D5.1 – Report on synthesis and implementation guidelines for "smarter" Living Labs

WP5 – Synthesis, guidelines and briefs for "smarter" Living Labs

Improving Anticipation and Social Inclusion in Living Labs for Smart City Governance

URBAN EUROPE

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Document Description

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1. Introduction

The 'Urban Living Lab' is an emerging approach in European cities, referred to projects devised to design, test and learn from innovative socio-technical practices (i.e. 'new ways of doing something') in urban contexts, with a diversity of stakeholders. A Living Lab (LL) was defined as an institutional environment for open innovation that supports experimentation with real users in real contexts (Folstad 2008; Hillgren 2013). It may be organized in a variety of ways (long-term or short-term, independent from or embedded in the municipal organization (Kemp and Scholl 2016), provider-driven or user-driven (Leminen 2013), but commonly characterized by situated experimentation, diversity and participation, learning, and evaluation.

Also in terms of aims of urban Living Labs there is quite a wide variety of foci. One typology to map this variety, as shown in Figure 1, is to distinguish the importance of (testing) new technology (on the x-axis), and the importance of developing new business (i.e. products, services, etc.), on the y-axis. Although the concept of Living Lab emerged from technology firms testing new products in practice (right bottom quadrant), there are currently also many Labs that design, test and learn 'new ways of doing things', which may include a technological component, while not aiming at new business development, but rather at tacking urban challenges or dilemmas together. As we will see below, this is the quadrant where the SmarterLabs cases can broadly be positioned.

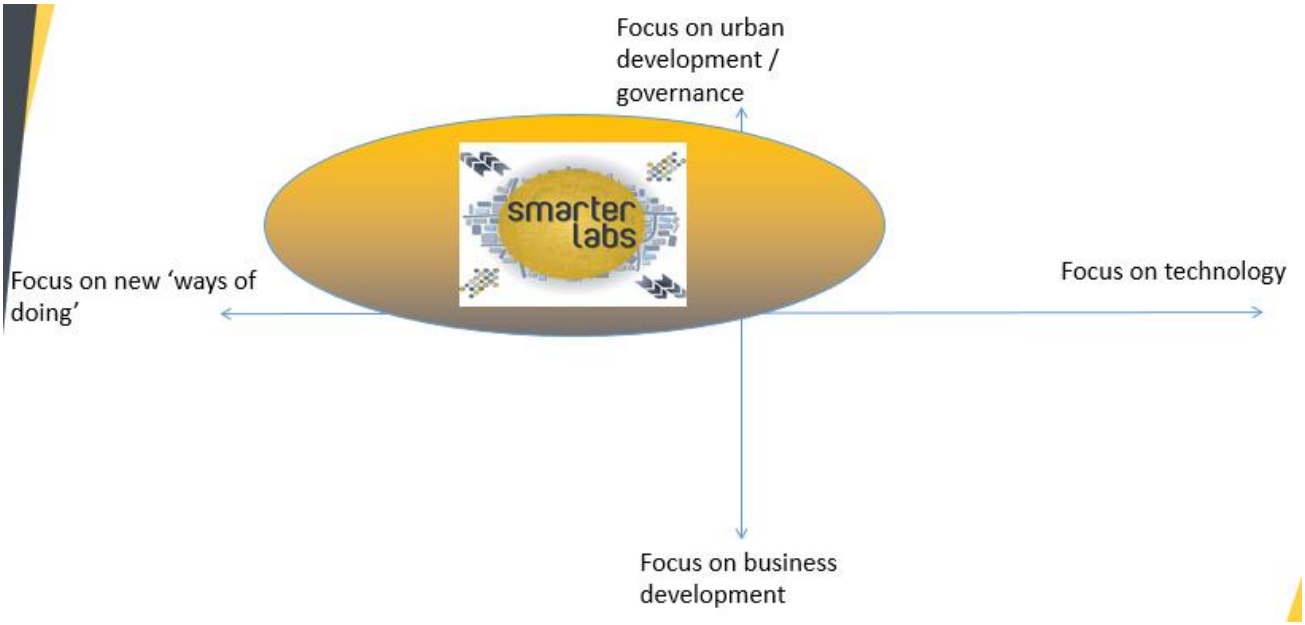

Figure 1 Positioning the SmarterLabs cases on a two dimensional map.

The interaction of the social and technical dimensions often makes urban infrastructure quite resistant to change (Hommels 2005, 2010) and thus requires specific attention when new practices are to be introduced. The current approach to living labs focuses on small-scale performance tests and technology-user interactions, mostly neglecting the larger social-institutional context (Karvonen & van Heur, 2014; Karvonen et al., 2013). Therefore, successful implementation of new practices in the reality of LLs is not a warrant for the large-scale adoption required to reach their full effect in resource efficiency. Another limitation of the current LL approach is that often digital technologies play a predominant role within it. This potentially results in an implicit preference for 'smart citizens' as privileged users and partners, namely citizens with both the cognitive and material resources to consume and co-produce the smart services of the smart city.

