Case Study Paper

Re-Thinking the city:

Basaksehir Living Lab (Case of Istanbul)

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Abstract

Smart Cities depend on strategies and solutions enabled by ICTs involving directly citizens, local governments and communities. Aim of the paper is to understand the challenges and potentials of new technologies and its applications in an urban setting while surveying urban innovation units and living labs. The paper uses the concept of smart cities as a mean and manner of urban future. Moreover, it examines the change in the concept and to find out cooperation between local governments and living labs in two different extents. One is to determine the effect of new technologies on city planning and its users and other is to find out social movements that might bring them together. In addition, this paper analyses a set of five key principles that define the concept of living labs. Using these five principles, organizers and volunteers in Basaksehir Living Lab in Istanbul (Turkey) were interviewed and most relevant projects and implementations were evaluated to indicate how well planning practice advances smart planning and projects that contribute to the local development.

Keywords
living labs; local development; participation; smart cities; technological innovation; Turkey.

1. Introduction

> "Cities are complex systems whose infrastructural, economic and social components are strongly interrelated and therefore difficult to understand in isolation."
>
> (Jacobs, 1961).

Before discussing technological effects on cities, one question should be answered: what does the 'city' mean? As yet, there is no global agreement on what a city is. It has been defined in different ways throughout history from country to country as the fact that the city is in a constant change by its nature and gains different meanings according to the socio-economic conditions. In this sense, it is not possible to find a single city definition and criteria to express this definition in the literature for all countries. In many countries, a city is termed by quantitative measures as Turkey. A city is not only a physical imprint on a map but organic entity with its own identity. Moreover, it responds to its inhabitants' demands and needs. As the global population continues to grow, cities are progressively being challenged by incessant and emerging phenomena. So that a city should be driven by responding to its inhabitants' changing needs and ambitions as well as values estimated in the global agendas (UN-HABITAT, 2016). UN-HABITAT describes cities as hubs of economic growth, innovation, culture and creativity. In addition, cities have the potential to provide an environment that embraces innovation. Many of the challenges our societies face

today are increasing in urban areas; this is one of the reasons why innovation is becoming more of an issue in cities.

In recent years, smart cities become global trend concerning various disciplines, from economics to urban designer and from technological development to globalization (Caragliu et al., 2015). The concept is not only related to technological applications in cities but also regulates many sectors. Smartness concept also includes a variation that involves digital or intelligent concepts or is discussed together. Smart city terminology focus on the significance of new ICT regarding modern infrastructures in cities in the 90s. The focus of the term smart city, which was first used in the 90s, was on the importance of modern infrastructures and ICT in cities (Albino et al., 2015). The idea of being a smart city has been criticized by arguing that technically oriented and smart city approach, which emphasizes the role of social capital in urban development, should be strong governance oriented. It is considered as an approach (Caragliu et al., 2015). The discourse on smart city promises an innovative era of urban planning through ICT implementation, based on urban technologies that will make cities cleaner, more beautiful, safer and more efficient (Hajer and Dassen, 2014). Therefore, the concept of smart city is not a static term and the concept has been developing since its first use. Although technology is the key to being a smart city due to the use of ICT to transform life and work within the city, a well-functioning infrastructure is required to be a smart city, but this is not enough (Nam and Pardo, 2011). IT infrastructure and practices are a prerequisite, but the tool as ICT and its practices exists to facilitate the participation of all actors in the development of smart cities (Lindskog, 2004). There is no smart city unless there is genuine participation and willingness to cooperate and cooperate between the private sector, citizens and public institutions (Lindskog, 2004).

According to Hajer and Dassen (2014), planning will become a continuous experiment and cities will serve as living laboratories. As a result, the main objective of the paper is to evolve a clear understanding of Living Lab concept in Turkey. So that, Basaksehir Living Lab will be examined to understand its concept, mechanism, decision making process and implementations, also, to determine the success of Living Lab initiative. The paper responds to the following research question: What are the appropriate technologies to serve urban planning problems and users' needs in the Living Lab and How these new technologies affect them?

