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RESEARCH ARTICLE / ARAŞTIRMA MAKALESİ

Innovation in Municipalities: Case of Living Lab

Belediyelerde İnovasyon: "Living Lab" Örneği

Meryem ARSLAN*

Abstract

The purpose of this article is to introduce the "Living Lab" ecosystem and to describe innovation in municipalities. Living labs are becoming more common and long-lasting. The concept views cities as innovation laboratories, with the goal of improving citizens' quality of life through the products and services provided, as well as democratising innovation by emphasising citizen and other stakeholder participation. The EU has described it as an innovation tool. The study, which includes theoretical and visual research, is about the Basaksehir Living Lab. The Living Lab network recognised this lab in a field study aimed at metropolitan municipalities as well as innovation projects, with a comparison to those in Finland, the United Kingdom, and Spain. The field studies were designed to contribute to future innovation studies to be conducted in municipalities. For the qualitative study, the "case study" method was chosen. The study's findings show that innovation research within urban planning, as well as social innovation projects, have materialised. However, more than half of the projects in the Living Labs are technological in nature. The study's findings suggest that due to factors such as requirements, needs, and technological developments, innovation, whose importance is emphasised and encouraged in international documentation and policies, is unavoidable in municipalities. Cities must be transformed into innovation laboratories, and the Living Lab ecosystem, in fact, has a catalysing effect on municipal innovation.

Keywords: *Innovation, Innovation in Municipalities, Living Lab, Smart City, Innovation in the Public Sector.*

Öz

Bu makale belediyelerde inovasyon faaliyetinin anlaşılmasını, yaygın ve sürdürülebilir seviyeye gelmesini, bu yönde kentleri inovasyon laboratuarı olarak gören, sunulan ürün ve hizmetlerle vatandaşların yaşam kalitelerini artırmayı hedefleyen, vatandaş ve diğer aktörlerin katılımını önemseyerek inovasyonu demokratikleştiren, Avrupa Birliği tarafından inovasyon aracı şeklinde betimlenen "Living Lab" ekosisteminin tanıtılmasını, living lab oluşumunun inovasyon aracı olarak kullanılabilirliğinin sorgulanmasını amaçlamaktadır. Teorik ve görgül araştırmayı içeren çalışmada büyükşehir belediyelerine yönelik alan araştırması ile inovasyon projeleriyle living lab ağı tarafından ödüle layık görülmüş Türkiye'de ilk ve tek etkin living lab olan Başakşehir Living Lab ile Finlandiya, İngiltere, İspanya living lablerinin inovasyon projelerine ve karşılaştırmalı analizine yer verilmiştir. Alan araştırmaları ile belediyelerde gelecekte yapılacak inovasyon çalışmalarına katkı sağlanması hedeflenmiştir. Araştırma bulguları belediyelerde hizmet, süreç inovasyonlarını içeren akıllı şehircilik

* Gaziantep Büyükşehir Belediyesi, Gaziantep, Türkiye. E-posta: meryemrsln@gmail.com, ORCID ID: 0000-0002-2877-0256

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kapsamında yer alan inovasyon çalışmaları ile sosyal inovasyon alanında projelerin hayata geçirildiğini göstermektedir. Living lablerde ise projelerin yarıdan fazlasının teknoloji ağırlıklı olduğu Başakşehir Living Lab ekosisteminin diğer living lablere göre inovasyon projeleri bağlamında yakın seviyede bulunduğu tespit edilmiştir. Çalışma bulguları uluslararası belge ve politikalarda önemi vurgulanan ve teşvik edilen inovasyonun ihtiyaç, istek ve teknolojik gelişmeler vb. faktörlerin etkisiyle belediyelerde uygulanmasının kaçınılmaz olduğunu, kentlerin inovasyon laboratuarı haline getirilmesi gerektiğini ve bu doğrultuda living lab ekosisteminin belediye inovasyonunu hızlandırıcı yönde etkilediğini ortaya koymaktadır.
Anahtar Kelimeler: *İnovasyon, Belediyelerde İnovasyon, Living Lab, Akıllı Şehircilik, Kamuda İnovasyon.*

1. Introduction

At the international level, innovation has become a development that has become of a lot of importance within the last thirty years and has been inspired at each chance because the additional worth it creates is realized. Accordingly, international organizations are attempting to ascertain innovation policies and live innovation performance of nations at intervals within the framework of the determining criteria. Innovation is applied in several areas comparable to guaranteeing world competition and economic growth, rising the standard of life of citizens, and particularly solving issues of hunger, infectious disease, lack of water, and environmental pollution. Realizing that innovation is an imperative need, countries prepare innovation programs and supply funding sources to be used extensively publicly establishments. Innovation is employed as a tool that solves issues and meets desires by looking at speedy changes in social and economic developments and technology. As a tool that exceeds subject expectations at the world level, it's enforced by municipalities, which are the highest units to voters among public institutions in commission delivery. In particular, technological innovations seem as sensible town applications and social innovations in municipalities and are effective in increasing property urban development, citizen welfare, and municipal service performance. Moreover, through the economical use of resources and reduction of costs, digital technologies comparable to artificial intelligence, sensible detector technology, etcetera are mirrored within the services provided. Additionally, with the assistance of innovation, effective participation of voters (democratic innovation) is feasible in the context of combating the difficulties encountered in urban life and meet rising needs. Municipalities acting in cooperation with non-governmental organizations and personal organizations offer a chance for creativity, creating it possible to supply faster, a lot of effective, and citizen-oriented service delivery in the field of innovation with organizations brought up as "Life Laboratories" or "Life Labs".

Innovation is a more and more recognized tool for municipalities that grade service quality, care concerning subject expectations and needs, and keep up with technological developments. In this context, this study through theoretical and empirical research, the subject of innovation in municipalities is explained by pertaining to the definition and historical development of the innovation concept, the importance of innovation for the general public sector, and therefore the innovation criteria determined by the OECD within the public sector. By mentioning the factors

that facilitate and stop innovation in municipalities, the factors that municipalities have to be compelled to concentrate on in implementing innovation are emphasized.

The study found little or no theoretical and empirical studies on innovation in municipalities and living work innovation in international literature. Moreover, no study within the literature evaluates living labs in the context of innovation in municipalities. Whereas researching the theoretical aspect, innovation in the public sector, living labs, and innovation-based literature were reviewed. Within the scope of the literature review, principally primary sources were mostly, and it had been deemed acceptable to conduct 2 field studies in the context of innovation and living labs in municipalities. Innovation practices of municipalities in the world and Turkey got as examples and it was tried to emphasize that each municipality will create innovations. With the instance of a living lab, which is an innovation practice, it's emphasized that municipalities, which are the service units nearest to citizens, can take pleasure in completely different ecosystems in implementing innovation.

2. Definition and Historical Development of the Concept of Innovation

As one of the essential parts of the new public management approach, the thought of innovation (Wu et al., 2011, p. 347) is seen as a locomotive within the development and perfection of the performance of public services, and has been employed in several areas, particularly since the nineties and has found its equivalent in Turkish because of the word "yenileşim" (TDK, 2016). To innovate, the verb sort of innovation in the Redhouse English-Turkish wordbook is expressed as "to make innovation, to form changes", and pioneer as "the one that makes innovation" (Redhouse, p. 607). The word has been used as a verb within the sort of "innovate" since the 1540s. It means, "introducing one thing as new", and "taking in new things, dynamic existing practices" (Online Etymology Dictionary, 2016). a number of the definitions relating to innovation in the scientific literature are given in Table 1.

