovation"<br><br>**"physical or virtual real-life context"** | "**Urban** living labs […] are a **regional forum** for innovation and dialogue **focusing on solving challenges in the urban area**"<br><br>"Contrary to the predominately technology-centred living lab concepts, **urban** living labs add not only the **urban component** to the conceptual design, but also a range of topics including **societal, political, and technological questions**"<br><br>"ULLs are located in a real **urban** context. Innovation happens at a **local and more manageable scale**. Examples for the **geographical area** can be the whole city, a district or neighbourhood, or only one house." |

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| Laboratory Perspective | | and co-creators in the tests" | | | |
| **Feurstein, Hesmer, Hribernik, Thoben & Schumacher (2008):** Living labs: a new development strategy | " research and development (R&D) methodology" | **"co-creative product development"** | **"Product and service innovations**" | "private actors" | "**real life environments** and **virtual networks** in **multi-contextual spheres**" |
| **Bergvall-Kåreborn & Ståhlbröst (2009):** Living Lab: an open and citizen-centric approach for innovation. | "A living lab is a **user-centric innovation** milieu built on every-day practice and research" | "four phases: Product **Idea**, Product **Concept**, Product **Development**, and **Market Launch**" | "new technologies" | "users" | |
| | | | "**solutions"** | "**users** are important informants and co-creators in the tests" | "a **multi-contextual** (= non-isolated), **empirical** real-world environment" |
| | "aiming to **create sustainable values"** | "Each process phase enables **co-creation** with **different methods and tools"** | **"Complex solutions"** | "customers and other stakeholders" | "in **real-life contexts"** |
| **Westerlund and Leminen (2011):** Managing the Challenges of Becoming an Open Innovation Company: Experiences from Living Labs | **"co-create innovations"** | "A living lab is a user-centric innovation milieu built on **every-day practice and research"** | **"innovative solutions"** | | "**real-life contexts"** |
| | **"Technology development and innovation**" | | "**ideas**, **systems**, and **solutions"** | **"**engaging **all relevant partners"** | **"real-life test and experimentation environment"** |
| **Higgins & Klein (2011):** Introduction to the Living Lab Approach | "Multi-disciplinary research teams actively involved in the **research** […], at times even driving the agenda" | **"approach that facilitates user influence** in open and distributed innovation processes" | **"processes"** | **"researchers"** | "**Real world setting**" |
| | | | "**knowledge** and **ideas"** | "**public–private-people partnerships"** | "**Real life contexts"** |
| **Schaffers & Turkama (2012):** Living Labs for Cross-Border Systemic Innovation | "**Research**, **development**, **experimentation**" | "A living lab is a user-centric innovation milieu built on **every-day practice and research"** | **"impacts"** | "… where **users** and **producers** co-create innovations" | **"**Implemented in **concrete innovation projects**" |
| | **"**with the focus on **accessing the ideas and knowledge of the users regarding the tested technology**" | **"approach that facilitates user influence** in open and distributed innovation processes" | "new **products** and **services"** | "**universities"** | "aim to capture users" insights, prototype and validate solutions **in real life contexts**, |
| **Schuurman & De Marez (2012):** Structuring User Involvement in Panel-Based Living Labs | "aim to **capture users" insights**, **prototype** and | "**creation**, **prototyping**, **validating**, and **testing**" | **"new technologies and services"** "new **technologies**, **solutions** and **policies"** | "Active role of **users** as co-innovators" | **"Multiple and evolving real-life contexts"** |
| | | "… where users and producers **co-** | | "involving **multiple stakeholders from multiple organisations** | |