2. Living Lab Concept

> "Urban living labs constitute a form of experimental governance, whereby urban stakeholders develop and test new technologies, products, services and ways of living to produce innovative solutions to the challenges of climate change, resilience and urban sustainability."
> (Bulkeley and Castan Broto, 2013)

According to Hillgren (2013), there is no uniform definition of living labs. Bulkeley and Castan Broto define living labs as a form of experimental governance by which new technologies, products, services and way of living are

developed by urban stakeholders to produce innovative solutions to urban problems (Bulkeley and Castan Broto, 2013). For technology-driven and digital/smart cities concepts, living labs have different objectives and ways of working. However, living labs are initiated by various actors and form different types of partnerships which has defined as sectors (public, private etc.) where universities play a key role (ENoLL, 2015). On the other hand, for some academicians and organizations, living labs are more in the light of pilot and demonstration projects (Kommonen and Botero, 2013).

At the beginning of 2000, Living Lab began to emerge as the focus of testing new technologies in newly built homes. Since then, the growing concept has now taken its place with the establishment of real-world context. The Living Lab concept can be used as a human-centred research and development approach where ICT innovations are co-created, tested and evaluated in open, collaborative and real-world environments. Living Labs could be considered as an environment for actors and industry to help them generate and improve their products and services or commercialise their technology. Besides, it could be considered as an approach for intentional collaborative experimentation of researchers, citizens, companies and local governments (Schliwa, 2013). The Joint Programming Initiative (JPI) Urban Europe introduced the term "urban living lab" and defines it as "a forum for innovation, applied to the development of new products, systems, services, and processes, employing working methods to integrate people into the entire development process as users and co-creators, to explore, examine, experiment, test and evaluate new ideas, scenarios, processes, systems, concepts and creative solutions in complex and real contexts" (JPI Urban Europe, 2013).

Living lab methodologies are based on education, investigation, testing and applying projects which are related to sustainable challenges and occasions that cities are facing in Europe (ENoLL, 2015). There is no clear understanding of the ultimate role of Living Labs could play in urban governance. From the point of view, many projects related to Living Labs are emerging phenomenon on participation, collaboration, experimentation, learning and governance in cities. Nonetheless, cities, competing to reduce carbon emissions and to be sustainable, try to position themselves as innovation leaders. However, living labs provide a mean of applying for high-profile statements of intent and means to fund sustainable urban development and encourage cities to adopt innovative solutions.

During the design of the concept, living labs were defined as an environment, a methodology and a system. While technological platforms and user based approaches can be countable for environmental perspective, data transfer and user participation are under consideration of methodological perspective. In addition, the Living Lab approach not only focuses on the inclusion of users in development processes, but also attempt to cooperating with other stakeholders from public–private–people partnerships. What distinguishes the living lab approach from other laboratories is the inclusion of users in the process as an actor that shape the innovation in their real-life environments. But, other labs or innovation networks experts are shaping the process while users are act as sources (Almirall, 2009). Ensuring equitable urban development; empowering civil

society, expanding democratic participation and reinforcing collaboration; promoting innovations that facilitate learning and the sharing of knowledge principles are given by New Urban Agenda in response to develop and test different forms of urban governance (UN-HABITAT, 2016). In a way, living labs could encourage cities to adopt new challenges.

2.1. Basaksehir Living Lab: "Technology for life"

Basaksehir Living Lab, was founded in 2015, is in European side of Istanbul also it is located Basaksehir district. The lab is identified with first Turkish living lab, which has performed 370 organizations, approved by ENoLL (European Network of Living Labs). The first purpose of the lab is to create an environment in which information technology and technology-related products design and services can be tested by real users in a real-life environment (BLL, 2018). Basaksehir Living Lab is focused on helping society to see the real accretion value of new products and services while serving an experiment, research and innovation environment (ibid.). Moreover, besides their focus on producing new products and services, the smart city projects and ICT based projects are adopted their agenda (ibid).

