Living Labs and Circular Economy: the case of Turin

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Category: Research in-progress

Topic: Smart Cities & Regions

Abstract
This paper aims to present the case of the Torino Living Lab on Sharing and Circular Economy in an attempt to highlight possible future scenarios for policies to stimulate urban innovation in the environmental and social fields. The case study is analysed in three phases. First of all, it is described the approach of the local public administration to the tool of the Living Lab as a stimulus to innovation. In the second part, the Turin Living Lab on Sharing and Circular Economy is deepened and potentialities and weaknesses are highlighted. In the last section we focus on understanding how the selected case can open possible fields of comparison between administrations in order to improve globally by sharing their local experiences.

Keywords: *Living Lab, Sharing Economy, Circular Economy, Regeneration, Turin*

1 Introduction

Last Autumn the Municipality of Turin launched the Torino City Lab as an initiative-platform aimed at creating simplified conditions for companies interested in conducting tests of solutions for urban living.

With this action, the City officially committed itself to become a promoter of public and private initiatives aimed at improving the urban ecosystem and proposing ideas in different fields of innovation: from IoT (Internet of Things) to collaborative and circular economy activities.

Adopting the perspective of a public actor not only as a regulator, but also as an hub of boost to local development, the Torino City Lab as permanent platform in the urban area was created for social, economic and administrative conditions.

As reported in the Giorgio Rota Report of 2018, the area of the City of Turin is characterized by a high rate of small and medium-sized bodies operating in the tertiary sector with less than 10 employees. Moreover, concerning capital corporations of the tertiary sector, Turin has an average of 14 employees per company. This aspect distinguishes Turin from the other large cities in the Centre-North, where the size of the company is usually larger (Centro Einaudi 2018). Even more significant is the low number of new companies registered in the Turin metropolitan area, which in 2018 stood at around 13 thousand units, recording the lowest result in the last decade (Camera di Commercio di Torino 2018). This stagnant entrepreneurial context, increased due to the economic crisis, is more frequently leading small and medium-sized enterprises to seek the support of public players, especially in the taking off phase of their market. This dynamic of local market is being progressively combined with the expressed commitment at national level to develop practical policies to foster and accompany development of start-ups considered innovative, as regulated in the Decree Law 179/2012, known as "Decree Growth 2.0" (Ministero dello Sviluppo Economico 2016).

Therefore, the City is planning to become a laboratory in which companies can establish direct contact with the final users of their products. The main purpose of the action consists in covering the weaknesses of local companies in pre-commercial phase. According to the local actor perspective, this initiative would contribute to regenerating of the local entrepreneurial landscape. At the same time, this mode of partnership with private sector could also attract investments from Italian or international companies to the territory.

Starting from this framework, the following contribution presents the case of the Torino Living Lab on Sharing and Circular Economy as a possible development basis for innovative environmental policies on a local and global scales. In order to provide the best possible structure for the research, the contribution is divided into five sections: (I) the description of the new permanent laboratory proposed by the City of Turin; (II) the past experiences of living labs in Turin; (III) the approach and the birth of the Torino Living Lab on Sharing and Circular Economy; (IV) the presentation of the experimentations admitted to the Living Lab; (V) the interpretation of the case study as a basis for future projects on local and international scales.

2 The Torino City Lab: a permanent platform for experimentation

To achieve the objectives described in the previous paragraph, the Torino City Lab presents itself as a platform that aims to generate four main outputs in the urban ecosystem.

First of all, the Lab ensures the access to public spaces through streamlining the administrative process. The initiative is promoted by adopting a new strategy on the part of the local authority, which is capable of acting by making all its sectors work with an integrated perspective. More specifically, the Innovation Area of the City is committed to working in agreement with the Environment and Green Spaces Area to ensure simplified procedures for experimenters. This cooperative management is born from the desire to quickly coordinate all the local offices and to meet all needs of experimental bodies.