Table 1. Definitions of innovation

Person/Institution Making the Definition	Definition of Innovation
Joseph A. Schumpeter	Finding new products, new production methods, new markets, new resources, and managing newly created organizations.
Oslo Guidelines	The realization of a new or significantly improved product (goods or service) or process, a new marketing method, or a new organizational method in internal practices, workplace organizations, or external relations.[1]

1 In the 1992 edition of the dictionary, data collection activity was carried out on the innovation process, and with the second edition in 1997, the concepts, definitions, methodology framework and the sectorial areas covered were increased. In both editions, the definition of innovation is made only for the technological products and processes, while organizational innovation and non-technological innovation are additionally given. This shows that a specific level of understanding has not been established for the definition of innovation in both editions. In the 2005 edition of the dictionary, it is observed that the emphasis on innovation increased, and definitions regarding organizational and marketing innovation were added.

OECD	They are new services or products or significantly improved services of products by the public sector.
Anthony Arundel and Dorothea Huber	To ensure the emergence of new or improved services and processes.
Andrew Van de Ven and Harold Angle	It is the implementation process of the new idea produced for problem solving. It is the process of producing, accepting, and applying new ideas, new processes, new products, and services.

Sources: Schumpeter, 1934, p. 66-78, Oslo Guidelines, 2005, p.50, OECD, 2017, Arundel and Huber, 2013, p.146-147, Kusiak, 2007, p. 864, Van de Ven and Angle, 1989, p. 12-20

Innovation could be a process that existed and practiced within the periods before it had been conceptualized. Accordingly, innovation was practiced in each field in spite of some specific date or place. The method was named innovation in the early twentieth century by the Austrian economic expert Joseph Alois Schumpeter. Schumpeter outlined innovation as "the transformation of concepts into product, process, structure forms and therefore the output obtained at the top of this process to search out a market and/or increase the potency of the firm" (Schumpeter, 1934, p. 66-78; Shearmur and Poirier, 2015, p. 8).

After Schumpeter, it's determined that innovation wasn't wide accepted as an inspiration till the first 1960s. In those years, innovation was perceived as a concept that ought to be rejected and, instead it is seen that the ideas of invention, automation and technical modification were used (Godin, 2008, p. 35-37). On the opposite hand, it is noteworthy that some academicians conducted studies on innovation within the public sector then examined structure innovation. It's seen that in 1965, the Sussex University Science Policies analysis Unit tried to term innovation as "science studies" and "science policy studies" and thus, innovation began to happen within the scientific literature since 1965. Consistent with the science Citation Index 1965-2004 data, it's seen that the word "innovation" is enclosed in article titles a lot of and more day-by-day. By the year 1974, St. Christopher Freeman, the director of the Science Policy Analysis Unit at the University of geographical region, emphasised that innovation causes economic and social changes in the long run, writing the books "The economic expert of business Innovation" and "Unemployment and Technical Innovation". Innovation research, that started with Sussex University, has unfold round the world since the 1980s. The analysis of the Japanese innovation system in 1987 additionally shows that innovation began to be thought of vital worldwide (Fagerberg et al., 2005, p. 2).[2]

3. Innovation Criteria and its Importance in the Public Sector

3.1. Innovation Criteria in the Public Sector

In the public sector, innovation is regarding achieving winning results for society, instead of applying one thing essentially new. Winning innovation within the public sector provides the results desired by society. Supported these elements, the outputs of the MEPIN Project and also

2 Freeman later took part in the innovation studies of the OECD and played a role in determining its innovation policies.

the innovation criteria in the public sector in line with the analysis of the OECD' Public Sector Innovation Observatory are shown in Table 2.[3]

Table 2. Innovation Criteria in the Public Sector

Innovation	Should bring new perspectives to the institution to which it is applied.
	Should be ambitious.
	A significant improvement must be made in the existing service or product.
Implementation	Innovation must be implemented.
Effectiveness/Benefit	Better results should be obtained.

Source: Adapted from (Nordic Innovation, 2019), (United Nations, 2017), (Alsos et al., 2015, p. 2).

According to Table 2, three important criteria are taken into consideration for an activity in the public sector to be considered as an innovation:

i. *Innovation:* Innovation should bring new perspectives to the organization to which it is applied and should be ambitious. A significant improvement must have been made in the existing service or product.[4]

ii. *Implementation:* Innovation should be implemented; it should not be left on the anvil.

iii. *Effectiveness / Benefit:* Innovation should aim for better results in terms of effectiveness, productivity, and employee satisfaction.

3.2. The Importance of Innovation in the Public Sector

Results of a study conducted by the OECD show that public directors understand the conception of innovation as a brand new or substantial modification in a very product or service, operational process, structure or communication ways to enhance the operational processes of the general public sector (Nordic Innovation, 2019; UN, 2017).

According to the results of a study conducted by the United Nations in 2014, today the urban population constitutes 54% of the world population, and it is predicted that this rate will reach 66% in 2050, adding 2.5 billion people will be to the world urban population (Alsos et al, 2015, p.1-2). This increase will grow the demand for service and therefore innovation will be indispensable for the sustainability of service quality. There is an increasing demand for innovation in the public sector. Citizens demand quality and accessible services where technological developments force the public to change, and demographic changes increase the need for public services. The scarcity of public resources leaves problems unsolved, and innovation in the public sector gains

3 The Measuring Public Innovation in the Nordic Countries Project (MEPIN) aims to establish measurement standards for innovation in the public sector in order to collect internationally comparable data, and at the same time, to understand what innovation is and how it is done in the public sector and thus to disseminate public innovation.

4 Even if this criterion determined at the firm level in the Oslo Guidelines is relatively applied in other public institutions or organizations, it may be considered new for the organization where the innovation is implemented.

importance due to all these factors and needs. Innovation is one of the central issues for the public sector (Wihlman et al., 2016, p. 50). It is also emphasized in the Oslo Guidelines (UN, 2016) that innovation is important for the public sector. With the "Green Paper on Innovation" document, all members of the European Union acknowledge that innovation is vitally important regarding competition and prosperity (UN, 2014).

It is emphasized in the Innovation Union Guidelines of the European Union that innovation is important to combat problems such as global warming, energy shortage, food shortage, transportation, meeting the needs of vulnerable and disadvantaged social groups, the unemployed etc., ensuring economic development and increasing international competitiveness. Moreover, the guidelines see innovation as the locomotive of economic development and states that innovation performance should be increased. The guidelines also state that thanks to the implementation of innovation in the public sector, benefits such as a more environmentally friendly Europe, a longer and healthier life, more efficient use of public resources, rational economic functioning that supports living standards, and ensuring personal development of citizens based on social innovation will be obtained (Veeckman and Graaf, 2015, pp. 6-7).

4. Innovation in Municipalities

Innovation in municipalities are the changes that make new and price supplemental merchandise and services, and structure processes (Pratiwi, 2016, p. 2). Pratiwi views innovation in municipalities as any type of reform in native governance (Pratiwi, 2016, p. 3). In step with Wihlman (2016, p. 50), the effectiveness of exploitation innovation within the municipal organization can facilitate to search out solutions to major issues by rising services. Innovation in municipalities may be expressed as meeting the changing and evolving demands of voters in the face of quickly developing technology, being ballroom dancing before society to find solutions to problems, providing new, considerably improved products and services with high supplemental value.