The lab also serves as an ecosystem for entrepreneurs whose projects, about information technology and design, approved by the committee (BLL, 2018). It also provides an environment for entrepreneurs working on similar topics. In addition, entrepreneurs are given free support to submit their projects to the market in the lab while young generations are supported to raise their awareness on ICT and design issues (ibid.). Likewise, Basaksehir Living Lab ecosystem serves same benefits and privileges to their partner institutions and organizations. Following indicators are proposed by Basaksehir Living Lab:

> (1) Entrepreneurs can benefit from the incubation centre and all facilities in the building such as Elektrolab, 3D Printer Laboratory, meeting rooms and video call rooms.
> (2) Entrepreneurs can benefit from consultancy and mentoring support in Basaksehir Living Lab during the project process.
> (3) Entrepreneurs can participate in Entrepreneurship Trainings given by professional entrepreneurship experts at Basaksehir Living Lab.
> (4) All can promote their products and services by taking part in the Basaksehir Living Lab stand.
> (5) Entrepreneurs can get all design support from IDF (Istanbul Design Factory) which is the solution partner of Basaksehir Living Lab.
> (6) Entrepreneurs can present their products and services in the User Experience Centre and Product Display Area and create an environment for the end users' experience.
> (7) In the Entrepreneurship Days, Entrepreneurs can expand their relationship network and cooperate with all institutions and organizations in the ecosystem.
> (8) Entrepreneurs can create test environments for their products and/or services that they developed and Entrepreneurs have an opportunity to test with real users in real life environment.

(9) Entrepreneurs have a place on their news on the international platform through Basaksehir Living Lab e-newsletter and ENoLL newsletter that publishes every month (BLL, 2018).

Basaksehir Living Lab cooperates with Basaksehir Municipality in all its projects and organizations by giving importance to strategic partnership. In addition, IDF and Zemin Istanbul institutions are involved in projects and organizations as partners. In addition to these partnerships, the lab cooperates with four other private organizations as a living lab strategic partners. (see fıgure 1) Other than strategic partners, each project and each event, organized by BLL, have specific partnerships in related topic.

Figure 1 Basaksehir Living Lab Strategic Partnerships

2.2. Background Mapping and Organization

Lab management consists of coordinator and vice coordinators who are whether business engineers or industrial engineers (Celik, 2018). Management perception of lab is to create a working space and/or environment for its users. The lab is defined by coordinator as an environment to develop informatics oriented projects and to improve users' ability (Celik, 2018).

The laboratory acts as an organ of Basaksehir Municipality. All projects and activities to be carried out during the year are prewritten report and presented to Basaksehir Municipality in advance (Celik, 2018). The organization of the lab is determined by technical specification by Basaksehir Municipality every year. For example; 35 hours of informatics training, 72 hours of mobile game training and 25 hours of entrepreneurial training will be provided for current year (ibid.). In addition, Basaksehir Municipality uses the lab as activity-based environment. Environmental support is provided to use in special events or organizations for Basaksehir Municipality as a collaboration (ibid.).

Private sector partnerships are provided through collaboration in organizations, projects or various events, as well as environment and room support. However,

actors or partnerships involved in the process are a project-based selected, determined by technical specification while choosing experts is left open ended (Celik, 2018). On the other hand, experts and designers are chosen from the existing ecosystem according to the event context and time. In addition, selection of the participants is also based on the concept and time of each event (ibid.). The job and participation descriptions and responsibilities of the users or actors in the process vary according to the project and/or activity.

Meanwhile, the process is completed by first identifying the event, then confirming and announcing the users of the event (Celik, 2018). Based on the event, special users are chosen such as entrepreneurs, municipal employees, university or/and high school students (ibid.). Some programs include special partnerships for children training. In addition, special training programs are provided for housewives or children with disabilities (ibid.). It is clear to understand from all these information is that educational approach is more crucial for Basaksehir Living Lab. While educational project approaches are the main principles in the living lab organizations, urban based implementations get higher points due to their importance level to solve urban problems. Even though there are some smart cities projects created in Basaksehir Living Lab, the impact area of projects is limited. In real-world context, implementation process should be more taken into consideration.