Secondly, the Laboratory is addressed to connect local actors operating in economic sectors considered to be innovative. Through experimentation activities, small and medium-sized companies have the opportunity to create partnerships with large public and private multiutilities that manage the services sector in the area. In addition, the experimenting subjects have the opportunity to deal directly with the world of research. Adopting this approach, a start-up might have the chance to collaborate with big local multiutilities as SMAT (management company of hydric sector), IREN (management company of energy sector), AMIAT (management company of waste) but also with the University and the Politecnico of Turin.

As a third point, the Torino City Lab aims to make it possible to test products and ideas that might be exported on a larger scale. From this point of view, every project in the Lab are not planned to fill out only local needs, whereas they should be designed to be reused and fitted on wider scales. This designed process is addressed to match the transnational co-creation strategy (Santonen, Creazzo, Griffon, Bòdi, Aversano 2017).

Finally, the Torino City Lab is based on the involvement of citizens as final users and aims to adapt the experimentations to the needs expressed by peoples. For this reason, in addition to the permanent chance to propose to the City innovation ideas, the public administration works to open specific calls based on identified challenges to fill out emerging needs of urban areas or European Union directives.

This last aspect puts the Laboratory in its own right in the category of Living Lab, providing the urban territory to create a public-private-people partnership, achieving the innovation model of the quadruple helix. As described in recent literature, this pattern shapes the collaboration of four main actors: public authorities, industry, academia and citizens (Varmland County Administrative Board 2018). Following this purpose, the City of Turin decides to plan in detail the Torino City Lab, in order to avoid wasting energy and to set specific objectives.

As shown in the Table 1 below, the City identifies specific mission, vision and values to be pursued in the development of the platform.

Table 1. The features of the Torino City Lab. Source: City of Turin[4]

Mission	Vision	Values
• Facilitate testing operations in real conditions of innovative solutions of public interest. • Offer constant support to facilitate access and then facilitate the conduct of trials, in relations with Internal Services and Utilities.	• Positioning Torino at European and international level as a place where innovation is easier and is a shared challenge for the territory. • Attracting companies from Europe and the world to engage new trajectories of economic development in sectors with high added value and to serve the citizens of tomorrow.	• Agility in the execution of activities. • Transparency of the process. • Openness of the partnership.

This platform enables the City to promote new challenges in environmental fields, which are difficult to address with classic regulatory tools, involving a huge variety of public and private actors as well as citizens. Eventually, within the City Laboratory the Municipality decides to promote one of the policy areas considered most important both to offer new opportunities for local development and to match European inputs in environmental policies: The Circular Economy.

3 Turin Municipality and Living Labs

As previously described, the Torino City Lab foresees the chance of hosting actors from different innovative fields. However, the City has decided to adopt the tool of living labs, paying particular attention to environmental impacts and the promotion of sustainable development. For this reason, the several steps that have marked the construction of the Torino City Lab have always combined innovation with environmental sustainability to achieve a long-term goal: becoming a Circular Economy Hub.

At the end of 2015, for the first time the European Commission designed a Circular Economy Action Plan. On the one hand, it claimed the necessity to change the economic model to face the lack of resources in a sustainable way. On the other, it sets up almost 10 billion to boost the transition towards a new plan of development, financing projects based on redesign, reuse and recycle values (European Commission 2019). Despite this, European research institutes,

[4] https://www.torinocitylab.it/it/

as the Ellen MacArthur Foundation, have stressed that the Circular Economy cannot be supported neither exclusively through top-down investments of funds, nor merely introducing regulative limits to the industrial processes.

From this point of view, the Circular Economy theory has been based on promoting the model of the 3 R (Reduce, Reuse, Recycle) starting from the capability to choose and act of the purchasers and end users of all services: the citizens (Yang, Zhou, Xu 2014).