The UN determined in its study entitled "The World's Cities", in 2016 that one out of each three folks can board cities thanks to the rise within the world population (United Nations, 2016), (United Nations, 2014). This prediction ends up in the emergence of the subsequent factors that force municipalities to pioneer (Veeckman and Graaf, 2015, p. 7):

i. Cities are moving towards becoming centers of entrepreneurship and innovation activities day-by-day.

i. Cities are listed as eco-systems that encourage innovation, use smart applications, new forms of participation, and open data.

i. Promoting innovation by using resources efficiently with low risk and cost brings local development and contributes to local prosperity.

i. The development of technology, the increasing number of mobile phone users, and the use of social media tools radically changes citizen behavior, which reveals the potential to deeply affect municipal services with innovation.

i. In some cities, the focus is on software development through open innovation, and applications are developed in cooperation with citizens.

i. Problems such as traffic density, environmental pollution, increasing demands of citizens with the development of technology (demand for higher quality and faster service), and governance put pressure on municipal corporations to introduce innovative services and solutions. Accordingly, air pollution is detected with sensors, for example, and municipalities have to produce policies regarding this. With hackathons, it is ensured that effective and citizen-centered applications are created with open data.[56]

4.1. Factors Facilitating and Blocking Innovation in Municipalities

According to the OECD, public demands, money problems, and varied difficulties necessitate innovation within the public sector generally (OECD, 2017). On the opposite hand, a number of the most obstacles to innovation in the public sector are bureaucracy, legislation and a scarcity of qualified human resources (Arpacı, 2009, p. 825). In line with designer and Bertucci (2006, p. 12), providing quick access to exemplary innovation studies and coverage these studies, establishing an award system to encourage risk-taking are among the factors that facilitate innovation publicly administration, whereas resistance to alter and strict regulation of legislation to a degree that will not permit innovation hinder innovation. Factors that facilitate and block innovation in municipalities are shown within the table below.

Table 3. Factors Facilitating and Blocking Innovation in Municipalities

Facilitating Factors	Blocking Factors
Support from senior managers	Making long term plans with short term budgeting
Presence of innovation source	Not having enough equipment in Risk Management and Change Management
Possibility to encourage and support human resources to innovate	Not adopting a culture of risk-taking
Citizen participation, unable to get the views of all stakeholders	Difficulties experienced during service delivery
Ability to adopt change management	Inability to devote time to innovation due to high managerial responsibilities (workload)
Ability to apply risk management	Insufficient encouragement or reward for innovation.

Source: Alberti and Bertucci 2006, p. 12; Patel, 2005, p. 34; Albury, 2005, p. 53-55; Mulgan and Albury, 2003, p. 31-34-36.

As seen in Table 3, while factors such as the support of senior managers, adoption of change management, risk management, etc. facilitate innovation in municipalities, insufficient encouragement or reward for innovation makes innovation difficult (Wihlman, 2016, p. 54-56).

5 Horizon 2020 is the most important source of funding for smart city applications.

6 Software competition

4.2. Innovation Practices in Municipalities

4.2.1 Innovation Practices in Municipalities around the World

Innovation could be a tool promoted by the state for the development of public services (Walker, 2006, p. 314). Innovation practices seen in municipalities round the world are innovations in technological associate degreed social fields, and are administered within the variety of the introduction of a replacement service to citizens, the improvement of an existing service, or the answer to problems. during a study conducted on 220 municipalities in fifty three cities in the USA, it absolutely was ascertained that the bulk of innovations are in the form of the appliance of latest technologies. This proves that technology innovation finds a lot of place in municipalities.[7]

Innovations emerging in the field of technology appear as "smart city (smart urbanism)" applications (Nelson et al., 2011, p. 303). The smart-city is an approach that includes domains such as the effective use of resources to increase the municipal service performance, sustainable urban development, citizen welfare, smart sensors, transportation, energy, health services, water, and waste, etc. where innovation and digital technologies are effectively used together with the reduction of costs. Innovation can be made by using information and communication technologies in the production of products and services with many business partners (Center for Public Service Innovation, 2015) .[8]

The main innovation practices observed in municipalities around the world are shown by country in the table below (See Table 4).

Table 4. Innovation Practices in Municipalities around the World

Country/Continent	Featured Innovation Projects
Australia	The Wynlens Project, which enables city administrators to make better city plans; where citizens can see the plans and the buildings made for the city of the future holographically with the help of special glasses and express their opinions about the city plans, was awarded in the innovation category to create a more livable Australia. The municipality that makes the innovation is the Municipality of Wyndham.
United States of America	The US has established the "Tempe Oil Cooperative" for the first time in the world regarding oil wastes, which cause serious problems such as overflow or blockage of the sewage system. With this project, the municipality won the 2016 J. Robert Havlick innovation award within the ICMA. The municipality that makes the innovation is the Municipality of Tempe.[9]

7 The European Social Innovation Team (info@socialinnovationprize.eu) provided the information by e-mail that there is no municipality that has received an award within the scope of the "European Social Innovation Awards", which was started to be implemented in 2017 by the European Commission. Detailed information is given in the references section.

8 According to the ABI Research results; Singapore, New York (USA), Los Angeles (USA), Paris (France), London (the UK), Dubai (United Arab Emirates), Beijing (China), Shanghai (China), Tokyo (Japan), Seoul (South Korea) have been identified as the smartest cities. In these cities; smart meters, smart grids, bike sharing, smart parks, electric vehicles, sensor technology, etc. and, smart urban applications are widely used to contribute to the development of environmental awareness and reduce air pollution (ABI Research, 2018), (Asian Correspondent, 2018).

9 International City Management Association (ICMA)

Canada	The Proactive Crime Prevention Unit was established to reduce crime rates, thereby helping to raise awareness of crime prevention in society. The application was deemed worthy of an award in the category of safe society award by the Municipal Affairs Unit of the Alberta Province of Canada in 2016. The city that makes the innovation is the Municipality of Grande Prairie.
Singapore	In 2014, Singapore focused on the solution of urban problems within the scope of the Smart Nation Program regarding smart urbanism. The launch of driverless taxis in the country since 2016 is one of the exemplary innovation activities carried out within the scope of smart urbanism. According to the research conducted by ABI Research in 2018, Singapore ranks first in the world within the scope of smart urbanism.
Kingdom of Saudi Arabia	The municipalities carry out their innovations within the scope of the "Future Saudi Cities" program for a better urban life, which is conducted by the United Nations. In the context of open innovation, the participation of citizens in innovation is supported by the application of "Idea Bank".
Russian Federation	With the Active Citizen Portal, citizens living in Moscow are allowed to determine the leading innovation projects of the city by voting. Efforts are made to popularize technology parks, the first of which was opened in Moscow and serves 1200 children between the ages of 13 and 17 to enable them to develop themselves and produce innovative projects in areas such as space, geographical informatics, robotics, modern transportation vehicles, and nanotechnology.
The Continent of Africa	In the continent, it is observed that innovation competitions are held within the scope of the European Union IPA fund, and since 2010, service innovations have been awarded within the scope of the Annual African Innovation Prize for the Public Sector awards organization. Among the innovation activities are resolving the traffic density of Accra, the capital city of Ghana, with smart urban planning practices, developing the city of Konza in Kenya as a technology center, and producing innovative solutions for the common and deadly malaria disease throughout Africa.