3. Basaksehir Living Lab Success Criteria

3.1. Methodology and Data Collection

To investigate the "smart plan" applications in urban planning and to determine development of technologies in urban planning, their inclusion in the planning will be revealed through documentary analysis of the projects and one-to-one interviews. The aim is to measure and evaluate the success of Living Lab initiative. Reflecting urban contexts suitability in a living lab environment and how it adapts to living labs' features. For this purpose;

(1) To identify the living lab practices / projects and events and design methods
(2) To identify design concept, project process and implementation process of the living lab
(3) To reveal the living lab' objectives and relations in the urban context
(4) To determine the network relations, partnerships and participation process are examined and analysed.

In addition, interviews were held with organizers, laboratory staff and board members. Interviews were based on a semi-structured questionnaire with questions related to organizations of the living lab, decision making process, actualization and were conducted in Turkish and English languages. All interviews were recorded and transcribed in order to allow further analysis.

Focusing on the Basaksehir Living Lab approach related to the components and principles of the living lab will be explored, and data will be collected to ensure a common knowledge base of available applications. Since living labs is a new field of research, the amount of supporting theories for understanding the concept is limited. The absence of systematic analysis and reflection on existing methods and tools and their relevance to the context of the living lab will also be determined to identify Basaksehir Living Lab success criteria.

3.2. Data Analysis

To analyse interviews, implementation process is highlighting an important statement that out of 15 projects and 370 events related to education, product and software design (see figure 2) only 3 projects were implemented in urban environment. One of them is a smart infrastructure system located in Basaksehir district. Others, also located in Basaksehir district, are about renewable energy and architecture related. According to interviewers, this situation is more about Turkish planning system. It shows what are the driving elements of living lab in the planning ecosystem.

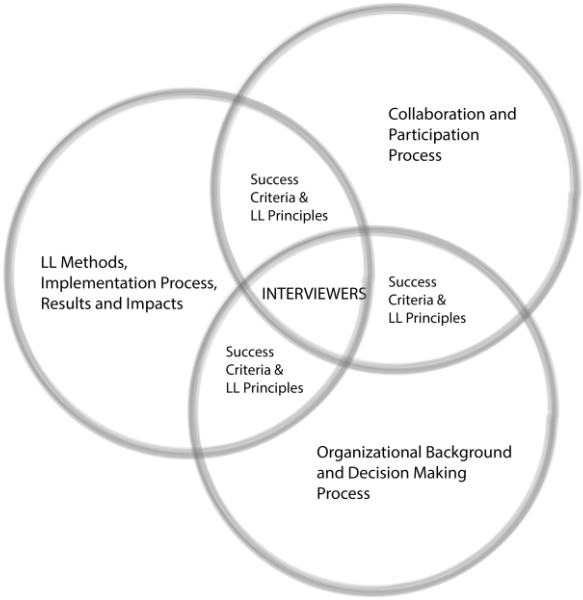

Figure 2 Interview questions pool

Basaksehir Living Lab has 7 strategic partners which are public (2) and private (6) institutions (see figure 1). This partnership encompasses different elements that shape the dynamics of new methods for urban planning and development such as user-driven methods, user-centred methods (Celik, 2018). But interviews show that living lab projects or events only seen as a platform to educate, or an environment where you can test your product and try new technologies (ibid.). However, it is assumed that collaboration of different actors and stakeholders should enhance smartness of a city as well as combinations of different elements should. How can city be smart without changing traditional government structure to adapt city functions to the new paradigm? The question releases problems regarded Turkish empirical domain. In order to solve problems, enforce rules or

allocate resources, the process should be more open, transparent and democratic at the same time. “Openness” is one of the main living lab principles that should be taken into consideration both partnership level and intellectual property rights (see figure 7). Also, cooperation between different stakeholders actively involved in a decision-making process should be affect to form public policy if necessary (Celik, 2018).