The reference idea started from the assumption that the citizen can represent the engine of change. In this sense, the end user goes to affect not only reducing their consumption or reusing as much as possible finished products, but also on the systems of product design and durability of materials with their choices of purchase.
Adopting this perspective, in recent years the City of Turin began to imagine the Living Lab tool as a potential stimulus to the Circular Economy. In this sense, the Public Administration has started to experiment laboratories in several fields directly linked to the Circular Economy topic.

In 2016, the City launched the first Living Lab in its history in the Campidoglio district, providing the urban area for an experimentation of technologies and innovative ideas related to the Smart Cities sector. For a year the neighbourhood became the home of 32 experiments that changed the area ecosystem through data sharing technologies and air quality monitoring systems, urban farming and projects against food waste.
In 2017, the local Public Administration decided to open another Living Lab spread over several suburbs of the city, focusing on the more specific issue of IoT. As in the previous laboratory, technological innovations were brought into contact with citizens with the clear aim of boosting new companies committed to environmental sustainability and improving the quality of life in urban contexts. Therefore, IoT technologies were selected with reference to specific areas of application related to the environment and the daily lives of citizens: the quality of the urban ecosystem (air and noise monitoring systems); mobility; energy efficiency; security and management of buildings; culture and social inclusion.

3.1 Turin Living Lab on Sharing and Circular Economy

Although both the described laboratories had a close link with environmental sustainability, neither of them had been specifically focused on the Circular Economy paradigm.

The real chance of implementing a Living Lab on the Circular Economy was opened in the summer of 2017, when the City of Turin received a budget of 18 million euros to implement the AxTo (Actions for the Turin suburbs) programme through a Presidential Decree from the Council of Ministers aimed at fostering urban regeneration.

Through this broad programme, the City was committed to implementing 44 specific interventions in the selected suburbs of the City, focusing on five areas of action: Public Space; House; Work and Innovation; School and Culture;

Community and Participation. Within the third pillar, which combined the challenge of stimulating businesses and employment with innovation, the idea of planning a Living Lab on Sharing and Circular Economy was born. Therefore, this specific laboratory was inserted as action 3.02, focused on innovation in the suburbs as mechanism capable of dealing with the crisis of local businesses (Comune di Torino 2018).
The reference pattern was based on creating open-air laboratories that give a chance to companies engaged in sectors such as sharing economy, internet of things, digital manufacturing, circular economy, environmental sustainability and food. In addition, innovation was also interpreted from the point of view of recovering the craft heritage of the reference areas to keep alive sectors of the craft industry that are strongly linked with circular economy (shoemakers, carpenters, hardwars). For these reasons, four main goals were identified by the City: boosting the local private sector; stimulating new ideas of business; creating a network of sustainable development composed by entrepreneurs; planning conditions to host in public spaces innovative experimentations.

To achieve these goals, the project was planned by the Development and Innovation Area of the City over 18 months, from May 2018 to December 2019, with a maximum time allowed of 9 months for each experimentation. In the spring of 2018, an external “Managing Authority” of technical support to companies and communication with citizens was identified through a public call for tenders. This initiative of the City was addressed to non-profit companies, associations and foundations specialised in development strategies and activities of territorial promotion.

In the same period, the City publishes the call for the selection of private experimenters, open for two months (May-July 2018) to companies in partnership with community associations or Universities and research institutions. The contribution made available by the City amounted to 100 thousand euros. Each testing action could receive a grant up to a maximum of 15 thousand euros, equal to 50% of the total eligible investment to cover the costs of experimentation.

The identified areas of experimentation of the Laboratory were concentrated in the North and South suburb neighbourhoods. However, proposals that provided actions spread throughout the city area were also allowed.