Source: National Awards for Local Government, 2017, p. 24; ICMA, 2016; European Social Innovation Competition, 2018; Alliance for Innovation, 2016; Municipality of Tempe, 2018; State of Alberta, 2017; Forum Virium Helsinki, 2017; ABI Research, 2018; Future Saudi Cities, 2017; Ministry of Municipal and Rural Affairs and Housing, 2018; Balady, 2018; Adesida et al., 2016, p. 108; Businesstech, 2016; IBM, 2018; CNN, 2018; Innovation Prize for Africa, 2018.

As seen in Table 4, countries and municipalities use both technology-oriented innovations and social innovations as tools for solving problems and meeting needs.

4.2.2. Innovation Practices in Municipalities in Turkey

Innovation Field Research in Municipalities

In the analysis for innovation studies of metropolitan municipalities, it had been tried to work out the extent municipalities dole out innovation activities within the context of worldwide competition as declared in the Tenth Development Plan.

The Purpose, Limitations, Method, and Data Collection Techniques of the Research

When examining innovation practices of municipalities in Turkey, it's seen that metropolitan municipalities have return to the forefront in innovation and their activities support the

emergence of innovation mistreatment their blessings of resource and size. The analysis covering thirty metropolitan municipalities aimed to see whether or not innovation was enclosed within the strategic plans, principles / objectives of the metropolitan municipalities, and whether there are innovation studies or studies that lay the groundwork for innovation, and what level they are at in terms of innovation. The knowledge and skill of the municipalities on innovation have tried to be analyzed with the innovation examples declared by them and / or the results obtained from document reviews. The actual fact that the thought of innovation isn't understood or adopted by several municipalities may be a limitation of the research. The research was conducted mistreatment the qualitative research method. Qualitative research is an approach that deals with researching and understanding social phenomena in their scheme with the aim of theorizing. The aim of qualitative research is to know however individuals produce their social world whereas seeking answers to the what, how, why questions, and to do to investigate how they understand the social surroundings in which they live (Erişti et al., 2013, p.9). For the direct observation technique, document reviews and participant observation were utilized in the research. As for the the indirect observation technique, interview (individual interviews) and correspondence (interviews with municipal officials, document reviews, and getting elaborate knowledge regarding activities with a form with open-ended queries within the electronic environment) was used (Karasar, 2017, p. 199-229).

Research Findings

It is determined that the word "yenilikcilik" was used rather than the word "inovasyon" within the analyzed strategic plans. Innovation is enclosed in the strategic plans of fourteen out of thirty metropolitan municipalities. Findings relating to sample innovation comes and activities of municipalities are shown in the table below:

Table 5. Innovation Research in 30 Metropolitan Municipalities

Metropolitan Municipality	**Presence of the Innovation Concept in the Strategic Plan**	**Featured Innovation Projects**
Ankara Metropolitan Municipality	No	Meteorology Stations, Durak Ankara
Adana Metropolitan Municipality	No	Smart urbanism applications
Antalya Metropolitan Municipality	Yes	Mavi Ev Alzheimer Patient and Patient Relatives Center
Aydin Metropolitan Municipality	Yes	3-D pedestrian crossing
Balikesir Metropolitan Municipality	No	Smart urbanism applications
Bursa Metropolitan Municipality	Yes	Chip of Love
Denizli Metropolitan Municipality	Yes	Smart urbanism applications
Diyarbakir Metropolitan Municipality	Yes	Air-conditioned bus stops with a library
Erzurum Metropolitan Municipality	No	Smart stops with heating for winter and air conditioning for summer
Eskisehir Metropolitan Municipality	Yes	Social innovation activities with Tepebasi Future Living Lab and Eliminating Barriers Living Lab

Gaziantep Metropolitan Municipality	No	KRITA Project, smart city applications, especially in traveling with contactless credit cards
Hatay Metropolitan Municipality	No	Smart urbanism applications
Istanbul Metropolitan Municipality	Yes	IBB Navi, Itaksi, Zemin İstanbul, Erisilebilir (Accessable) Istanbul, IBB Mobile Traffic application, Smart Recycling Container, Hikayematik (Story-matic) and other smart urban applications
Izmir Metropolitan Municipality	No	It established its R&D Innovation Directorate for the first time in Turkey. The smart traffic management system that won the best project award at the Amsterdam Intertraffic Fair, and other smart urbanism applications
Kahramanmaras Metropolitan Municipality	Yes	Social alarm device and other smart urbanization applications
Kayseri Metropolitan Municipality	Yes	Smart urbanism applications
Kocaeli Metropolitan Municipality	No	Its excavation information and management system received an award in the best smart city technology category at the Golden City Awards 2016.
Konya Metropolitan Municipality	No	Mobile Mesnevi Application, e-Pati Project
Malatya Metropolitan Municipality	Yes	Smart urbanism applications
Manisa Metropolitan Municipality	No	Smart urbanism applications
Mardin Metropolitan Municipality	Yes	Amber Project
Mersin Metropolitan Municipality	Yes	Smart urbanism applications
Mugla Metropolitan Municipality	No	Smart urbanism applications
Ordu Metropolitan Municipality	No	Innovation Contest called "Basimiza Icat Cikar"
Sakarya Metropolitan Municipality	No	Smart urbanism applications
Samsun Metropolitan Municipality	No	Smart urbanism applications
Sanliurfa Metropolitan Municipality	Yes	Microloan
Tekirdag Metropolitan Municipality	No	Smart urbanism applications
Trabzon Metropolitan Municipality	No	Smart urbanism applications
Van Metropolitan Municipality	Yes	Smart Ticket Application

Source: Prepared by the author.[10]

As seen in Table 5, innovation is included in the strategic plans of 14 out of 30 metropolitan municipalities. Municipalities that stand out with their innovation works are Istanbul, Adana, Bursa, Mersin, and Konya Metropolitan Municipalities. Municipalities attach importance to smart city applications. The number of projects implemented in the field of social innovation is limited. Ankara Metropolitan Municipality makes climate assessments with the meteorology stations it has established in all districts and ensures

10 Bursa Büyükşehir Belediyesi, 2016, Denizli Büyükşehir Belediyesi, 2015, Aydın Büyükşehir Belediyesi, 2015, Kayseri Büyükşehir Belediyesi, 2016, Mardin Büyükşehir Belediyesi, 2016, Kamuda Stratejik Yönetim, 2015, Diyarbakır Büyükşehir Belediyesi, 2018, Şanlıurfa Büyükşehir Belediyesi, 2015, Sakarya Büyükşehir Belediyesi, 2015, Tekirdağ Büyükşehir Belediyesi, 2015, Antalya Büyükşehir Belediyesi, 2016, Mersin Büyükşehir Belediyesi, 2015, Malatya Büyükşehir Belediyesi, 2015, Gaziantep Büyükşehir Belediyesi, 2015, Eskişehir Büyükşehir Belediyesi, 2015, Adana Büyükşehir Belediyesi, 2015, Balıkesir Büyükşehir Belediyesi, 2014, Erzurum Büyükşehir Belediyesi, 2015, Hatay Büyükşehir Belediyesi, 2014, İstanbul Büyükşehir Belediyesi, 2015, Konya Büyükşehir Belediyesi, 2015, Kahramanmaraş Büyükşehir Belediyesi, 2015, Muğla Büyükşehir Belediyesi, 2015, Ordu Büyükşehir Belediyesi, 2015, Samsun Büyükşehir Belediyesi, 2015, Kocaeli Büyükşehir Belediyesi, 2015, Akıllı Ankara Projeleri, 2016, İzmir Büyükşehir Belediyesi, 2015, İSBAK, 2018, İBB, 2018.

