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DO LIVING LABS LIVE IN RUSSIA?

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Innovation infrastructure plays a crucial role in the establishment of links among knowledge producers, intermediaries, and exploiters to deal with socio-economic challenges. Traditionally, the representatives of public sector, business and academia have been considered as the key stakeholders; however today there is a shift of interest towards end users or consumers of products and services. Users, especially citizens, are able to bring new insights of their experience while taking part in testing and validation of innovative products and / or services. Hence, it is essential to decide, which forms of innovation infrastructure units enable successful involvement of users into the design and innovation process. Since mid-2000, the European Union has successfully introduced a platform for testing and experimentation based on the users' engagement – a living laboratory.

The study investigates the features of living labs, including their possible business applications, and searching for the living labs' analogous among the existing forms of innovation infrastructure units in Russia. Business Model Canvas and comparative analysis are employed to do the research. Taken together, our results support the idea that a living lab is a very special form of innovation infrastructure unit, since it brings a product, technology, or service closer to the market, based on the insights from the end users' engagement in testing and experimentation.

JEL classification: O31, O32, R58

Key words: living laboratory, innovation infrastructure, cluster, user's innovations, Business Model Canvas

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Introduction

Innovation infrastructure plays a crucial role in the establishment of links among knowledge producers, intermediaries, and exploiters to deal with socio-economic challenges (Feldman & Florida, 1994; Porter & Stern, 2001). Traditionally, the representatives of public sector, business and academia have been considered as the key stakeholders (Etzkowitz & Leydesdorff, 2000); however today there is a shift of interest towards end users or consumers of products and services (Ballon et al., 2005; Almirall & Wareham, 2011; Schuurman, 2015). Users, especially citizens, are able to bring new insights of their experience while taking part in testing and validation of innovative products and / or services (Voorberg et al., 2015; Seltzer et al., 2013). Adaptation of this unique expertise smooths the process of crossing the gap between innovators and early majority. Hence, it is essential to decide, which forms of innovation infrastructure units enable successful involvement of users into the design and innovation process.

Since mid-2000, the European Union has successfully introduced a platform for testing and experimentation based on the users' engagement – a living laboratory (herein after – a living lab) (European Commission, 2009). The core idea of living labs goes back to the Scandinavian tradition of cooperative and user-centred design in the 1970s. Then, the workers were involved into the design of IT application in their workplaces with the support from trade unions (Shuurman, 2015). Two features of living labs – user engagement and real-life context – derive from that form of cooperative projects.

Conceptualization of living labs is connected with the works of Mitchell (Robles et al., 2015). As an urbanist and architect, he anticipated the need to integrate IT into the process of shaping future cities, smart houses, and urban areas. In the era of digitalization, the majority of living labs deals with the routine application of these technologies. Viseur (2016) underlined that emerging markets serve as the best fit for living labs, because technologies under development need testing and validation for the further use.

Living labs movement in Europe dates back to 2006, when it was first mentioned in Helsinki Manifesto (European Commission, 2006). The focus area of the Helsinki conference was global competitiveness level in Europe, and innovation policy that would spur it in the long-term perspective. More than that, all structural changes and activities were directed towards more efficient use of ICT. At that time, *the European Network of Living Labs* (ENoLL) was launched under the Finnish presidency to enhance European innovative power by the creation of open and user-centric environment. It was particularly stressed by the Manifesto, that the network should be "cross-regional, cross-national and pre-market, which creates multi-stakeholder co-operation models for public-private-citizen-partnerships (PPCPs)" (European Commission, 2006). Since

2006, the ENoLL calls for new members through application waves; thus, in 2017 it was already the 11th call for applicants. In the initial phase the network united 20 living labs in 16 regions, whereas now it serves as an umbrella organization for around 400 members all around the globe.

Public authorities supported living labs especially within the European Unions' *6th Framework Programme.* The strategic objective of collaborative working environments in ICT was to advance and apply user-driven co-creation process that would allow coming up with new technological solutions. The ENoLL encouraged international cooperation, and since 2010 China, Brazil, Australia, and some African countries have entered the network.

Living labs activities are also embedded into the European Union Research and Innovation programme *Horizon 2020* (European Commission, 2015; 2017; ENoLL, 2011). The ENoLL brought its own contribution in the form of recommendation to the Committee of the Regions (CoR) during the programme design (European Committee of the Regions, 2017). The CoR brings the voice of regions and has the following areas of responsibility: economic, social, and territorial cohesion; employment; social affairs; education, youth, and culture; public health; transport; sport; environment, energy, and climate change.

Primarily, rapid evolvement of ICT boosted the research interest to the concept of living labs. Their real-life environment infrastructure helps to bridge the gap between innovations and their applications through testing and further customization of a product or a service. However, it is hard to make a clear-cut conclusion about the impact that living labs as a form of public-private partnership bring, since it is a relatively new concept, which requires an inflow of thorough studies.

The working paper aims at exploring the potential and limitations of living labs launch in Russia. We are specifically interested to find out:

– what elements are crucial for the launch of living labs, in which particular locations and domains they are most common;

– if living labs are governmental experiment or self-sustained entities, with a solid business model that helps them earn money;

– which types of innovation infrastructure units in Russia can be analogous to living labs?

Hence, there are two objectives pursued in this work:

– to distinguish the characteristics of living labs and build up their typology using Business Model Canvas;

– to compare the characteristics of living labs with those of innovation infrastructure units in Russia.

The problem behind this research has different facets. First, new forms of innovation infrastructure units extend rather slowly due to administrative inertia. Additionally, only popular

forms are borrowed without any national or regional consideration and adaptation needs. In some cases, these new forms simply copy functions of already existing entities (*e.g.* engineering centres).

The working paper has four main sections. We begin with the literature review, and analyse the variety of definitions applied to understand the nature of living labs, their feasibility, existing taxonomies and forms. The methodology and data section describes the instruments applied during the research: Business Model Canvas, and comparative analysis of living labs and innovation infrastructure units in Russia. The findings section focuses on the results derived from the analyses: we conclude on business model applicability to living labs, suggest their two basic models, and distinguish living labs from innovation infrastructure units in Russia. Finally, policy implications dwell on the potential of launching living labs in Russia.

1. Literature review

Much of the current literature focuses on the essence and definitions of living labs, their existing typologies, application areas, and methodologies applied to assess their feasibility.

The approaches to understand living labs are numerous. The ENoLL as an umbrella organization defines living labs as "user-centred **open innovation ecosystems** based on a systematic user[5] co-creation approach, integrating research and innovation processes in real life communities and settings" (ENoLL, 2017). Living labs are assigned four main activities: *co-creation* (involving users and producers in co-creation process), exploration (discovery of new possible ways of application and entering the market), *experimentation* (creation of real-live situations within user communities), and *evaluation* (assessment of concepts, products and services according to socio-ergonomic, socio-cognitive and socio-economic criteria) (ENoLL, 2010). Citizens are regarded as the core stakeholders that shape newly introduced opportunities, in particular ICT-related ones, according to their needs. Further on, the nature of living labs is specified as "taking the step from technology prototypes for innovative and visionary users to evolving products for pragmatic and mainstream user. <…> Crossing the pre-commercial gap is the major acting field for living labs, which adds significant value to the rapid prototyping and service/product development phases" (ENoLL, 2011). A group of authors agree on defining living labs as open innovation ecosystems, or networks. For instance, Leminen et. al (2012) state that the user's experience directs further development of a product, or service, therefore serving as innovation platforms for companies. Pallot et al. (2010) keep to an almost similar point of view, regarding living labs as an open innovation ecosystem, which engages user communities as a market pull force, and solution developers as a technology push force. Directorate-General of the European Communities, Information Society and Media supports the definition of an open innovation ecosystem, though at the same time stressing the enabling power of partnership between government, business and citizens (European Commision, 2009).