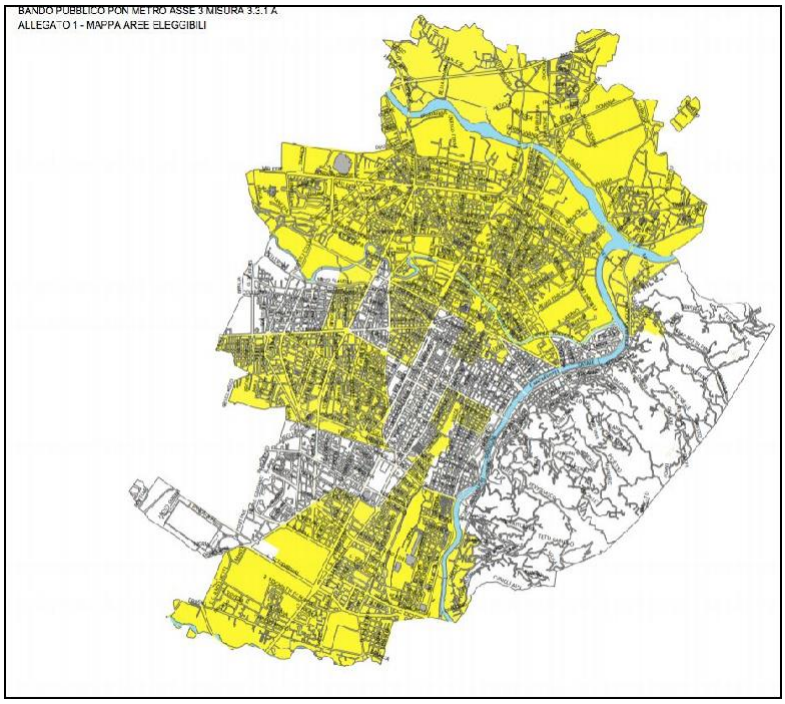


Figure 1. The map of admissible areas of the Living Lab / Source: City of Turin[5]

To objectively examine proposals that were could be deeply diversified from each other, the City set up an ad hoc evaluation committee to select the projects. This evaluation body was composed bringing together experts in the different fields of activity. Accordingly, to the committee effort, the evaluation process was based on five criteria considered decisive for access to public funding: (I) Technical Feasibility; (II) Uniformity; (III) Level of Innovation; (IV) Level of Engagement; (V) Economic Sustainability.

The type of contract chosen by the City to start the testing phase with the selected subjects was the Partnership Agreement. The latter was considered by the public administration as the most suitable to start the Living Lab because it clarified the conditions and facilitates the administrative procedures for the transfer of grants.

3.2 The methodology

From the point of view of small companies, planning projects in the context of the circular and collaborative economy, activating partnerships with other private subjects, cooperatives and universities are not simple actions. These difficulties can represent obstacles to innovation. For this reason, the City of Torino wanted to include a Management Authority that could apply an accompanying methodology.

In the design phase of the Living Lab on Sharing and Circular Economy, the experts of the Authority met the proponents with the aim of informing and encouraging new networks. These preliminary meetings were an opportunity to share ideas and encourage their development. This action enhanced the

[5] http://www.comune.torino.it/sfogliato/axto/files/assets/basic-html/page-1.html#

strengths and highlighted the weaknesses of projects in terms of technical feasibility and economic sustainability, urging subjects to improve specific aspects.

In the evaluation of projects phase, the team constructed a summary table in which the strengths and weaknesses of presented projects were indicated with reference to each specific assessment criteria. They also guaranteed their presence during the discussion, with the objective of facilitating the work of the evaluation commission.