that the data obtained contribute to agricultural production. With the Durak Ankara capital project, it makes it potential for the voters to be told the time of arrival of the buses to the station. In addition, the Başkent Card application, that has the feature of a credit card, was launched for families receiving social assistance, and has been received several awards within the field of social innovation. It aims to contribute to the innovation scheme with its innovation and technology center sculpturesque getting ready to the living research laboratory concept. Adana Metropolitan Municipality organized the Turkey Innovation Week Adana event, worked on the utilization of good energy systems in buildings and net integration, burial ground system and good urbanism, and supported urban R&D comes with the grants received at intervals the scope of Horizon 2020. Aydın Metropolitan Municipality has place into follow the three-dimensional pedestrian crossing, that aims to forestall potential accidents. Balıkesir Metropolitan Municipality offered smart stop system, car place recognition system, barrier system and robotic parking applications that save area within the scope of good town Balıkesir to the service of voters. Bursa Metropolitan Municipality has put into practice the Sevgi Çipi and smart parking application for citizens with Alzheimer' disease. Denizli Metropolitan Municipality stands out with its artificial intelligence-supported application that shortens the waiting time in traffic, the college bus following system and similar innovation projects. Diyarbakır Metropolitan Municipality stands out with its cool and library bus stops and good junction signal system; Erzurum Metropolitan Municipality with windflower smart price tag, smart stops; Eskişehir Metropolitan Municipality with smart ticket Escard; Gaziantep Metropolitan Municipality by victimization credit cards in transportation, and with smart stop application; Hatay Metropolitan Municipality with smart environmental applications; İstanbul Metropolitan Municipality with IMM Mobile Traffic, IMM Navi and similar smart urban applications. İzmir Metropolitan Municipality was granted a reward at the capital of The Netherlands Intertraffic honest in 2016 with its smart traffic management system. Kahramanmaraş Metropolitan Municipality stands out with its social alarm device, which is Associate in Nursing example of social innovation application offered to folks over the age of 65. Kayseri Metropolitan Municipality stands out with its solar-powered charging stations; Kocaeli Metropolitan Municipality with its excavation scientific discipline and management system, that it absolutely was awarded at intervals the scope of Golden town Awards 2016; Konya Metropolitan Municipality with the appliance of contactless use of bank cards in transportation vehicles, for which it was awarded within the scope of 2013 open-end credit Awards and e-pati application that permits observation the health standing of animals; Malatya Metropolitan Municipality with good bike-sharing system; Manisa Metropolitan Municipality with citified project to scale back coal use, Mardin Metropolitan Municipality with Amber Project progressing to empower deprived girls economically, Mersin Metropolitan with Municipality traveller data system, smart intersection management system, Muğla Metropolitan Municipality with smart station and smart bicycle system, Ordu Metropolitan Municipality with smart station and smart bicycle system, Sakarya Metropolitan Municipality with smart stop project, Samsun Metropolitan Municipality with town investments observation application and Şanlıurfa Metropolitan Municipality with its micro-credit application that may offer economic development for disadvantaged groups.

When other applications related to innovation in municipalities are examined, it is observed that municipalities' patent and utility model applications stand out with the eTurkiye (Etr) awards, an

event aimed at supporting and disseminating the best and the most innovative applications and to evaluate and award the successful projects of public institutions and local governments. The event has been organized by TUSIAD and Turkey Informatics Foundation organization since 2003, and similarly, the Altin Karinca Municipal Awards organized by Marmara Municipalities Union, aimed at awarding projects in the category of R&D and innovation since 2017, which covers the best practices and projects of municipalities (Etr Ödülleri, 2009, Altınkarınca Ödülleri, 2018).[11]

5. The Living Lab Example As An Innovation Application

5.1 Definition and Historical Development of the Living Lab Concept

The concept of living lab was first introduced by William J. Mitchell with his proposal to bring innovation research to the real environment (Guzman et al., 2013, p. 29) and came to life as development environments where researchers find inspiration by observing citizens and test their hypotheses through experimentation (European Commission, 2009, p. 25-30).[12]

ENoLL, the organization that coordinates all living labs in the world, emphasizes the purpose of making life easier when defining living labs and innovation used as a tool to achieve this goal. The European Commission, similarly, sees living labs as one of the tools that innovate and realize Europe's growth targets under the roof of the Innovation Union. In recent years, citizens have been included in research and every stage of the innovation process, and thus living labs, which contribute to the competitiveness and growth of Europe, have come to the fore as a powerful tool (ENoLL, 2015, p. 13; European Commission, 2009, p. 5). The prominent definitions in the scientific literature regarding living labs are included in Table 6.

Table 6. Definitions of Living Lab

Person/Institution Making the Definition	Definition of Living Lab
ENOLL[13]	They are citizen-oriented, open innovation ecosystems based on the approach of developing together with citizens, and institutions that integrate research and innovation processes with society, develop new solutions to encourage open innovation, collaborative innovation, and to facilitate life.

11 According to the information provided by the Turkish Patent Institute, the number of patent applications made between 2006-2015 is 14, and the number of utility model applications is 10.

12 He was a Professor at The Massachusetts Institute of Technology (MIT).

13 The European Network of Living Labs (ENOLL) was born in 2005 in the European continent, based on the experiences gained from the life experiences of Northern European countries. Veli Pekka Niitamo, who is seen as the founder of the European living lab movement, initiated the ENoLL movement in early 2006. The first network of Labs was established as LivingLabs-Europe with the consultancy of Denmark. The European living lab network was introduced by the Finnish Term Presidency on November 20, 2006 as the first step towards the new "European Innovation System", with an emphasis on the principle of creating innovation together by public, private and non-governmental organizations. In 2006, the European Union accelerated the ENoLL movement with a series of measures and aimed to develop a common innovation system for living labs based on information and communication technologies with projects such as Corelabs, Clocks, Open Futures and Integrated Projects (ENoLL, 2015, p. 13, European Commission, 2009, p. 5, European Commission, 2016, Guzman et al, 2013, p. 29, (www.openlivinglabs.eu, 2015, p. 12).

European Commission	They are citizen-oriented open innovation ecosystems based on the development and innovation process, enabling citizens to actively participate in research and innovation processes with the partnership of business, citizens, and government.
H. Schaffers et al.	They are citizen-centered environments created for open innovation, where citizens are included in all stages of the innovation process from the first stages, and where citizens have the opportunity to work with other stakeholders.
D. Schuurman	They are regular and continuous organizations with a combination of public, private sectors, and people that gather life experiences and the active participation of many stakeholders in different ways under the umbrella of making innovation.
A. Folstad	They are environments where citizens discover innovation, new information, and communication technology opportunities for innovation and development, and apply these technology solutions in a real-life-like environment.

Source: ENoLL, 2015, p. 1, 13; European Commission, 2009, p. 5; Schaffers et al., 2007, p. 1; Schuurman, 2015, p. 184; Folstad, 2008, p. 116.