Ballon et al. (2005) include living labs in a wider term of **test and experimentation platforms (TEPs)**. They enumerate the elements that are close by definitions as usability labs, experience and application research centres (EARCs), experience prototyping, living labs, prototyping environments, field trials, societal pilots, testbeds, co-development environments, demonstration centers, user trials, pilot networks, and commercial pilots. All these forms are considered as joint innovation facilities aimed at experimenting, prototyping, and validation of

[5] In understanding the nature of users in living labs our work relies on ISO 9241-210, which says that a user is "a person who interacts with the product" and – we can add – with the service. It defines user experience as "person's perceptions and responses resulting from the use and/or anticipated use of a product, system or service", which also includes emotional response, influence of beliefs and preferences of an individual.

products or services. They argue that TEPs should be implemented to spur innovation activities rather than facilitate the process of fundamental research or commercialization. In turn, living labs are mainly described as open experimentation environments where users act as co-producers. Additionally, they suggest a conceptual framework, which considers three aspects: technological readiness or maturity (horizontal axis); testing or design platform (vertical axis) and the degree of openness (upper horizontal axis) (figure 1).

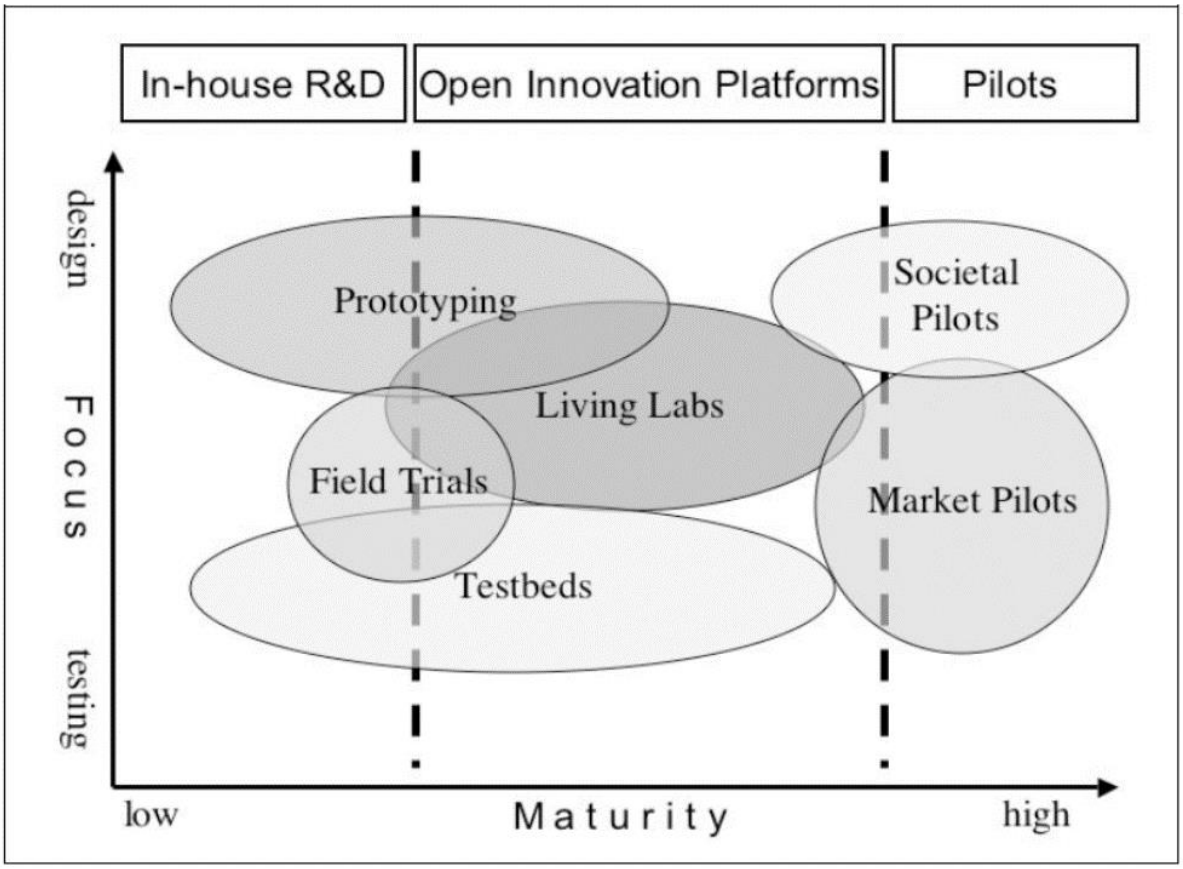

Figure 1. Features of living labs in TEPs interpretation

Source: Ballon et al. 2005, p. 3

In this framework a living lab is interpreted as "an experimentation environment, in which technology is given shape in real life contexts, and in which (end) users are considered co-producers" (Ballon et. al 2005, p. 3). All of the forms are further elaborated and compared with regard to six parameters: openness, public involvement, commercial maturity, vertical scope, scale, and duration. In particular, living labs are characterized by a high degree of openness, large scale, and vertical scope, when all groups of stakeholders are involved and medium- or long-term timeline. According to Ballon et. al. (2005), intensity of public involvement differs, and all the above-mentioned TEPs can be combined with each other depending on the initial purpose.

Almirall and Wareham (2011) talk about living labs as **collaborative projects** that join the key stakeholders from government, academia and business. Theoretical ground of their work is based on the assumption that "living labs represent a novel approach to innovation intermediaries in product development and validation" (Almirall &Wareham, 2011). Moreover, they connect the theory on living labs with three overlapping ones – tacit and domain knowledge generation (Boisot et al., 2007), entrepreneurial risk-taking (Bhidé, 2008), and design-driven innovation (Brown, 2008). This approach suggests another function of living labs – mediation among users, public, or private organizations capturing and codifying the users' insights in real-life environments (Almirall & Wareham, 2011).

Dell'Era and Landoni (2014) collected thirteen definitions of a living lab, and argue that all of them "have failed to highlight the original new product development approach" (Dell'Era & Landoni, 2014, p. 139). They regard a living lab as a **methodology** that includes the same two pillars mentioned by Almirall and Wareham – the users' involvement and real-life settings. Throughout the process of case studies, they delivered two variables – "type of interaction with users" and "decisions on platform technology" – for the sake of structuring living labs methodology. The authors acknowledge that living labs require presence of provisional structure and organizations, and recognize the role of the environment in living labs. Nonetheless, they consider methodological aspect to be more useful. So, they suggest defining living labs as design research methodology with the goal of co-creating innovation, based on the user involvement in real-life settings (Dell'Era & Landoni, 2014). Mulder and Stappers (2009) support the idea of living labs as a specific methodology of collaborative experimentation and user-driven open innovation. Eriksson et al. (2005) outline that living labs "refer to an R&D methodology where innovations, such as services, products, or application enhancements, are created and validated in collaborative multi-contextual empirical real-world environments" (Eriksson et al., 2005, p. 5). Edvardson et al. (2012) regard living labs as a **method** to capture users' experience and information in the mode of a "reflective practitioner". Basically, there are four modes of typical users: correspondent, reflective practitioner, tester and dreamer (Edvardsson et al., 2012). They claim that in the reflective practitioner mode users "are not in a real-life service situation that creates or intends to create value" (Edvardsson et al., 2012, p. 423). In their view, living labs include a number of methods, creating virtual situations and contexts with the help of physical material and computer software. All in all, living labs are only in charge of building context or environment for innovation and create specific conditions to involve customers and attain related information from them.