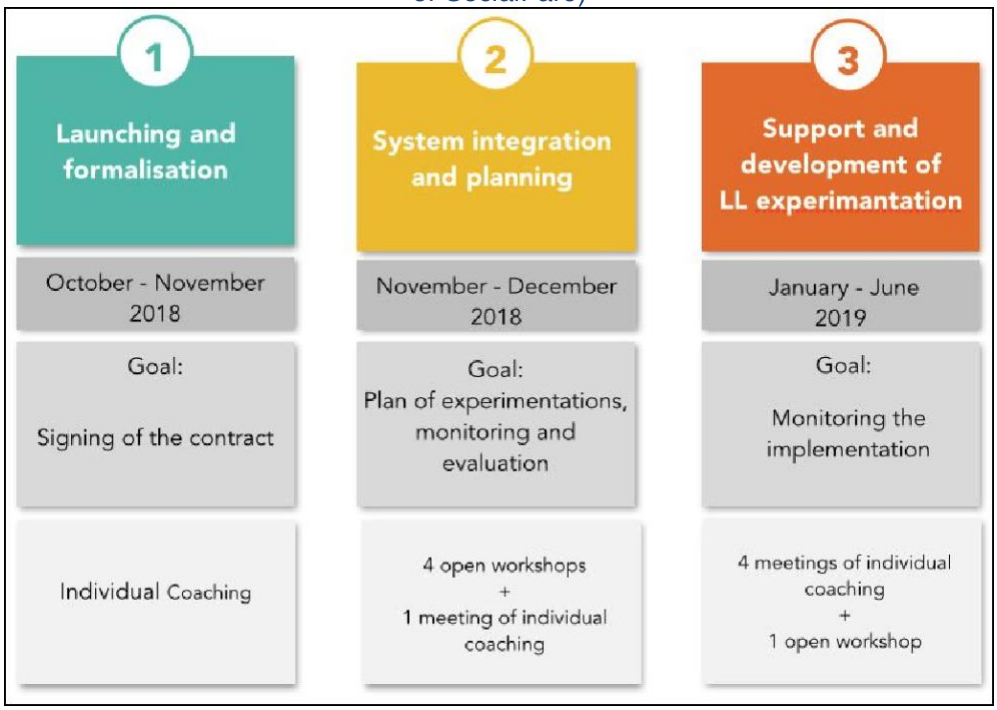
In the system and planning phase, the proponents followed a structured training course in four workshops with the aim of validating the idea; identify monitoring, evaluation and impact indicators; find consistent community engagement methodologies; develop the action plan. Design thinking and systemic design were the basis of the working method. System map and Social business model canvas were the main tools used. The output of the entire activity was a roadmap for each of the eight projects admitted to the trial.

In the testing phase the team specialists met the proposers, individually or with the whole project team, on at least four different occasions with the coaching methodology. On the one hand, this initiative was implemented to reaffirm the value of the partnership between public and private subjects. The meetings could be experienced as a form of bureaucratic control. However, the difference between monitoring as a form of support instead of control has not been easy to perceive and it has made necessary to build a relationship of trust with the proponents. On the other, emphasizing weaknesses has represented a value for the project, as well as insisting on the identification of precise indicators of success or failure.

Form the point of view of the City, the accompanying methodology carried out by the Authority has given rise to some points for reflection. First of all, coaching activities have allowed to gather information and data useful for evaluating the effectiveness. The collected data have concerned the individual projects, the identification of the critical phases, the prevailing orientations of the proposers, the blind spots of the projects, the ability to involve and engage the population, with the aim of identifying suitable forms of support and accompaniment for future living labs. In addition, information has been collected on the entire experimentation process, the ability to facilitate the activation of territorial networks, the visibility and the communicative impact, with the aim of developing processes capable to promote innovation in the circular and collaborative economy.

The accompaniment has also made it possible to provide adjustments during the course of the Living Lab, in order to deal with difficulties that have arisen in the process phase. Furthermore, the in-progress accompaniment has facilitated the activation by the Public Administration, in terms of authorizations and definition of agreements with the involved public departments.

Table 2. The methodology pathway of the Living Lab (Adapted by authors with permission of SocialFare)



The latter aspect has represented a tough step. Social innovation and economic innovation require the presence of an ecosystem capable of accepting and enabling changes, both from the point of view of norms and local regulations and authorization processes. For instance, one of the companies needed to conclude an agreement with the city to experiment with hydroponic production in a city park; another needed to collect plastic with the contribution of citizens, avoiding that it ends up in the waste stream; a third decided to produce and distribute hot meals in the homes of the first night shelter for homeless people also using food from charitable collections from the city markets. In these cases, Authority has activated various services to cooperate within the short time frame of implementation.