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| **Almirall, Lee & Wareham (2012):** Mapping Living Labs in the Landscape of Innovation Methodologies | **validate solutions** in real life contexts" | **create** innovations" | and their interaction" | **"Natural setting"** |
| **Mulder (2012):** Living Labbing the Rotterdam Way: Co-Creation as an Enabler for Urban Innovation | "… **providing structure and governance to the user involvement**" | **"Active role of users as co-innovators**" | "**Multi-disciplinary research teams** actively involved" | **"real contexts"** |
| **Pallot and Pawar (2012):** A holistic model of user experience for living lab experiential design. | "[providing] **methodologies and organizations to filter and sense user insights"** | "**Specific methodologies and tools**" | "**stakeholders"** | "**real use context**" |
| **Schuurman, Baccarne, Kawsar, Seys, Veeckman, De Marez & Ballon (2013):** Living Labs as Quasi-experiments: Results from the Flemish LeYLab | "an iterative experimental design process that shares, crystallises and accumulates knowledge of stakeholders **to enhance user experiences in relation to the Internet of Things"** | "**Community building activities**" | **"Multi-stakeholder"** | "**real-life environments"** |
| **Friedrich, Karlsson & Federley (2013):** Boundary conditions for succesful urban living labs | **"innovative solutions"** | **"**users are subjected to a **combination of research methodologies** while they **test** new technologies that are still in **development"** | **"end-user"** | **"physical regions or virtual realities"** |
| **Leminen (2015):** Living Labs as Open Innovation Networks - Networks, roles and innovation outcomes | "to **develop** and **test** <u>**new**</u> ideas, systems, and solutions" | **"prototype** and **validate** solutions" | "integrates **residents** and **other stakeholders"** | "ULLs are located in a **real urban context**. Innovation happens at a local and more manageable scale. Examples for the **geographical area** can be the whole city, a district or neighbourhood, or only one house." |
| | "besides **producing the concrete solutions**, the aim is to **learn** and **exchange knowledge** among the partners" | "**user involvement**" | **"**the **users** of the developed services or solutions are active partners in the development work during the whole process" | **"real-life experimentation environments"** |
| | "**Experimentation** and **learning** are not only considered as a side-effect, but experiments constitute | "**Sensing**, **prototyping**, **validating** & **refining"** | **"companies**, **public agencies**, **universities**, **users**, and **other stakeholders"** | **"Geographical embeddedness**: Urban living labs are placed in a geographical area – they are **predominately not virtual platforms**" |
| | | "**iterative** experimental **design process** that **shares**, **crystallises** and **accumulates knowledge** of stakeholders" | "Some scholars argue that […] it remains **uncertain** which stakeholders need to be involved – and to what extent – to enable that co-creation" | "**sites** devised to design, |
| | | "Value **co-creation**" | | |
| | | "**learning** by experience" | | |

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| **Franz, Tausz & Thiel (2015):** Contextuality and Co-Creation Matter A Qualitative Case Study Comparison of Living Lab Concepts in Urban Research<br><br>**Voytenko, Y., McCormick, K., Evans, J., & Schliwa, G. (2016)**: Urban living labs for sustainability and low carbon cities in Europe: towards a research agenda.<br><br>**Hakkarainen & Hyysalo (2016):** The Evolution of Intermediary Activities: Broadening the Concept of Facilitation in Living Labs<br><br>**McCormick (2016):** GUST Policy Brief: Urban Living Labs | a main element of ULLs. They focus on **user-centred experimentation** and **co-production of knowledge** and ideas with the users".<br><br>"**Open innovation"**<br><br>"They aim to extend **co-design** and **open innovation** activities"<br><br>"learning"<br><br>"to **design**, **test** and **learn** from **social and technical innovation"**<br><br>"**experimentation** and **learning"** | "**Multi-method"**<br><br>"**User-centric"**<br><br>"**develop** and **test"**<br><br>"the solutions will be **developed** and **evaluated**"<br><br>"the users of the developed services or solutions are active partners in the development work during the whole process"<br><br>"users and customers are the focus of innovation activities rather than passive receivers of innovation"<br><br>"active **integration of citizens**"<br><br>**"Testing, validating, developing"**<br><br>"Actions and impacts of an ULL need to be **evaluated** on a frequent basis in order to establish a **feedback loop**. This allows to **adjust** the goals and visions accordingly and enhances the **learning** effects"<br><br>"**Participation** is a core element of ULLs and it appears throughout all | "collaboration between two or more groups of **actors** that include **residents** as a prerequisite"<br><br>"active integration of **citizens**"<br><br>"They focus on user-centred experimentation and co-production of knowledge and ideas with the **users"**<br><br>"ULLs provide platforms for participation and **user** involvement"<br><br>"observations in practice: **users, public actors, private actors, knowledge institutes"**<br><br>"collaborative efforts of **users** and **developers"**<br><br>"**user-centered"**<br><br>"all **stakeholders**"<br><br>"**public**-**private**-**people** partnerships" | test and learn from social and technical innovation **in real time"**<br><br>**"in real world conditions"** |

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| | stages of an ULL" | |
| | "**design-in-use"** | "bringing together **citizens**, **practitioners**, **decision makers**, and **researchers**" |
| | **"co-design"** | |
| | "from […] **planning** and **designing** to **developing**, **implementing**, **evaluating** ULLs actions and **updating** ULLs ambitions" | |
| | **"Participation** and **co-design"** | |