Katzy (2012) looks at living labs from the perspective of a **business excellence model** since it is a matter of primary importance to know who the customers and the stakeholders are

(Katzy, 2012). First of all, the business excellence model serves as a management tool to structure living labs' activities into three stages: ideation, co-creation and venturing. The author stresses that entrepreneurial component within a living lab defines its success. One of the possible ways for further development is to find an investor, and transfer created value by letting business actors bring it to the market. Consequently, a living lab is regarded as an infrastructural unit in the innovation ecosystem. Some researchers try to close the gap on the compatibility and interconnection between business models and living labs. One of the attempts has been taken by Rits et al. (2015). From the literature review they concluded that there is "a lack of studies dealing with an actual iterative process of designing, experimenting with, and redesigning business models" (Rits et al., 2015, p. 20). In this respect, living labs can assist to redesign business models as they accumulate great amount of data on customer needs and behavior. Svensson and Eriksson (2009) also stress the need to use business modelling to secure the production of commercially successful innovations (Svensson & Eriksson, 2009).

To better understand the underlying purpose of living labs, technological readiness level (TRL) can be employed. There is no particular research on the issue, however the European Innovation Partnerships within the European R&D programme *Horizon 2020* offers to use this indicator. All the levels in table 1 are specified to living labs.

Table 1. Technology readiness level in living labs

Technological Readiness Level	**Description**	**Relation to living labs**
TRL 1	Basic principles developed	Not applicable
TRL 2	Technology concept	Not applicable
TRL 3	Experimental proof of the concept	Not applicable
TRL 4	Technology validated in a laboratory	Not applicable
TRL 5	Technology validated in relevant environment	Services / products implemented at a living lab but not deployed
TRL 6	Technology demonstrated in relevant environment	Services / products implemented at a living lab and deployed
TRL 7	System prototype demonstration in operational environment	Not applicable
TRL 8	System complete and qualified	Not applicable
TRL 9	Actual system proven in operational environment	Not applicable

Source: compiled by the authors based on European Commission (2015)

Living labs relate to TRL 5 and TRL 6. At TRL 5, users test services and / or products using the facilities of living labs; at TRL 6 users do this at homes in daily situations.

As long as there is no unified definition of a living lab, the next step of our literature review aims at investigating typologies to discern similar patterns of their performance.

Ståhlbröst and Holst (2012) come up with the following typology of living labs depending on the **environment created**: research, corporate, organizational, intermediary, and

time-limited. The differentiation between the above-mentioned types is not distinct, as there could be combinations of several types.

More solid approach is introduced by Leminen et al. (2012). It is based on the data from their interviews with the representatives of living labs. The defining feature is the **type of an actor** who manages all the activities. Thus, four types of living labs are distinguished: utilizer-driven, enabler-driven, provider-driven and user-driven. In a *utilizer-driven* living lab the key actor is a company, which strives to gather data from users through testing prototypes of newly emerged technologies, products or services. Living lab is considered as a strategic tool to obtain necessary information for a short-time perspective and eliminate risks of market entry; therefore, utilizers immediately integrate data into business processes. *Enabler-driven* living labs are initiated by governmental bodies, municipalities or non-governmental organizations to achieve social goals. Frequently, this type is used in the framework of regional development policies; hence, collaboration among all stakeholders plays a crucial role. *Provider-driven* living labs focus on finding the exact solution to a particular problem. They are often organized by educational institutions or universities to promote research and knowledge generation. *User-driven* living labs are formed by communities of users that seek to solve daily-life issues. Value is co-created for a particular community with indirect social advantages in general. The feature of this type is informal organization and management. In practice, living labs pursue several goals, and are mixed-type.

According to Leminen et al. (2016), the performance of living labs depends on strategic intention, passion, knowledge and skills, and partners in the living lab network. The ENoLL prioritizes several **thematic domains** that aid in shaping the real contribution of living labs. In this respect they are supposed to tackle different social challenges and stimulate cross-sector collaboration, especially given the fact that ICT and associated technologies penetrate every aspect of life and economy. These thematic areas are: eHealth, Preventive Care, Well-being (*e.g. ProFit; StreetLab*); Energy and Environment (*Lighting Metropolis, Green way, CareVille living labs*); Media and Creativity (*The RECORD online Living Lab*); Rural Regions and Territories; SMEs, Entrepreneurship, Manufacturing (*Green way*); Social Inclusion (*StreetLab*); Transportation, Mobility; Smart Cities (*Slovenian automotive living lab*) / Smart Citizens (*Adelaide, Lighting Metropolis, StreetLab*) (ENoLL, 2010, p. 13). These areas correspond with the program sections at *Horizon 2020*, especially in the societal challenges domain. Thus, living labs are employed to find solutions to socio-economic problems which are public relevant.

The academic literature on living labs analyses their **business opportunities** (however, the issue has been given shallow focus so far). Mastelic et al. (2015) attempt to precisely define a living lab and evaluate its sustainability with ENoLL evaluation criteria used to select new

members for the network (Mastelic et al., 2015). But the currently employed evaluation system does not cover cost structure and customer segments at all, and slightly touches upon revenue streams.

A specific feature of value, precisely the value proposition canvas is employed by Äyväri and Jyrämä (2015) to investigate the process of value building. They argue that the value proposition canvas helps to experiment with the basic prototypes of products introduced. Conclusion concerning these particular tools rests on the revealed contradiction between the value created by users in living labs, and the value created by enterprises for their customer segments. Concluding remark is elaborated further on implying that "the multi-stakeholder or service ecosystem perspective is missing from the value proposition building process" (Äyväri and Jyrämä, 2015, p. 10).

From the literature review we can conclude that the focus of research on living labs has been mainly organized around open innovation system, users' involvement, types of consumers, and their roles in incremental or radical innovation process. Several authors dwell on the issues of business model application and integration, but ongoing discussion still leaves some space for elaboration and improvement. The analysis reveals some key determining characteristics of living labs and their activities:

– maturity of the product and/or service, specifically defined by technology readiness level, explains main functions of living labs, which are testing, experimentation, and validation;

– particular lead of the ICT application in different domains prescribes the direction of activities living lab execute;

– the type of the environment, created by living labs, matters, though it is not simply an open innovation ecosystem as stressed by some authors, but an experimental and real-life environment, including daily and routine situations and circumstances;

– user engagement, user experience and user feedback are the core driving forces of experimentation and design processes; users take part in the co-creation process and validate product and / or services tested.

To sum up, living labs are believed to create enabling environment to spur partnerships among various groups of stakeholders, and with the help of users tackle economic and social challenges.

From this review we derive the following research question:

1. What features are essential for living labs?

2. Do a living labs have a business model, and what types of business models are most common for them?

3. Is a living lab an analogous to some of the existing forms of innovation infrastructure units, or it is a new and self-sufficient form of infrastructure unit?