Another aspect to emphasize has been the support of the Authority for the dissemination of the 3.02 program aimed to insert and position the City of Turin in a European debate on the circular and collaborative economy, identifying opportunities for meetings, workshops, conferences, where to present the case of the experiments conducted on the territory of the City.

4 The experimentations

The time frame for developing the eight selected projects is from January to September 2019. To have a better understanding of the characteristics of the Living Lab it is necessary to present the projects admitted to experimentation on the urban territory.

Abbasso Impatto (Lower Impact)

Abbasso Impatto is a project conceived and developed by the Verdessenza cooperative, based on the collaborative economy and built on the model of Solidarity Purchase Groups (collective purchasing groups). The objective is to reduce the environmental impacts in the consumption of catering and hospitality establishments and to guarantee sustainable prices for supplies thanks to collective purchasing. The experimentation area identified is the San Salvario district of Turin.

Verdessenza is primarily concerned with assessing the needs of catering and hospitality establishments, and simultaneously identifies and selects the groups of products and services to be offered to them. In order to carefully choose the suppliers of the necessary products and services, it draws up the Minimum Environmental Criteria through which to select the suppliers that guarantee a production process more attentive to socio-environmental sustainability.

Edilizia Circolare (Circular Building)
Edilizia Circolare, a project conceived and developed by the Emmegi company, was born with the aim of applying the concept of reuse and recycling in the construction sector.

The first step is the establishment of a team of professionals for reuse, made up of architects, designers, companies and artisans. This will be followed by the identification and collection of potentially reusable materials that will be donated by citizens, businesses and local artisans, to be transformed and come back to life in new furnishings and finishes. Throughout the project, workshops and focus groups will be organized for both professionals and DIY (do it yourself) enthusiasts.

The final product of the trial will be the restyling of a room located in Via Montevideo 41, entrusted by the Municipality of Turin to the Paradigma Social Cooperative, which will host a café for members and new laboratories.

Suolo sostitutivo (Replacement soil)
The project, conceived and developed by Horizon srl, aims at the re-use, in the context of territorial planning, of inert material, following an appropriate treatment, coming from excavations carried out in the city for infrastructural works. Normally, in fact, this material is classified as waste and is stored in landfills.

The main objective of the project is the development of a technical protocol for the constitution of a soil capable of replacing the natural one, suitable to sustain a plant substrate over time.

Large volumes of inert materials that are difficult to dispose would be transformed into secondary raw materials, in line with the principles of the circular economy and with the current provisions of the European community regarding waste reduction and re-use and recycling of waste materials in order to guarantee the conservation of ecosystems.

The information taken from the experimentation can then be used to redesign or convert parts of the industrial waste generation process and to develop a mixture that can become a marketable product.

UrbanAquaFarm
UrbanAquaFarm, an experimental project proposed by Carlo Prelli Service, wants to develop and test innovative systems for horticulture. Within the framework of the "Orti Urbani Torino" system, a pilot project is proposed that creates a collaborative system of production and consumption of plant products based on "hydroponic" culture techniques. Specifically, the project will build prototypes and experiment with circular horticulture practices, in the area of the "urban gardens" inserted in the Parco dei Laghetti in the north of the city, inaugurated during the 2018 spring in an area currently undergoing redevelopment.

During the implementation of the project, specific dissemination activities will be carried out, as well as additional parallel and collateral initiatives, directly applicable to the entire system of "Urban Gardens" of the city, such as training courses on the "Hydroponic" system, vocational training seminars, visits guided tours for students and groups of citizens.

Humana, RicuciTo project
The project arises from the fact that 5,000 of the 20,000 tons of used clothes stored each year in the Pregnana Milanese warehouse have any market value. Humana has chosen to build a pilot project capable of dealing with one of the main components of this quota, denim. To do this it has built a partnership with the design course of the Polytechnic of Turin, which has allowed 240 students of the second year of Design to work on the problem, and with the social cooperative "Il Gelso" which has also activated the laboratory of the District House Lorusso and Cotugno of Turin where three women work.