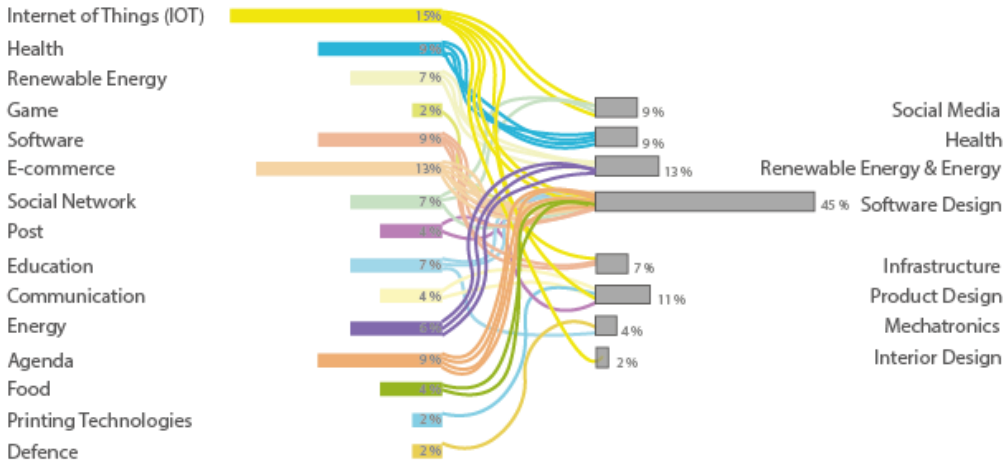

Figure 3 BLL projects and events content

The participation process is evolving under the control and the support of the private sector other than strategic partners. This may in fact reveal the strength of cooperation and the need for diversification in projects. However, it also provides the basis for a variety of actors (see figure 4). As seen in figure 3, the projects produced between 2015 and 2019 in the lab are more focused on software design. Only total of 29 percentage of projects include smart city applications such as health, infrastructure and energy. From this point of view, situation pushes to think that the priority field studies of the lab are overriding spatial planning. Whether ICT become more countable than spatial/environmental reflections of the projects or ICT serves the new environment for the reflection of the projects. It may lead us to statement that virtual environments, applications and developments can be considered spatially. As a matter of fact, become more transparent and open, besides all the collaboration between BLL and Municipality of Basaksehir living lab process should be more communion about project details and results, is a necessity. Long term commitments and large scale communities should be considered apart from number of events and projects.

Variety and number of users diverge according to the projects (see figure 4 and 5). For each activity or project, an average of 25 users are selected by announcement method. In some cases, the first responders are preferred, while in some cases, choices are made in line with the intended purpose of the projects and the professions or age/tender of citizens. Within the scope of the activities and collaborations determined by the Lab, the users are designated to specific groups. All this reveal “empowerment of users” according to the Enoll principles. In the

case of Basaksehir, the users are passive and take plays the tester or informant role in the decision-making process of the projects.

Figure 4 Organisational partnership and user participation network

Yet, according to Enoll principles, "continuity" can be put forward with the project lifespan. In the case of Basaksehir, this period is generally kept short. Although each event is renewed according to user demand, no continuity is observed in the projects. The actor diversity varies according to the project and differs to the subjects. Some projects or activities include a wide variety of actors within the scope of the established cooperation, while others (usually for educational purposes) include a limited number of actors. The role of the designer in this process was defined as the trainer. Although the designer helps the users in the process, its contribution is limited (see figure 7).

In addition to all these, Basaksehir living lab has a high impact on “realism” and “real world content” due to the technological opportunities offered by the lab building and environment. The projects developed within the Lab come into the real-world context with time and space constraints. Although the spatial impact on Istanbul is not yet in effect, its impact on the Basaksehir Neighbourhood borders

is indisputable. In addition, it has national and regional "influences" through the entrepreneurs who trained or supported by the lab (see figure 7). A potential risk at the living lab is that the lab come from a technology-push rather than a demand-pull. In fact, giving support to the needs rather than the necessities takes steps towards the solution of city problems and directs the users and entrepreneurs to the right market.