2. Data and methodology

The study uses a qualitative methodology, which offers an effective way of analysing a considerable amount of descriptive data.

2.1 Business Model Canvas applied to the living labs cases

To answer the first research question and identify the essential features of living labs, we use case studies based on Business Model Canvas (BMC). BMC encompasses nine elements (figure 2), which allow "mapping, discussing, designing and inventing new business models" (Hong and Fauvel, 2013).

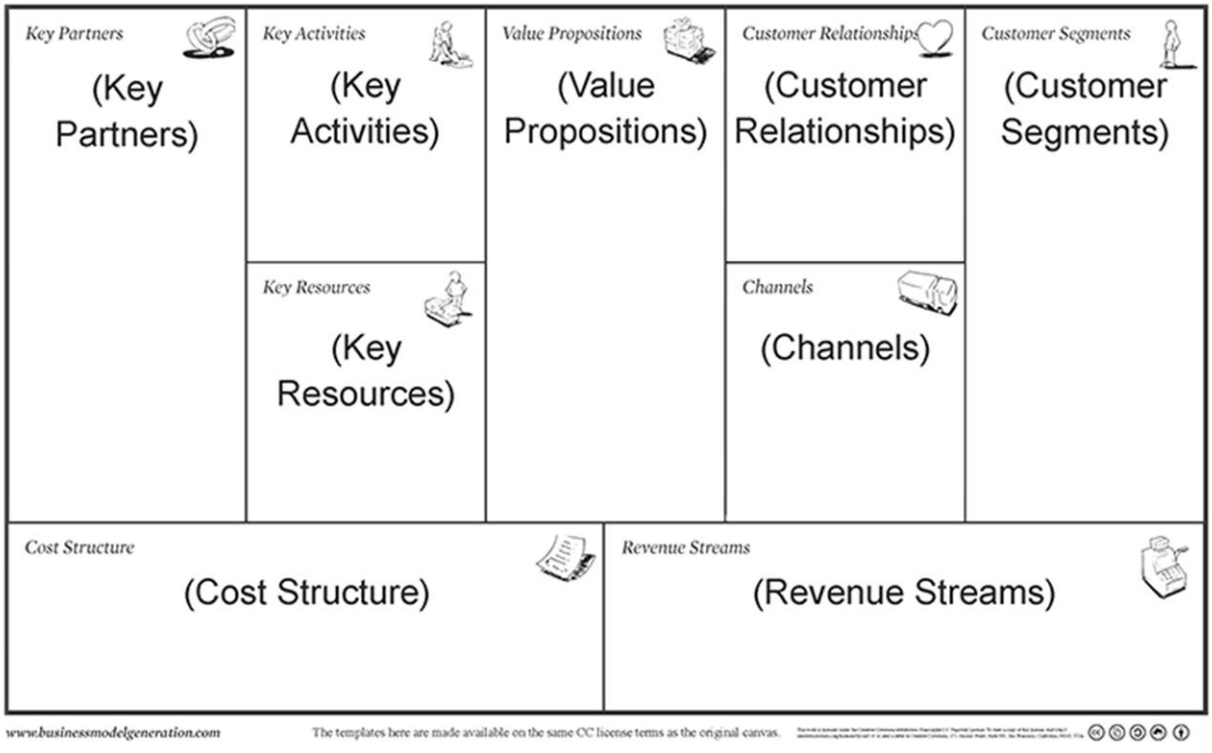

Figure 2. Building blocks of Business Model Canvas

Source: Osterwalder and Pigneur, 2013

Value proposition is a specific product or service that contains value for customers. Many factors affect the quality of value proposition, for instance, performance, customization, design, and price. *Channels* help reaching customer segments and deliver value proposition serving as communication lines. *Customer relationships* allow building particular types of interaction with customer segments, including co-creation (when customers are encouraged to take part in the design or innovation process). *Revenue streams* are the money that a company receives from customer segments. *Key resources* determine the features of value proposition,

customer relationship and channels. They are categorized as physical, financial, intellectual, and human. *Key activities* describe how a company's value proposition is created. *Key partnerships* are established to strengthen relationship with suppliers, or to become more competitive on the market. Partnerships can be in the form of strategic alliance, joint ventures, etc. *Cost structure* includes all costs that appear during operation of a company. *Customer segments* are groups that should be reached in order to get profit (Osterwalder and Pigneur, 2013; Hong and Fauvel, 2013).

Cases for analysis are selected considering the availability of relevant information on activities, management and completed projects of living labs, as well as the diversity of the thematic areas they represent. These are *Lighting Metropolis* in Denmark (urban lighting), *Adelaide Living Laboratory* in Australia (low carbon environment), *ProFit* in the Netherlands, Belgium, and the United Kingdom (innovation in sports), *StreetLab* in France (eye diseases), *Green way* in Ireland (clean technologies), and *CareVille* in Belgium (elderly care). The source of information on living labs is their web-sites. Each living lab is studied according to BMC template, and then their essential features are distinguished.

To answer the second research question and find out if living labs have a business model, we further applied BMC with a focus on value proposition. Presence of the value proposition means that a living lab has business outreach and an offer to potential customers (Osterwalder and Pigneur, 2013). The goal was to identify, whether living labs can yield profit, and thus have a viable business model.

2.2 Comparative analysis of essential features of living labs and innovation infrastructure units in Russia

To answer the third research question and distinguish living labs from the existing forms of innovation infrastructure units, comparative analysis was used. We selected the following units of innovation infrastructure in Russia, supported by the Federal Government[6]:

- a technological park,
- a business incubator,
- an engineering centre,
- a centre for certification and standardization,
- a youth innovative creativity centre,
- a prototyping centre.

[6] Decree №178 declares that subsidies to Russian regions are allocated to create infrastructure for SMEs. Decree № 1605 declares that subsidies to Russian regions are allocated to assist innovative SMEs. Order № 167 of the Russian Ministry for Economic Development declares to create infrastructure to support SMEs in the area of innovation and production.

We also selected a research organization, a technology transfer centre and a proof-of-concept centre.

The comparative analysis was performed as desk study. The following criteria for comparison were selected on the bases of case studies and review of legal acts, which regulate the development of innovation infrastructure units in Russia (Ernst and Young, 2017):

1) *source of financing* are the main financial inflows that support activities of innovation infrastructure unit (public funds on federal or regional levels, Higher Education Institution funds, private financing);

2) *application areas* are the domains, in which the key activities are executed (can be general or focused);

3) *research component* specifies, whether the research is one of the key activities; if yes – which type of research: basic, applied, or experimental development. Basic research includes undertakings aimed at acquiring new knowledge without any particular applications. Applied research is directed towards particular practical aim or objective. Experimental development is directed to producing new products or process, or to improving existing products and processes (OECD, 2015: 45). Some forms of innovation infrastructure units execute marketing research;

4) *facilities presence* implies premises and / or physical units (*e.g.* instruments, materials, simulators, machinery.) offered for customer use;

5) *key activities* represent distinguishing actions each innovation infrastructure unit executes according to its goal;

6) *essential resources* ensure sustainable functioning, and correspond with the key activities.