Izmade, Beautiful Precious Plastic project
Izmade creates design objects and furniture, working wood and metal. Beautiful Preciuos Plastic aims to include the Precious Plastic open source machine in the laboratory, so as to expand the range of materials and objects. The machine consists of a shredder, an extruder, an injector and a press. To carry out the process it is necessary to engage the local population that is called to participate in a dedicated collection of plastic and that will then be able to access the workshops dedicated to specialists and amateurs in the multifunctional centres of Barriera di Milano area.

Magma, the Balon's Marketplace project
The project plans to create a marketplace dedicated to vintage goods and antiquities marketed in the traditional Balôn market in Turin, which has been held since 1857. The markeplace has two main objectives: 1) to increase the commercial capacity in a traditional sector, opening it to a foreign clientele or resident far from Turin; 2) supporting evolution and transparency in a traditional sector closed to innovation and comparison with wider and more developed markets.

Stranaidea, project CON il cibo 2

The project is the evolution of a previous experimentation with which the Stranaidea Social Cooperative had already begun to distribute hot meals in one of the three-night shelter facilities it manages. The objectives of the project are to guarantee at least one hot evening meal to the guests of the facilities managed directly by the cooperative and to encourage the empowerment of guests by involving them in food collection preparation and distribution. The cooperative is trying to activate a negotiation with the City, the client of the service, also in agreement with other subjects that manage other reception centers that could benefit from the service.

5 Towards a circular economy Hub for the Municipality of Turin

Cities are in a critical position with respect to the transition to the circular economy. On the one hand they have a very high impact on the environment for all the activities they carry out. On the other hand, their characteristic of having a high concentration rate of resources, capital, data and talents in a relatively narrow geographical area can be an opportunity.

In this perspective, it becomes interesting to think about the city in terms of a peculiar ecosystem of social and economic innovation, able to face the transition from a linear to a circular economic model (Ministry of the Environment for the Protection of the Territory and the Sea, Ministry of Economic Development, 2017). In order to increase awareness of its existence, there are two fundamental ingredients that those who administer a city have to consider: a) intention to invest in and with the city community; b) establish clear and shared governance mechanisms.

Within this perspective is moving forward the ongoing experimentation of the Living Lab on Sharing and Circular Economy of the City of Turin, for which the Municipal Administration has chosen to be flanked by a Managing Authority. The objective of this choice is to experiment a methodology and a practice aimed at building the structure of a territorial hub of Circular and Collaborative Economy of Turin and at formulating the definition of a city policy concerning the circular economy issues. Specifically, a territorial hub is meant to be an ecosystem of public, private and civil society subjects that interact with the aim of bringing to value, economic, social and institutional the environment in which they operate.

In order to function at its best, this ecosystem has to plan a governance structure capable of effectively putting the various actors involved into relation. Therefore, the action of the Municipal Administration in assuming the management of direction and involvement plays a key-role. As regards the strategic political address, it is desirable to create an inter-council Control Room (environment, innovation, work, social inclusion, culture and education). Concerning the involvement, it is necessary to consider that the boundaries of the Circular Economy, as literature is defining it (Lacy P., Rubqvist J., Lamonica B., 2016), is very broad and extends well beyond the only field of recycling. Rather it includes all the phases of the realization of a good and service, and therefore: the

conception and design, the production, the distribution, the modality of fruition and of transformation. The circular economy business models are different, and they cover several phases of the production cycle: circular chain from the beginning (biobased material and energy, and/or second raw material as productive inputs); recovery and recycling; upcycling; extension of product life; sharing platforms; product as a service.