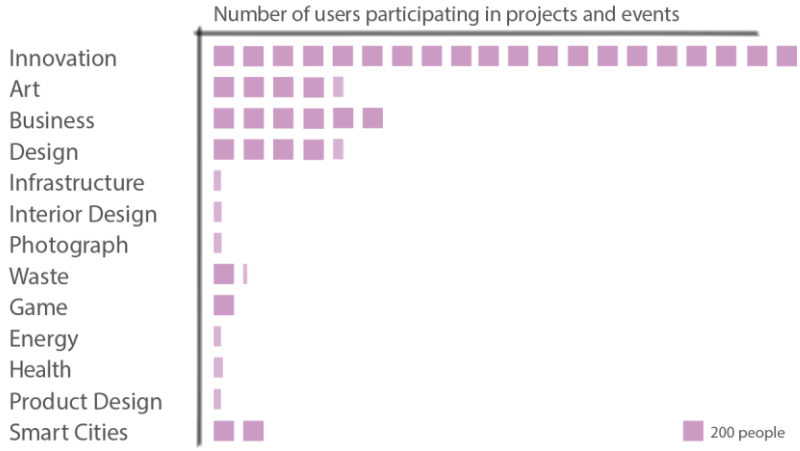

Figure 5 Project based participation of users

As a result of given parameters (see figure 7), Basaksehir Living Lab should manage a more open process and provide a transparent environment for the users and public. Lab methods applied in future projects can be developed and users take part as experiments as well as being used as a contributor. This also applies to designers.

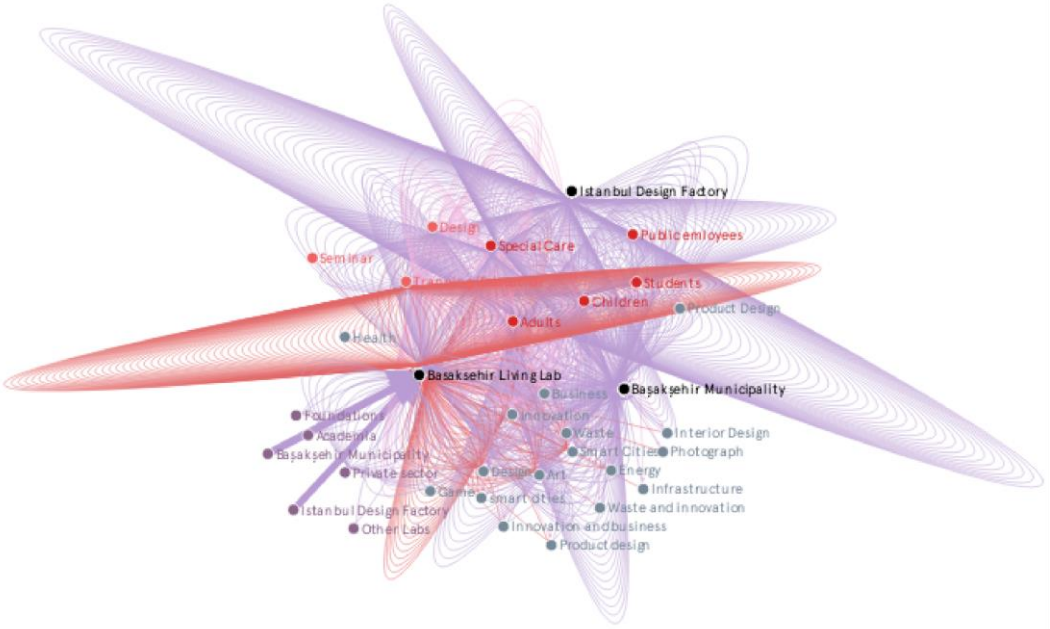

Figure 6 Network Analysis in BLL projects

	Criteria	Basaksehir Living Lab	Level
Openness	Level of openness - partnership	Semi-exclusive partnership	2
	Level of openness - intellectual property rights	little results and information generated in the living lab are shared (only brief updates or summaries)	2
	Domain	Mostly digital domains, rarely diagnostic and actual domain	1
Empowerment of users	Users role	Mostly informant, rarely contributor (creating with user)	1
	Scale	Small (<100 users)	2
	Selection of Users	Mostly without any criteria, rarely with professions	2-3
Continuity	Lifespan	Short term Project (<6 months)	1
	Ecosystem approach	Value creation and sharing to some of the stakeholders in the living lab ecosystem (missing links in the value chain, no equal contribution of all stakeholders)	3-4
	Actor Diversity	Mostly small scale (1-2 actor), rarely medium and large scale	2
	Designer Role	Mostly interpreter, rarely context designer and contributor (creating with users)	1
Realism	Technical Infrastructure	Infrastructure with extensive monitoring and in-depth technical testing	4
	Real-world context	real-world context with some time or space limitations	3
Influence	Context Research	The usage context is substantially considered using advanced techniques (surveys, diaries)	3
	Design Method	Educational	1
	Impact Area	Regional or National	4
	Community	Neither passive nor active community (equally shares)	3
Spontaneity	Co-creation	User feedback is captured (iterative), which may lead to some modifications/ alterations of the innovation	3
	Evaluation	Limited evaluation by users (post survey)	2