3. Findings

3.1 BMC case study results

Based on the results of case studies (annex 1), we revised the following features of living labs:

– maturity of products and or services correspond to TRL 5 and 6. No concept development or basic research were found;

– one of the essential resources every living lab possesses is the users who participate in testing activities. Users can either represent target groups of people (*e.g.* living labs in healthcare like *StreetLab* and *CareVille*), or general mass of people (*i.e.* citizens able to test and validate new products or services in their real-life circumstances). In either way, collection of users' experience and feedback is of primary importance;

– public authorities, especially on regional and local levels, play an important role in launching and supporting living labs (*i.a*. via funding);

– living labs tend to be launched in big cities or in cross-border regions. Medium-size towns tend to cooperate with larger cities to form a strategic vision for the designated territory. Cooperation among adjacent locations strengthens competitive advantage and creates economic growth, providing access to a bigger market (e.g. *Lighting Metropolis* in Greater Copenhagen area);

– living labs require innovation incentive environment and strong R&D base. For instance, Greater Copenhagen – a location of *Lighting Metropolis* – is home for 19 science parks and business incubators, 17 universities and colleges. A living lab can also be a part of a research organization or university (*e.g. StreetLab* and *Adelaide Living Laboratory*).

To reveal a business model in the selected living labs, we looked more thoroughly at their value proposition apart from other BMC components (table 2).

Table 2. Value proposition of the selected living labs

Living lab	Value proposition	Features of a business model (yes/no)
Lighting Metropolis	no	no
Adelaide Living Laboratory	no	no
ProFit	no	no
StreetLab	customization, market entrance risk reduction, certification	yes
Green Way	unique test-bed platform open for local and global clean-tech companies	unclear
CareVille	personalized offer to accelerate and support companies; support their innovative solutions in a real-life environment through testing and validation.	yes (in time)

Source: compiled by the authors

Only three living labs – *StreetLab*, *Green Way* and *CareVille* – have value propositions to specific customer segments. Two of them – *StreetLab* and *Green Way* – are able to earn money from the services they offer, and not completely depend on external sources of financing. Thus, we conclude that a business model is an optional feature of living labs. Considering some basic criteria applied to describe living labs, we suggest two models: project-based and organization-based (table 3).

Table 3. Description of living labs' models

Description of models / **Description criteria**	**Project-based living labs**	**Organization-based living labs**
Life cycle	time-bound	unlimited
Primary funding sources	sponsorships	sponsorships + revenues from customers
Orientation to solve socio-economic challenges	strong	moderate
Form of PPP	public-private partnership	private-public partnership
R&D focus	strong	moderate
Presence of a business model	rather no	rather yes

Source: compiled by the authors

The majority of living lab we studied tends to be project-based, with no business model. Project-based living labs do not aim at maintaining self-sustainability, which requires diverse funding sources not limited to sponsorships. Organization-based living labs, on the contrary, need to have a business model. For instance, *StreetLab* is a company earning money from a full range of services.

Now, when the features of living labs are specified and their models are distinguished, we move to comparative analysis with Russian innovation infrastructure units to delineate potential overlapping elements and functions.

3.2 Comparative analysis of living labs and innovation infrastructure units in Russia

Detailed comparison of the selected living labs and innovation infrastructure units is presented in table 4.

Table 4. Comparative analysis of a living lab and innovation infrastructure units in Russia

Criteria for comparison / Innovation infrastructure unit	**Sources of financing**	**Application area**	**Key activities**	**Research component**	**Facilities**	**Essential resources**
Technology Park	Public, private	General	Complex infrastructure	No	Yes: premises	Premises, services
Business Incubator	Public, HEI	General	Environment for startups	No	Yes: premises	Premises, favorable conditions
Engineering	Public,	Focused	Physical creation of	Experimental	Yes / No	Equipment,

Center	HEI		a product / technical solution	development, applied research		skilled workforce
Center for certification and standardization	Public, private	Focused	Documentary support	No	No	Skilled workforce
Research organization	Public, private	Focused	New knowledge production	Basic research or oriented basic research	Yes/No	Equipment, skilled workforce
Technology Transfer Center	Public, HEI	General	IPR creation and protection	No	No	Skilled workforce
Youth Innovative Creativity Center	Public, private	General	Teaching teenagers to turn their engineering ideas into functional prototypes	No	Yes	Equipment, skilled workforce
Prototyping Center	Public, private, HEI	General	Physical creation of a product	Experimental development	Yes	Equipment, skilled workforce
Proof-of-Concept Center	Public, HEI	General	Assessment of commercialization opportunities of R&D results	Applied marketing research	No	Skilled workforce
Living Lab	Public, HEI	Focused	Testing, modification and improvement, increase of users' loyalty	Experimental development and marketing research	Yes	Skilled workforce, targeted user segments, trial fields

Source: compiled by the authors

Below are brief comments to comparative analysis of the selected innovation infrastructure units and living labs:

1) *sources of financing:* public funding is the main source for both innovation infrastructure units and living labs. Even though private sector can provide some financing, the government plays the leading role;

2) *application area:* living labs focus on one or several overlapping areas (*e.g.* a living lab deals with ICT application in a particular domain, like health and well-being, or smart cities). In Russia, three forms of innovation infrastructure units – an engineering centre, a centre for certification and standardization, and a research organization – have a focused outlook, but not necessarily at ICT;

3) *key activities:* living labs perform testing, modification and improvement of a product and / or service, and increase of users' loyalty. Prototyping and engineering centres are able to physically produce a model or a form, but are not in charge of testing them, all the more with the help of users and potential consumers;

4) *research component:* innovation infrastructure units and living labs mostly deal with experimental development and marketing research. Living labs aim at analysing market potential via feedback form users, who test products and / or services directly in the living environment. As it has been examined before, technology readiness levels applied to living labs are TRL 5 and

TRL 6, which imply testing by users in their own living environment. Engineering and prototyping centres conduct experimental development; a proof-of-concept centre is highly involved in marketing research. Only research organizations could be involved into basic research;

5) *facilities:* living labs require not only machinery equipment, but test-bed platforms and simulators for testing and experimentation;

6) *essential resources*: facilities are the main resource for sustainable functioning of living labs. Another essential resource is users, and their right targeting depending on the focus area. In Russia, there is no form of innovative infrastructure that requires the presence of users as testers.

The comparison results show that living labs have some unique features, missing in other innovation infrastructure units:

– engineering and prototyping centres execute technical functions, and mostly assist produces in creating the first physical form of a product. They do not engage users in testing either;

– a centre for certification and standardization confirms compliance of products with existing standards, but does not deal with further market demand;

– a youth innovative creativity centre pursues the goal to develop engineering skills, and offers the place and facilities for creative activities (*e.g.* the provision of 3-D printers and training how to use them). This may include testing, but on a limited scale, which does not end up in the commercial application of a product;

– a proof-of-concept centre is a new form of innovation infrastructure unit in Russia, which executes holistic evaluation of a product and / or service, and concludes on their potential application pathways and commercial visibility, but only on concept development phase. It is considered as a consulting and supporting form.

To sum up, all the selected innovation infrastructure units lack user engagement, which is a crucial element of living labs. A living lab is a new and self-sufficient form of infrastructure unit, with has a significant potential in fostering innovations.