According to these definitions, living labs are open innovation environments where citizens can find solutions to problems they face by taking advantage of opportunities offered in the real-life environment, by innovation and technology with their participation, finding responses to their needs and requests, mediating the emergence of new products and services, and employing multiple methods.

The establishment processes of living labs are supported by certain stages. The EU Institution of Data and Communication Technologies bases the history of living labs on three main stages in terms of innovation and citizen participation: The Scandinavian Cooperation Model and Participatory Movement, which continued from the 1960s to the 1970s, the knowledge and European Social Experiments supported Communication Technologies within the 1980s and therefore the Digital City Projects that began to be implemented within the 1990s. It's seen that living labs are developing rapidly in America and Europe after the establishment process of those three stages. The event of living labs within the Americas continued with the approach of airman, who introduced the term living lab with a stress on observed routine activities, supported the applicability of latest technologies within the everyday home environment. The living lab, located in PlaceLab, which was established within Massachusetts Institute of Technology (MIT) on a vicinity of 1000 square meters, was equipped with the facilities of an everyday house where the habits of citizens were monitored and recorded. During this process, importance was attached to the technical infrastructure that enables data collection (Ballon et al., 2005, p. 8; ENoLL, 2015, p. 13, 14, 18).

The main mission of the ENOLL movement is to benchmark the best practices of its members and increase the number of members through annual calls (ENoLL, 2015, p. 32, 33). The Basaksehir Living Lab in Turkey is an active member, while Tepebasi Future Living Lab and Eliminating Barriers Living Lab are supporting members (http://www.openlivinglabs.eu, 2018) and the Smart City Istanbul Living Lab established by the Istanbul Metropolitan Municipality terminated its membership on the grounds that the network is not efficient enough.

5.2. The Purposes and Common Elements of Living Labs

Living Labs puts people at the heart of real-world innovation, while working to better leverage the opportunities presented by information and communication technologies to find answers to local needs. Methods and provide solutions to problems (ENoLL, 2015, s. 13). Living Labs also interacts with other labs in the network. Along with this advantage, laboratories have the opportunity to learn, align what they learn with the country in which they operate and carry out international projects by conducting joint research with laboratories. Other on specific topics.

The purposes of living labs are listed below:

1. To ensure the adoption of best practices by other living labs and focusing on lessons learned in solving problems (Lievens et al., 2011, p. 3),
2. To build a bridge with technological development with the inclusion of actors such as the business sector, government, and citizens, and to provide new products and services, to produce innovative services and business models that allow the evaluation of the socio-economic impacts of new technological solutions (European Commission, 2009, p. 5),
3. To create innovation and development processes, to explore new service opportunities, and to create new information and communication technology-based solutions to problems with stakeholders (Folstad, 2008, p. 106, 116).

The concept of living labs includes the citizen-technology interaction within the innovation process. In this context, living labs realize innovation using the common elements listed below (See Figure 1) (Stahlbröst, 2008, p. 36; Stahlbröst, 2012, p. 10, 20; Corelabs, 2007; Chesbrough, 2011, p. 87; Bergvall-Kareborn et al., 2009, p. 1, 10; Kareborn ve Stahlbröst, 2009, p. 9; Living Lab Roadmap, 2007, p. 11):

1. Effective citizen participation: Citizen participation is the reason for living labs to emerge. For this reason, it is important to achieve success in the processes and to include the citizen from the beginning of the process, and to empower the citizens to influence the innovation process.
2. Real-life environment: Living lab activities are done in a real environment to obtain healthy data and have detailed information about the conditions. Testing and experiencing the objects produced includes being involved in the innovation process under conditions closest to the real environment.
3. Multi-stakeholder participation: In living labs where citizen participation is important, it is vitally important that all relevant stakeholders (private sector, public sector, and academicians) are included in the processes.
4. Multi-method approach: All living labs can determine the most appropriate methodology among citizen-centered and co-creation methods according to their needs. It includes a perspective consisting of a combination of engineering, ethnography, psychology, sociology, and strategic management methods and tools.

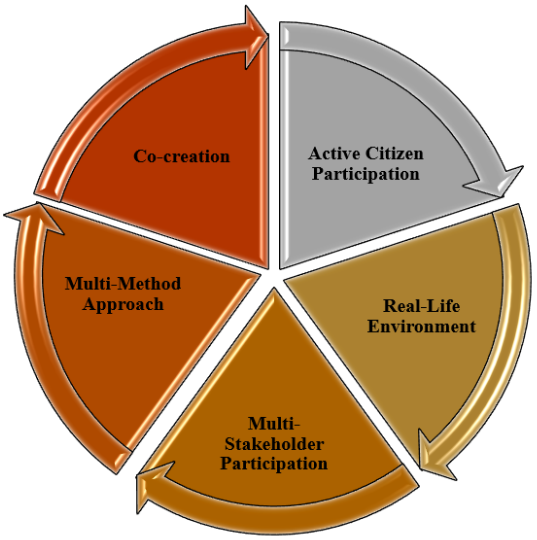

Figure 1. Common Elements of Living Labs

Source: Malmberg and Vaittinen, 2017, p. 11; ENOLL, 2018; Schuurman et al., 2013, p. 30.

5.3. The Contribution of Living Labs to Innovation in the City

Projects carried out in the living lab are supported under the city's push to discover and create innovation (Cosgrave et al., 2013, pp. 671). Living Labs is seen as a center to solve many problems that will arise in the hope that the urban population will increase in the future. The living laboratory is considered to be the center of solutions to problems that may arise in urban transport systems (Quak et al., 2016, p. 72). Cities help digital citizen communities listen to citizens' needs and quickly implement new ideas, and this process is done more efficiently than with traditional management. While searching for solutions to problems, cities are using technology products such as mobile communication, social networks, internet of things, cloud computing, which are suitable for the new paradigm of technology. Information and communication, while placing the citizen, the end user, at the heart of the innovation process, thus emphasizing people rather than technology. It is now citizens, rather than experts, who create the service's content with their own needs in mind, that determine the quality and ensure the co-creation of the service. Living Labs is used as a policy tool to improve cities through citizen-centred innovation and multilateral processes (ENOLL, 2015, p. 13). Therefore, the European Union supports the development of living laboratories in smart city conditions (Lehmann et al., 2015, p. 1089). Because with its multi-agent structure, the living laboratory contributes to urban innovation in the field of smart urban planning and open innovation. Stakeholder proposals are thought to be successful in terms of

smart urban planning applications in everyday life, at this stage the multi-stakeholder structure of the floating laboratory is on (Broers et al., 2015, p. 8). Live labs are observed to be active in technology-driven data assessment for innovation in a city. Spatial data is important for decision-makers in land-use planning for activities carried out by municipalities and support groups in the public service sector. For example, the Living Laboratory in the Czech Republic has focused on research and development of new technologies for collecting and modifying geographic data (Horak et al., 2009, p. 115). The City of Living Futures Lab, located in Milan, Italy, aims to reduce the gap between people and technology with Internet of Things (IoT) technology and create innovative services for people's needs. people by means of co-creation (Vicini et al., 2013, p. 254, 255). Living Labs has played a key role in creating people-centric products and services and facilitating processes in the smart city planning arena. They also play an important role in creating value for the city and engaging residents in the process. Living Labs takes a leading position in ecology, economy, society and sustainability by ensuring that needs are met through open innovation (European Commission, 2016).