Moreover, could be considered crucial the creation of a subject as a Circular Economy Manager Group, which acts as the executive branch of the Control Room. This body would operate with the mandate to coordinate and bring to system the various initiatives, practices and projects that already are moving in the city in the various sectors of the circular economy.

Several are the key actors to be involved in the Hub governance structure. First of all, the different universities in the area: The University of Turin, through the new Doctoral School Innovation for the circular Economy; the Polytechnic of Turin, thanks to the multiple skills related to Systemic Design; the University of Gastronomic Sciences of Pollenzo which carries out research related to food and circular economy.
Secondary, strategic players that must be involved in the Hub's governance structure are trade associations such as the Chamber of Commerce, Industrial Union, Confindustria, Confartigianato, CNA, Confcooperative, Legambiente.

Thirdly, the various utility companies are key-actors that have to be involved. In this regard, the experience carried out by Maribor is interesting. In June 2018 Maribor became the first city in Slovenia to define a strategy for transition in the circular economy, in close synergy with the Charter of Sustainable Development Goals. This strategy was conceived and developed by Wcycle Maribor - Institute for the circular economy - founded by five utility companies in the city. The objective is to implement a management system for all flows of materials and resources available in the city, capable of generating cross-sectoral cooperation between seven different fields: urban waste; construction and demolition waste; mobility; water; power; territorial planning; collaborative economy. The five companies aim to achieve the highest rate of reuse of material, energy and water, sharing information and activities.

Finally, the concept of hub recalls the network paradigm (Buchanan M., 2003). The constituting Hub is to be understood both as a new network of territorial actors and at the same time connection of existing ones. Additionally, the Hub has to be meant as a node of a wider network, connected to supra-local scales of action. With regard to the connection with the supra-local networks, the work of the Circular Economy Manager Group is strategic, which makes it possible to relate what is moving, developing and is learned at the Hub level with the rest of the Italian and international circular economy context.

To sum up, adopting the City perspective it will be important to identify one or more significant places in the urban area, able to rise to physical places of networking and exchange, in which companies, citizens, schools and universities can directly interact. Some of these can be identified starting from the same

experiments in progress through the Living Lab on Sharing and Circular Economy. At the same time, the City is thinking of exploiting disused spaces, such as the Remida centre, to build physical clusters for the new Hub.

Therefore, the next step will be to find a suitable home for the Hub, making the most of the huge architectural heritage left unused by the crisis of local industry.

6 Conclusions

This paper has addressed the practical case study of the Living Lab on Sharing and Circular Economy of the City of Turin. Deepening the Turin policy of using Living Labs as a stimulus for innovation, the case study suggests three main points of discussion.

First of all, the Living Lab on Sharing and Circular Economy has shown how there is an emerging network of local businesses, associations and committees of citizens increasingly active in the field of sustainable entrepreneurship. Through the facilities made available by the City and the guidance of the Managing Authority, these bodies have managed to get in direct contact with citizens. This direct approach provided through the Living Lab could be a tool to improve their innovative ideas and modify them to better match the needs of citizens.

Secondly, the case study has suggested how the Living Lab methodology allows to build the foundations to turn cities into innovation hubs. In the recent history of the City of Turin, no classic regulatory or business incentive tool has ever managed to bring together the City, research institutions, businesses and citizens on such a key-issue as the Sharing and Circular Economy. This Living Lab will therefore be the starting point for transforming the Torino City Lab into a real Hub of Circular Economy.

Finally, the case presented has highlighted how local action is directly linked to global policies. The need to find sustainable business solutions that preserve the environment by working on reuse, material recovery and recycling is shared by most of the world's institutions. However, shared policies on paper often find barriers insurmountable in practice. Nevertheless, living labs could represent practical tools to connect cities and to scale from local to global policies in support of the sharing and circular economy.

To sum up, the case of study has clarified that the greatest challenge is to bring together different actors on both a local and global scale to promote real changes in environmental regeneration and citizen services policies. A challenge that can only be faced by cities through dialogue and positive exchanges addressed to the planning of future living labs.

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