4. Implications for policy and practice

Public authorities, mostly on regional or municipal levels, are the main driving forces of living labs. They select a particular socio-economic challenge or thematic area, and launch living labs to find solutions. Such a new form of public-private partnership is of mutual benefice. On the one hand, there are challenges, which require governmental attention, but cannot be solved without partnering sides. Living labs enable regional or municipal authorities to involve private sector in resolving socio-economic issues. The officials also learn about innovative products and / or services of local companies, with the perspective of public procurement (*e.g*. smart city solutions). On the other hand, companies need living labs to get valuable insights into consumers' behaviour, and hence shape products and / or services they offer. Users and academia are also among beneficiaries of living labs. Users take part in co-development of new products, and learn innovative entrepreneurship tips. Dealing with living labs helps users better understand their needs, and forms new habits. Last, but not the least, testing new gadgets is usually associated with pleasure. As for universities, living labs provide them with big data for research (*e.g.* living labs in sports), or suggest challenges that could be transferred into joint projects with private sector (*e.g*. solving the problem of air pollution in cities). Still, it is the government that is responsible for the initial investment in the launch of living labs, with business taking operational expenses to sustain them.

In Russia, living labs are unpractised yet (neither project-based, nor organization-based). The comparison of their features with those of innovation infrastructure units, claims the lack of total similarity. Engineering and prototyping centres have some functions of creating test models of a product; however, neither of them attracts users, since they are in charge of the technical issues, and not incremental development process. These innovation infrastructure units correspond with the TRL 4 – technology validated in a laboratory implying closed artificial environment. Proof-of-concept centres provide expertise on commercialization opportunities, but have no testing function, and obviously do not involve users.

Meanwhile, Russia has a significant potential for the launch and use of living labs. For example, *The Forecast for Science and Technology development till 2030* outlines strategic areas for the national competitiveness growth: ICT, biotech, medical care and public health, advanced materials and nanotechnologies, sustainable use of natural resources, transport and space systems, energy efficiency and energy saving (HSE, 2016). As our analysis shows, these areas are the most fruitful for living labs.

Long-term forecasting forms intellectual basis, which assists in identification of challenges Russia will face in 10-15 years, and respective innovative solutions required to ensure national security, quality of life, development of the sectors of the new technological order. To

establish fundamentally new markets[7] and conditions for global technological[8] leadership of the country to be reached by 2035, Russia launched *National Technology Initiative (NTI)* in 2016. The project covers nine market and 13 technology groups, and brings together design and creative teams, fast growing technology companies, top universities, research centers, development institutions, professional communities, public authorities (National Technology Initiative, 2017). The users' engagement is a crucial element missing in *NTI*, which could contribute to the initiative fulfilment.

From the point of view of living labs, people are a new resource for innovations, which is not connected with public support directly (*i.e.* via subsidizing). In Russia, there are 15 metropolitan cities with unclaimed creative and testing potential of their inhabitants. Meanwhile, Russian people generally demonstrate positive attitude to science and technology. The country ranks among top European states (*e.g.* Poland, Germany, Denmark, Finland, Sweden, Ireland, Luxembourg, the Netherlands) by a share of population persuaded that because of science and technology, there will be more opportunities for the next generation (80-89%). Up to 50% of Russians claim they would like to use the following new technological solutions in their daily life: solar batteries on the roof, smart clothes, e-cars, telemedicine, smart houses, 3-D printers, personal robot-assistant, and gene diagnostics (HSE, 2018). Another aspect relevant for the emergence of living labs concerns users' engagement in innovation activities. In Russia, the share of user innovators who are ready to exchange ideas with their peers on a voluntary basis is much higher than in western countries, and dates back to the Soviet tradition of community activities. At the same time, Russian user innovators are unwilling to commercialize their innovations, and would rather keep them for themselves (Fursov, Thurner, 2017). So, a great source of ideas and commercial opportunity of the country remains untouched.

One of the possible ways to introduce living labs in Russia could be innovative clusters having been supported by the government since 2012. The presence of appropriate facilities and qualified workforce are the key prerequisites for the functioning of living labs. Clusters, in their turns, can benefit from living labs, which introduce new solutions to cluster development (*e.g.* foster the progress of clusters in cities by bringing new technologies in urban economy; expand cluster partnerships by enforcing B2C sector and attracting users for testing and experimentation).

[7] EnergyNet distributed power from personal power to smart grid and smart city); FoodNet (system of personal production and food and water delivery); SafeNet (new personal security systems); HealthNet (personal medicine) AeroNet (distributed systems of unmanned aerial vehicles); MariNet (distributed systems of unmanned maritime transport); AutoNet (distributed network of unmanned management of road vehicles); FinNet (decentralized financial systems and currencies); NeuroNet (distributed artificial elements of consciousness and mentality).

[8] Digital design and simulation; New materials; Additive technologies; Quantum Communications; Sensory; Mechabiotronics; Bionics; Genomics and synthetic biology; Neurotechnologies; BigData; Artificial intelligence and control systems; New sources of energy; Unit base (including processors).

In Russia, we found two clusters, which share most common features of living labs and thus have the highest potential to launch them.

1. BRIGHT CITY Lighting and Optoelectronic Instrumentation Cluster of Mordovia has a unique system of engineering centres, operating in lighting technology and in related industries (instrumentation, nanotechnology). The cluster infrastructure includes a technology park *Mordovia*, an engineering centre for energy saving lighting technology, an engineering centre for fiberoptics, an experimental production centre, and a nanotechnology and nanomaterials centre (Technopark-Mordovia, 2016). The cluster can be compared to *Optonet* in Germany, *Photonics* in Finland, and *High-tech and photonics cluster* in the Netherlands. One of cluster projects, with activities similar to living labs, was a live experiment of turning Saransk (capital city of the Mordov Republic) into a site for demonstration and implementation of new cluster products during the *Lighting Forum*. Numerous producers of urban lighting solutions were invited to test and demonstrate their products on a testing field near the city airport. During the forum experts and producers visited the designated testing field and measured different lighting parameters such as the intensity of illumination and light temperature. In the end, the parameters of all participants were compared, and the winner was selected. The demonstration project and the competition were single actions. Now, there is a growing interest from the cluster authorities to create a long-term platform for regular testing that would be an umbrella field for all technologies developed in the cluster. Involvement of citizens into the testing of lighting systems (outdoor and interior), or equipment to provide access to the home Internet could be the pilot themes for living labs.

2. IT and radio electronics cluster of Saint Petersburg runs a pilot project *Safe Smart City Kronstadt* with some similar features of living labs. It is designed to address the issues of integrated safety and security, energy efficiency and ICT for ensuring the high level of socio-economic development of the city and quality of life. Kronstadt is a city with 43K inhabitants; located on the island with complex hydraulic engineering constructions, the city is a heritage site and a naval frontier base of the Russian Federation. It is also an industrial center that includes shipyard, garment factory, food-processing factories. Objectives set within the project correspond with some activities of a living lab:

– to validate and demonstrate technological solutions of national producers;

– to organize demonstration of successful technological solutions;

– to strengthen coordination system among administration, city service providers and companies participating in the projectct.

However, the following characteristics make both clusters different from a living lab:

– these are mature technologies and products that are tested to validate their operability;

– users (residents of designated areas) are not engaged in testing activities, or engaged indirectly;

– user experience or feedback are not collected to improve the new solutions (at least it is not articulated among project targets);

– the testing ground has no organization structure.