6. A Field Research On Living Lab Applications

6.1. The Purpose, Limitations, Method, and Data Collection Techniques of the Study

The main purpose of the field research is to examine living labs under specific headings, which are seen as an innovation tool in international policy documents, whose establishment and activities are supported by national / international funds, which are at a leading position around the world and which allow municipalities to find solutions to problems, demands and needs using innovation and adopting unorthodox methods and to increase the quality of living of citizens. In turn, to compare international living labs with the living lab example in Turkey, and to subsequently reach conclusions on what should be done to become the best living lab in terms of municipality innovation. Within the scope of the research, only living labs operating in certain countries were examined, and they were compared with Basaksehir Living Lab, which operates as the only active living lab in Turkey. The fact that similar research has not been done before in Turkey has prevented the opportunity to make comparisons within the national literature. The research population within the field research consists of the awarded projects of City Observatory (The Institute for Future Cities) operating in the UK, Forum Virike Helsinki carrying out innovation activities in Finland, the Library Living Lab within a library in Spain, and Basaksehir Living Lab, which support innovation and has been transformed into innovation. In the study, the data collection approaches in the Oslo guidelines served as guidelines for measuring innovation activities in the public sector, and one which combined the two (the subject and object proximity). As a guide, the thematic approach typically identifies the factors that influence the emergence of innovative activities and innovation, and the audience approach aims to collect qualitative/quantitative data on these changes. Most important or most important. It is best to use both approaches together to measure innovation in the public sector in order to collect high-quality data (OECD, 2005, p. 77; Arundel et al., 2015, p. 1, 3; Bloch, 2009, p. 4, 5). In the fieldwork, living labs with pioneering and innovative projects around the world and awarded at the 2016 ENoLL Best Living

Lab Awards were discussed. Living Labs projects were selected according to this criterion, their impact on city innovation was examined, and winning projects were marked. The methods of participating in observation, data collection with document scanning and open-ended questionnaires were used to obtain detailed data about the activities. In light of the data obtained, the living labs in Turkey, Great Britain, Finland and Spain, included in the sample, were subjected to comparative analysis, and the strengths and weaknesses of the live laboratories were analyzed.

6.2. Research Findings

Findings of innovations in living labs that interact with municipal innovation in the innovation-based research on living labs are shown in Table 7.

Table 7. Innovation Research on Living Labs

Living lab	**Projects / Activities Related to Municipal Innovation**	
City Observatory Living Lab (The United Kingdom)	The City Observatory	Smart Urbanism Applications
	Glasgow Atlas	
	Sensing the City	
	Step Up Project	
	Predictive Crime Project	
Forum Virium Helsinki Living Lab (Finland)	Helsinki Region Infoshare open data service	Smart Urbanism Applications
	Smart Kalasatama	
	The Last Mile	
	bloTope Project	
	SOHJOA	
	6AİKA	Unitv
	The Nordic Business & Living Lab Alliance	
	EMPOWER	Smart Urbanism Applications
	Finest Smart Mobility	
	Lumipark	
	Envy&You	
	Bright Agening	Social Innovation
	SILVER	
	D-CENT (Decentralised Citizens ENgagement Technologies)	Participation-Drect Democracy
The Library Living Lab (Spain)	As an example of open innovation	Open Innovation
Basaksehir Living Lab (Turkey)	Smart Underground Garbage Containers	Smart Urbanism Applications and Service Innovation
	Mobile Health Measurement and Screening System	
	Duyum	Social Innovation
	Innovation Competitions	Innovation Activities
	Smart Cities – Internet Of Things Hackathon	
	Mechathon	

Source: Prepared by the author.[14]

14 City Observatory, 2018, Forum Virium Helsinki, 2018, Library Living Lab, 2018, ENOLL, 2018, Başakşehir Living Lab, 2018,

According to Table 7, out of the 26 innovation activities identified for 4 living laboratories, 3 are social innovation, 3 are innovation activities, 2 are union activities aimed at creating innovation to solve problems of the cities, 1 is the application of participatory democracy that enables citizens to participate in the search for innovative solutions to urban problems, and 17 are innovation in the areas of smart urban planning, intelligence and service innovation. As can be seen, 53% of innovations made in living labs are implemented in the area of service innovation / smart city planning. As the table shows, the City Observatory Laboratory in the UK continues to innovate with data-driven projects and improve citizens' quality of life. The City Observatory, as one of its projects, collects and analyzes data under such headlines as traffic, health, energy, crime, and social structure. Cities perceive growth zones by analyzing this data and interpreting their policy priorities based on this data. With the Glasgow Atlas, the demographics, property prices, deprivation areas, drug use, vehicle theft and similar categories for the city of Glasgow are displayed on a regional basis as statistical data, allowing decision makers and citizens to analyze this information. Decision makers can analyze public issues based on data. For example, regulators who see an increase in vehicle theft data have followed policies that value street lighting and the widespread use of camera systems. In the Sensing the City app, air pollution is measured by sensors and the city can come up with innovative solutions based on the type of light pollution from the data obtained. During project enhancement, the city must find solutions to detect and reduce carbon sequestration. On the other hand, in the Predicted Crime project, the municipality can analyze and follow certain strategies based on the crime data obtained. Only in this way can the crime rate be reduced. As can be seen, in the projects, the city is considered by the municipality and the living laboratory team as a laboratory and the problems are solved in a creative way. With the Helsinki Region Infoshare, the first project of the Forum Virium Helsinki Living Lab in Finland, data such as air pollution, traffic and traffic density are shared with the public, and products can be innovated at the same time based on shared data. With the Smart Kalasatama project, the city is working with private companies to deploy innovative products and services that will pioneer the development of smart cities. As part of this project, a pneumatic garbage collection system was developed and the bins are scheduled to be emptied without human intervention. In addition, electric vehicles have been put into service in this area. With The Last Mile project, the problem of transporting employees to work from remote areas every day is solved by smart urban planning applications. On the other hand, the bloTope project includes taking innovative measures to eliminate the necessary infrastructure problems and provide charging services, based on the forecast that electric vehicles will join the traffic more and more every day. With the Envy&You project, part of smart urban planning, air pollution is measured with sensor technology and innovative solutions are produced to this problem.

The popularization of smart lighting in cities is achieved with the Lumipark project. As part of the best Smart Mobility project, smart traffic apps are used by residents. On the other hand, related to the field of social innovation in cities, the living laboratory contributes to the Bright Aging project. Thanks to this project, elderly people have been able to use smart lighting in their homes and avoid possible accidents. 6 Aika, presented in the union category of the table,

is an open innovation platform that covers six major cities in Finland and aims to solve urban problems in innovative ways. Nordic Living and Business Lab, on the other hand, was founded in Scandinavian cities and aims to produce innovative solutions to urban problems. In terms of promoting direct democracy, citizen participation in city decisions, budgeting processes, etc. through a mobile application is possible with the DCent Decentralized Citizen Interaction Technology project. Under the heading on open innovation in the table, the Living Library Lab in Spain organizes innovation activities for citizens and aims to provide innovative services. The first of Başakşehir Living Lab's projects in the context of service innovation and smart urban planning is the Smart Underground Garbage Container. In this project, developed in cooperation with the Directorate of Clean Affairs of the City of Başakşehir, container occupancy rates are monitored by satellite without personnel, and a garbage collection system Intelligence is deployed based on these data. Project Duyum, rated in the social innovation group in the table, is a project that aims to improve quality of life by allowing deaf mothers to be notified by vibration when their baby cries, using technology Sensor. The Living Lab strives to enhance the innovation capacity of the city with its innovation activities. In that context, with the innovation competition it holds every year, it ensures the creation of innovative projects for the city and improves the quality of life of its residents. With its Hackathon and Mechaton events, it is a pioneer in the production of original projects within the framework of city renewal.