Figure 7 BLL success criteria

Although figure 7 is determined as the success criteria, the result shows the parameters that should be developed, not the failure of the lab.

4. Discussion and Conclusion

In some research areas, a multi-stakeholder partnership is a necessity for living labs. Living labs are a form of experimental governance; urban stakeholders

develop and test new technologies, products, services and lifestyles to produce innovative solutions to the challenges of urban context. It is a way of developing solutions which cities have faced or facing. Different forms of smart city approaches are being developed and tested in living labs. As differs in Turkey, there are not many projects include smart city approaches regarding to spatial planning. Somehow, spatial projects have been replaced by virtual ones. In the research, we aimed to determine new technologies affect urban planning. Analysis show that technological transformation process is currently in digital environment rather redound on spatial environment in Turkey. In other words, it is social enforcements that can trigger development of such transformations. While living labs provide opportunities to adapt to technology, the fact that they have not become widespread or not yet known, show limitations in terms of cooperation and application.

Current technologies, information technologies, ICT, smart city applications show that a new era has started in urban space and a new structure has been formed, because of limitless information flow and sharing. Although the digital area overcomes the urban area, it is seen that the studies made promise to be considered within the scope of urban governance. The participation process has also taken on a new structure with all these changes. Instead of public participation in the planning process or implementation process, it is more important for the next steps to be involved in the education process and design process offered by living labs. Basaksehir Living Lab studies show that it is all about the process of education in the beginning, following designing with users and after designing by users. There are all steps to take into considerations. Social learning and education point towards clever solutions by creative people. However, living lab approach can help governments under pressure to adapt smart city approach to improve the city visibility and the citizens' life quality. Although, smart city ranking reveals the winner and the loser, entering the global competition may pose risks. Smart solutions, smart planning should not be about the competition. According to Nam and Pardo (2011), smarter government should do more than simply regulate the outputs of societal and economic systems where it interconnects with businesses, citizens, communities in real time to inspire growth and innovation. For that, living lab success not only measured by living labs principles and theoretical indicators but development process and future tendencies lead to success.

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6. References

Albino, Vito; Berardi, Umberto; Dangelico, Rosa Maria (2015) "Smart cities: definitions, dimensions, performance, and initiatives", Journal of Urban Technology, Vol. 22, No.3, (January).

Angelidou, Margarita (2014) "Smart city policies: a spatial approach", cities, Vol.41, No.1 (July).

Basaksehir Living Lab (2015) "About Basaksehir Living Lab" (online) Available at: http://basaksehir-livinglab.com/BLL/anasayfa (Accessed 21 October 2018).

Caragliu, Andrea; Bo, Chiara Del; Nijkamp, Peter (2011) "Smart Cities in Europe", Journal of Urban Technology, vol. 18, No. 2, (August).

Celik, Ozge (2018) Interviews, about Basaksehir Living Lab.

Hajer, Maarten; Dassen, Ton (2014) Smart About Cities: visualising the challenge for 21st century urbanism, Rotterdam: naio10 publishers.

Lindskog, Helena (2004) "Smart communites initiatives", ISOne World Conference, The Information Institute.

Nam, Taewoo; Pardo, Theresa (2011) "Conceptualizing smart city with dimension of technology, people, and institutions", Proceedings of the 12th Annual International Conference on Digital Government Research, (June).

UN-HABITAT, (2016). Urban planning and design lab tools for integrated and participatory urban planning.

UN-HABITAT, (2016). World Cities Report: Urbanization and development-emerging futures.