In summary, the results of this chapter indicate that the launch of living labs in Russia is a reality. Innovation-driven regions, with developed infrastructure and R&D base (especially clusters) and access to active and curious citizens, have the highest potential. Considering necessary PPP nature of living labs, their launch does not require much extra public funding. However, there are legal and organizational solutions that cannot be neglected. It is recommended to define sectors with a critical mass of companies, which need used-driven innovations and a quick test of their products by the target customers. Priority areas in urban economy (based on citizens' demands) need to be identified to introduce new technologies. The selection of location and target group of users for a pilot living lab are necessary as well. Other important activities are to select a business model, strategic and short-term planning; to synchronize actions performed by regional and some concerned national authorities, and municipalities (*e.g.* via roadmaps). The identification and elimination of legal barriers that limit access to infrastructure and users for private sector stakeholders, promotion of living labs' opportunities for citizens and business, and staff training to operate and manage living labs are the milestones in successful launch of living labs.

Conclusion

Our study was aimed at investigating the features of living labs, including their possible business applications, and searching for the living labs' analogous among the existing forms of innovation infrastructure units in Russia. Apparently, there is no unified definition, which would holistically describe and assess functions, advantages and shortcomings of a living lab. Nevertheless, the issue receives high attention by academicians and practitioners, since there is a shift in STI research and policy towards engaging users not only into testing and experimentation, but into the design process as well. Policy makers deploy living labs for tackling socio-economic challenges, and strengthening competitive advantage of a particular area.

Business model is an optional feature of living labs. Based on the life cycle, primary funding sources, orientation to solve socio-economic challenges, form of PPP, and R&D focus of the selected living labs, we suggested their two models: project-based and organization-based living labs. Business model is a prerequisite for organization-based living labs, while project-based living labs do not usually have one.

The research findings aid in distinguishing the features of living labs from other innovative infrastructure units in Russia. Technological maturity of living labs corresponds to TRL 5 and 6; the decisive role in their launch and funding belongs to the government, and the most frequent form is public-private partnership; the users' contribution is their key resource of living labs, and the focus of their activities is mainly testing, modification and increase of the users' loyalty. Further on, we compared living labs to innovative infrastructure units in Russia using these criteria, which resulted in no total resemblance. Taken together, these results support the idea that a living lab is a very special form of innovation infrastructure unit, since it brings a product, technology, or service closer to the market, based on the insights from the end users' engagement in testing and experimentation.

Russia has a high potential to launch and develop living labs. The Federal Government pursues policies aiming at enchasing national technology base and entering new global hi-tech markets. Metropolitan cities with developed infrastructure and access to users, who demonstrate interest in science and eagerness to test new technologies, are important prerequisites, which are available in the country. One of the possible ways to incorporate living labs as a new form of innovation infrastructure unit into on-going activities could be via clusters. The cases of BRIGHT CITY cluster of Mordovia, and IT and radio electronics cluster of Saint Petersburg prove that Russia is on the way to the launch of pilot living labs. The paper suggests some practical recommendations, which could held policymakers trigger the process.

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1. Lighting Metropolis

Lighting Metropolis is a living lab located in the area of Greater Copenhagen, which unities the Skåne region and Copenhagen in Sweden, and Zealand in Denmark, and accounts for 3.8 million inhabitants. The project aims at making the designated area the largest testing ground for smart urban lighting. Adjacent regions are encouraged to collaborate and involve all types of stakeholders – municipalities, universities, private companies, and local communities. The project has social focus as it tackles security, well-being, health, and culture issues, and lasts from October 2015 until October 2018 (Lighting Metropolis, 2017). The overall BMC template is presented in the table 5. The information available does not allow to make conclusions on channels, cost structure and revenue streams, besides, value proposition does not imply testing and experimentation services for businesses.

Table 5. BMC template for *Lighting Metropolis*

<table>
<tr><th>Key partners</th><th>Key activities</th><th>Value propositions</th><th>Customer relationships</th><th>Customer segments</th></tr>
<tr><td rowspan="3">Public sector: municipality of Albertslund; country councils
Universities: Technological University of Denmark
Companies: Philips, Cisco
Agencies: Invest in Skåne; Copenhagen Capacity; Gate 21</td><td>– smart urban Demo projects
– partnership platform (triple helix) for collaborative purposes
– new education and competence development in lighting (for public sector)</td><td rowspan="3">No</td><td>Not applicable</td><td rowspan="3">Not applicable</td></tr>
<tr><td>Key resources</td><td>Channels</td></tr>
<tr><td>Financial: total budget €7.3 M (i.a. the EU Interreg - €3.65 M; Region Skåne - €325 K; Region Hovedstaden - €530 K + other partners)
Skilled workforce: University staff</td><td>Not applicable</td></tr>
<tr><th colspan="3">Cost structure</th><th colspan="2">Revenue streams</th></tr>
<tr><td colspan="3">Not applicable</td><td colspan="2">Not applicable</td></tr>
</table>

Source: compiled by the authors

2. Adelaide Living Laboratory

Adelaide Living Laboratory is a part of the Cooperative Research Centre for Low Carbon Living (CRCLCL) in Australia. CRCLCL is a research hub, which deals with the problem of developing low carbon environment sector. The overarching aim of the research centre is to decrease Australia's carbon emissions by 10 mega tones by 2020 (Low Carbon Living CRC, 2017). One of the research programs of CRCLCL – Engaged communities – manages Adelaide Living Laboratory in partnership with the University of South Australia. The living lab has three physical living sites: Tonsley, Bowden, and Lochiel Park. For instance, Tonsley's precinct is an innovation district in Adelaide, which is creating environment for companies to innovate in collaboration with research and educational realms. Focus sectors are health and assistive technologies, clean technologies and renewable energy, software, mining, and energy services. Special attention is payed to communities and the role of users. Previously a manufacturing zone, Tonsley is now one of the most liveable areas in Australia that has been awarded 6 Star Green Star in Communities rating Certification, which demonstrates that the project team has considered how Tonsley will support healthy and active living, social cohesion and affordable housing, and create employment opportunities (Green Building Council of Australia, 2017). Adelaide Living Laboratory is a 4-year project lasting from April 2014 till April 2018. The overall BMC template is presented in the table 6. According to the available information, it is not possible to make clear conclusions on channels, cost structure, and revenue streams.

Table 6. BMC template for *Adelaide Living Laboratory*

<table>
<tr><th>Key partners</th><th>Key activities</th><th>Value propositions</th><th>Customer relationships</th><th>Customer segments</th></tr>
<tr><td rowspan="3">Universities: The University of Melbourne; Curtin University
Companies: Sydney Water corporation, Fletcher Insulation; Knauf Insulation; Blue Scope Steel limited
Public sector: City of Melbourne; Commonwealth Department of Industry, Innovation and Science, Clean Energy Council; Energy Efficiency Council
Agencies: Industry association – Consult Australia</td><td>– research and monitoring focused on three development sites
– research projects by students within the CRCLCL framework (University of South Australia)</td><td rowspan="3">No</td><td>Co-creation</td><td rowspan="3">Industry, especially building and construction companies</td></tr>
<tr><td>Key resources</td><td>Channels</td></tr>
<tr><td>Financial: sponsored by the Government, independent partners
Skilled workforce: University partners</td><td>Not applicable</td></tr>
<tr><td colspan="3">Cost structure</td><td colspan="2">Revenue streams</td></tr>
<tr><td colspan="3">Not applicable</td><td colspan="2">Not applicable</td></tr>
</table>

Source: compiled by the authors

3. ProFit

ProFit is a project, initiated to create a network of field-labs in urban setting to promote innovation in sports (ProFit, 2018). These field-labs are implemented in four cities: Eindhoven, Delft (the Netherlands), Kortrijk (Belgium) and Sheffield (the UK). The overall BMC template is presented in the table 7. As in the previous two cases, the information available sheds no light on channels, cost structure and revenue streams of ProFit regarding BMC.