Decisions, analysis and recommendations based on the results of the research are as follows: The City Observatory, operating in the United Kingdom, collects all data about the city, making the data available to the City online. Glasgow with four projects and prepare the urban environment needed to innovate for a sustainable city and carry out innovation projects in this direction. It is important to create database-driven projects in city innovation. It can be seen that Basaksehir's Living Lab, tested in Turkey, does not have the same city-related data collection process as in the City Observatory's Living Lab. The Helsinki Living Lab Silver Project has contributed to social innovation by enabling people with disabilities or the elderly to continue their lives using robotic technology. Basaksehir Living Lab aims to improve the quality of life of disadvantaged people with projects such as DUYUM, Audio Steps Boni (an application that facilitates the movement of visually impaired people in indoor spaces) and a patient washing bed project. The DCENT (Decentralized Citizen Engagement Technology) project, whose Finnish branch is managed by Helsinki Living Lab, begins to be deployed in Spain, Finland, France and Iceland, spreading direct democracy by ensuring citizen participation in city decisions, policies and budget policies via a mobile application. The Living Lab library in Spain and that of the Basaksehir Living Lab have largely similar activities in the areas of technology, design operations, mechatronics, robotics, smart urban planning, and services for children.

The fact that laboratories live, focusing on smart city planning, information technology and sensor technology, collect data and open it up for everyone to share, will especially promote product innovation. and services and contribute to urban life. At this stage, formal organizations should share the data they have with Living Labs, transfer the data, and provide the procedural environment necessary for Living Labs to collect the data. For example, Basaksehir Living Lab,

one of the facilities whose axis is sensor technology, can share data by detecting air pollution levels and holds a leading position in the production of light projects. created with cities and other stakeholders to reduce pollution rates. In addition, identify the most densely populated areas of the city due to migration, demographic status of immigrants, urban problems caused by migration, information on health problems, and collect and analyze data on immigrant professionals and capital holders, and share data sets with key stakeholders, primarily municipalities and innovation projects to solve problems and capitalize on opportunities, can be realized with cooperation. Basaksehir Living Lab can apply pilot activities to all projects instead of implementing them at the contractor's request. Therefore, the principle of participation, which is one of the basic principles of a living laboratory, will be applied regularly in addition to promoting the development of products and services and saving costs. Basaksehir Living Lab can create innovation platforms that focus on smart urban planning and contribute to city innovation. With an application that will be developed with stakeholders, as in the DCENT project, Basaksehir Living Lab could be an example of promoting direct democracy by ensuring citizen participation in decisions. , city policy and budgeting process. As a result, citizens can participate in city decisions, budget processes and policies by voting or expressing their opinions through the mobile app.

7. Conclusion And Recommendations

Innovation is an increasingly important tool in cities that can be used to increase efficiency, productivity, and citizen satisfaction in services that require effort and finding solutions. solutions to urban problems. In the study of innovation in cities, the focus is on city service delivery in the public sector, with a focus on international literature, and in this sense, live laboratory applications have been developed. presented as an example to increase their innovation performance.

Within the framework of the research, the conclusions and recommendations related to the field research on innovation in cities could be listed as follows: In consideration of the interviews and research conducted on the city members, city, found that the perception of innovation in general had not been established. Innovations made by one city will be adopted by other cities. Adoption of best practices lays the groundwork for innovation if used as an incentive for the city to implement its unique approaches. In cities, first, to ensure an innovative mindset shift, protect, support and reward innovative employees against attacks such as workplace bullying and the innovative adoption of All employees under the leadership of senior managers will ensure the establishment of an institution of innovation culture. Incorporating innovation policies and defining innovation goals into strategic plans is helpful for effective service delivery. In the context of democratic renewal, it is necessary to attach great importance to the participation of the people in the renovation process. With citizen participation, feedback can be discovered quickly and citizen satisfaction can be increased. Cities are the body that can most accurately observe the needs of citizens. In this way, greater importance can be given to studies of social innovation.

The determinations and recommendations regarding the Living Lab Field Research are as follows: The activities carried out in the living labs regarding municipal innovation are generally

the innovation projects produced regarding the city. Living labs ensure the dissemination of innovation in a multistakeholder ecosystem to find solutions to urban problems and increase the quality of life of citizens. City Observatory Living Lab, operating in the UK, collects data about the city, such as transportation, health, demographic information, real estate prices, crime rates, etc., with The City Observatory, Glasgow Atlas, Sensing the City, Step Up Project, Predictive Crime Project, and creates resources for municipalities to produce innovative projects. Using these data sets, municipalities identify problems related to the city and tend to produce innovative solutions. With Helsinki Region Infoshare, one of the first projects of Forum Virium Helsinki Living Lab, operating in Finland, data transfer between public institutions is possible by sharing the data on urban problems with the public, and it contributes to the production of innovative projects. With the Smart Kalasatama project, people see many applications in the field of smart urban planning such as the spread of electric cars in traffic, smart energy applications, etc. was made. With the Sohjoa project, the presence of autonomous vehicles in traffic, the use of smart trash cans created by the method of waste separation, the issuance of tickets for vehicles parked incorrectly use smart glasses, etc. practices are carried out and contribute to the innovation of the city. With the Empower project, it aims to expand the use of electric vehicles. With the Silver project in the field of social innovation, it aims to bring a safer life, an accident-free life and improve the quality of life by using robotic technology for the elderly citizens living alone. The Living Lab library in Spain aims to find solutions to social problems through open innovation with the participation of the people. A workshop on creative reuse of used objects could be presented among its pilot projects. The Mobile Health Measurement and Screening System Project, one of Başakşehir Living Lab's award-winning projects, is produced in a living laboratory and carried out by the Municipality's Health Affairs Directorate . The project conducts 30 free tests for citizens who cannot afford to go to the health center and send the test results to the citizen's mobile phone by SMS. Forum Virium Helsinki and Başakşehir Living Lab have adopted the principle of supporting solutions from private companies and citizens in solving problems related to the city. Awardwinning projects such as the Mobile Health Measurement and Screening System, the Duyum project, and many more have been developed by startup companies. In line with the awardwinning living lab projects shown above as an example, it is seen that living labs focus on one or more themes in line with the needs of the regions where they are established, that they contribute to municipal innovation by producing projects focused on service innovation, smart urban applications and social innovations, that they operate as a pioneering tool in producing innovative solutions to urban problems. Living labs operate as the innovation centers of municipalities, contributing to solving problems, identifying needs, and producing innovative projects for the city and citizens.

Innovative urban projects that improve the quality of life can emerge from autonomous cities in Turkey, taking into account the collection, analysis and sharing of data with live laboratories and have enough resources. A living laboratory organization, which brings innovation advantages to cities and drives innovation, can be used as a tool for innovation and to track developments in cities around the world gender. Therefore, it can be ensured that self-governing cities develop more effective and sustainable innovation policies and create exemplary practices in the area of

innovation centrally managed cities. Future researchers working in this field are recommended to focus on the interaction between living laboratories and governance cultures, and to study the policies that need to be followed to establish a culture of innovation in cities.

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