Table 7. BMC template for *ProFit*

<table>
<tr><th>Key partners</th><th>Key activities</th><th>Value propositions</th><th>Customer relationships</th><th>Customer segments</th></tr>
<tr><td rowspan="3">Sports and Technology cluster (project coordinator)

Public sector: Eindhoven, Delft, Kortrijk and Scheffield

Universities: Eindhoven University of Technology, Delft University of Technology, Ulster University, Howest - University college Flanders, Sheffield Hallam University</td><td>– development and testing of prototypes
– athletes' performance monitoring
– assessment of users' involvement and latent needs through context mapping</td><td rowspan="3">No</td><td>Not applicable</td><td rowspan="3">Not applicable</td></tr>
<tr><th>Key resources</th><th>Channels</th></tr>
<tr><td>Financial: Interreg IVB North West Europe program

Skilled workforce: researchers form universities

Physical: testing facilities</td><td>Not applicable</td></tr>
<tr><th colspan="3">Cost structure</th><th colspan="2">Revenue streams</th></tr>
<tr><td colspan="3">Not applicable</td><td colspan="2">Not applicable</td></tr>
</table>

Source: compiled by the authors

4. StreetLab

StreetLab is a company created by *Institute de la Vision* and located in the Quinze-Vingts hospital in France. The Institute is a research hub that has expertise in eye diseases (StreetLab, 2018). It has a database of patients who act as users in the testing process. *StreetLab* supports the developers and manufactures of innovative products and services that improve the quality of life of visually-impaired people. The unique value proposition of *StreetLab* includes the reduction of market entrance risks, and a full pack of services, which helps companies at every stage of product development. More than that, a company can be labelled by the Institute, which proves that their product or service is certified for visually-impaired people. Customer relationships are built around co-creation and personal assistance through direct channels. *StreetLab* generates revenues from selling services. Customer segment is comprised of companies offering products and services for visually-impaired people. The overall BMC template is presented in the table 8.

Table 8. BMC template for *StreetLab*

<table>
<tr><th>Key partners</th><th>Key activities</th><th>Value propositions</th><th>Customer relationships</th><th>Customer segments</th></tr>
<tr><td rowspan="3">Public sector: City of Paris, Paris region, Ministry of Industrial Renewal, The Directorate General for Competitiveness, Industry and Services (DGCIS)

Companies: Crysalide (consultancy agency), Santech (e-health multi-platform)</td><td>– design, evaluation and training
– experimentation and evaluation report for companies seeking to get a label
– complementary services in collaboration with partners</td><td rowspan="3">Customization, market entrance risk reduction, a comprehensive system of services, which allows companies to get a label from Institute de la Vision</td><td>Co-creation personal assistance</td><td rowspan="3">Companies offering products and / or services for visually-impaired people</td></tr>
<tr><td>Key resources</td><td>Channels</td></tr>
<tr><td>Physical: facilities for testing – simulators, artificial street, Homelab (experimental apartment)

Skilled workforce: researchers and professionals

Users: patients</td><td>Direct contact</td></tr>
<tr><td colspan="3">Cost structure</td><td colspan="2">Revenue streams</td></tr>
<tr><td colspan="3">Not applicable</td><td colspan="2">Revenues from the services offered to companies in this particular field</td></tr>
</table>

Source: compiled by the authors

5. Green Way

Green Way is living laboratory, which acts as a test-bed platform for global companies in clean technologies that need testing for commercialization of their products and / or services. The vision of *Green Way* is to become a civic laboratory for Dublin. The goal is to enable promising technologies to jump the chasm from R&D to commercialization and deployment (Aodh O'Mahony, 2017). This living lab is an essential part of Dublin's Cleantech cluster, and its services are enlisted among others, like business mentoring or new technology licensing. The living lab is supported by Enterprise Ireland, the governmental organization responsible for the development and growth of Irish enterprises in global markets. The overall BMC template is presented in table 9. According to the information available, it is not possible to make clear conclusions on channels and cost structure.

Table 9. BMC template for *Green Way*

<table>
<tr><th>Key partners</th><th>Key activities</th><th>Value propositions</th><th>Customer relationships</th><th>Customer segments</th></tr>
<tr><td rowspan="3">Dublin Airport Authority

Universities: Dublin City University, Dublin Institute of Technology
Public sector: Dublin City Council, Fingal County Council (FCC), North Dublin Chamber of Commerce</td><td>Pre-commercial testing of products / services</td><td rowspan="3">Unique test-bed platforms for global cleantech companies planning to commercialize their research results</td><td>Co-creation personal assistance</td><td rowspan="3">Companies in the field of clean technologies</td></tr>
<tr><td>Key resources</td><td>Channels</td></tr>
<tr><td>Facilities and public infrastructure: buildings, energy, water and transport networks, street lighting owned and managed by the partners

Skilled workforce: individual researchers</td><td>Direct contact</td></tr>
<tr><th colspan="3">Cost structure</th><th colspan="2">Revenue streams</th></tr>
<tr><td colspan="3">Not applicable</td><td colspan="2">Revenues from the services offered to companies in this particular field</td></tr>
</table>

Source: compiled by the authors

6. CareVille

CareVille is a living lab that introduces innovative solutions in the domain of elderly care. This living lab is focused on mobility of care, be that the mobility of a caregiver, elderly population, or the care itself as a product and service. *CareVille* is one of the living labs supported by the subsidy from the Flemish government for the period of 2013-2017. There are 6 living labs united at one platform: CareVille, Hasselt and Gent; Aging in Place Aaalst (AIPA), Aalst; Active Caring Neighborhood (AzoB), Antwerp; InnovAge, Leuven; LiCalab, Turnhout; ONLINE buurten, Ostende and Bruges. *CareVille* will establish and manage at least 7 company projects during 2016-2021 (ENoLL, 2018). The overall template is presented in table 8. Cost structure and revenue streams are not covered.

Table 10. BMC template for *CareVille*

<table>
<tr><th>Key partners</th><th>Key activities</th><th>Value propositions</th><th>Customer relationships</th><th>Customer segments</th></tr>
<tr><td rowspan="3">Public sector: Flanders' care Enterprise Flanders, Department of Welfare, Public Health and Family, Flanders Investment and Trade, Government agency for Innovation by Science and Technology, Flemish Agency for Care and Health

Companies: Independent investment company PMV</td><td>– testing and co-creation of products / services with the users involvement
– accelerating start-ups and companies that develop related technologies</td><td rowspan="3">Unique personalized offer of acceleration and support system for companies in the healthcare domain</td><td>Co-creation, personal assistance</td><td rowspan="3">Companies and startups in the field of elderly care</td></tr>
<tr><th>Key resources</th><th>Channels</th></tr>
<tr><td>Financial: subsidies from the government and support from partners

Users: patients

Skilled workforce: researchers and professional medical stuff</td><td>Direct contact</td></tr>
<tr><th colspan="3">Cost structure</th><th colspan="2">Revenue streams</th></tr>
<tr><td colspan="3">Not applicable</td><td colspan="2">Not applicable</td></tr>
</table>

Source: compiled by the authors