Even though user-centered design approaches are available, and even methodologies to engage non-users in the design of such innovative technologies were tested, citizens lacking these resources risk to be excluded or to be unable to fully participate as users and co-creators in LL. Similarly, they are likely not to be able to use the smart services once these are implemented on a larger-scale (Dutilleul et al., 2010). The consequence is not only limited adoption and use of these smart technologies but also social inequality and exclusion (Evans & Karvonen, 2014).

Acknowledging such drawbacks, in the SmarterLabs project we focused our attention on how to foster upscaling and avoid social exclusion. Starting from literature review on these topics and on retrospective analysis of past experiences with participatory decision making processes in four European cities (Bellinzona-CH, Brussels -BE, Graz-AT, and Maastricht-NL), we developed a novel approach that anticipates such challenges. The approach was tested through 'smarter' Living Lab experiments addressing mobility-related topics in the same four cities, in an action-research approach. The way this was tested in these Living Labs and the lessons learned are described in Deliverables D 4.1, D 4.2, D 4.3, and D 4.4.

In Bellinzona citizens were involved in co-designing a smartphone app aimed at promoting individual behaviour change and rewarding those who reduce car use. In Brussels citizens were involved in participatory measurements of air quality, with the aims of increasing awareness on the impact of urban traffic flows on local air pollution and mobilizing for more sustainable mobility. In Graz citizens and local stakeholders were engaged in the 'smart' redesign of Griesplatz, a large square in the centre of the City, especially important as a traffic hub. Similarly, in Maastricht a series of focus group meetings exploiting a visualization tool were held to engage stakeholders in developing and assessing future visions of the central station area.

This reports aims at presenting a synthesis of the findings in the four cities, with the final aim of summarizing:

- Typical constraints that commonly affect social inclusion and upscaling;
- possible ways capable of effectively anticipating each constraint, during the design of living lab processes.

2. Methodology

The whole methodology followed in the SmarterLabs project is summarized in *Figure 2*. We started by identifying an innovation project in each city for which at least some actor was seeking for upscaling the innovation. These were:

- upscaling car alternatives (cycling, public transport, inter-modality) in Bellinzona;
- upscaling societal support and activism for car alternatives (cycling, public transport, inter-modality) in Brussels;
- upscaling participatory mobility and spatial planning in Graz;
- upscaling car alternatives (cycling, public transport, inter-modality) in the train station area through infrastructural & parking measures in Maastricht.

All such processes involved three types of actors, namely public administrations (cities), universities, and civil society. We sought to intervene in each process to anticipate better on constraints on the upscaling process in an inclusive way. To identify the local constraints on upscaling, we first performed a literature research (WP2) and developed a retrospective analysis on mobility, participation and land planning processes in the four cities participating in the SmarterLabs project (WP3). We referred to upscaling as the emergence and expansion of an innovative practice (i.e. new way of doing something) in the particular urban area. We referred to social exclusion as a multidimensional, multi-layered and dynamic understanding of deprivation that people may suffer because of new urban practices. Note that social exclusion is a key constraint affecting upscaling itself. For the sake of simplicity, we keep them separate here. However, in our understanding addressing constraints on social inclusion is a pre-condition to effective upscaling.

Activities in WP2 and WP3 allowed to identify a generic list of critical constraints affecting social inclusion and upscaling of urban experiments (see Table 1). Then, the most appropriate constraints were identified in each SmarterLabs partner city, and the "smarter" living lab processes were explicitly designed and managed in order to address and anticipate them (WP4).

Table 1 Constraints precluding social inclusion and upscaling, as they were identified at the end of WP3 activities.

Constraints on social inclusion		**Constraints on upscaling**	
Exclusion *from the LL*	**Exclusion *in the LL***	**Related to *LL design***	**Related to *context***
1. Citizen's lack of financial, intellectual and human resources 2. Mismatching goals between the citizens and the Lab 3. Overlooking people outside lab context	4. Reproducing existing power structures inside the Lab	5. Limited learning 6. Wait-and-see attitude 7. Poor timing	8. Low stakeholder receptiveness 9. Low institutional receptiveness 10. High institutional fragmentation 11. Sticky urban assemblage 12. Neglecting effects outside project locality

Through the action research in the living labs, insights on effectiveness of the anticipating strategies was gained, and also a few constraints were more sharply formulated, some new ones emerged, and a few ones were discarded because they were already covered by one of the others.

Evaluation of (or the reflection on) the effectiveness of the anticipating strategies aimed at avoiding social exclusion and favouring upscaling was at first performed by the managers of each living lab process, within structured evaluation processes, that also included the relevant actors engaged at the local level. Then,

findings from each living lab were compared, and successful strategies across different contexts were identified; similarly, strategies failing to achieve their intended outcome were identified as well, and possible reasons behind their failure were identified. Finally, insights from such cross-comparisons were brought to discussion also tested outside the SmarterLabs research team: three dissemination workshops were organized in three different European contexts, targeting practitioners, representatives of the public administration and universities as well. These workshops were organized in Helsinki (FL), Istanbul (TK), and Santander (ES), and allowed to:

- better focus and refine insights from the living lab activities, while they were developing over time;
- discuss the context-dependency and transferability to other contexts of the identified ways to anticipate critical constraints on social inclusion and upscaling.

At the end of these activities, the final set of constraints on upscaling inclusive urban living labs innovations was identified, together with a corresponding set of strategies to better anticipate.

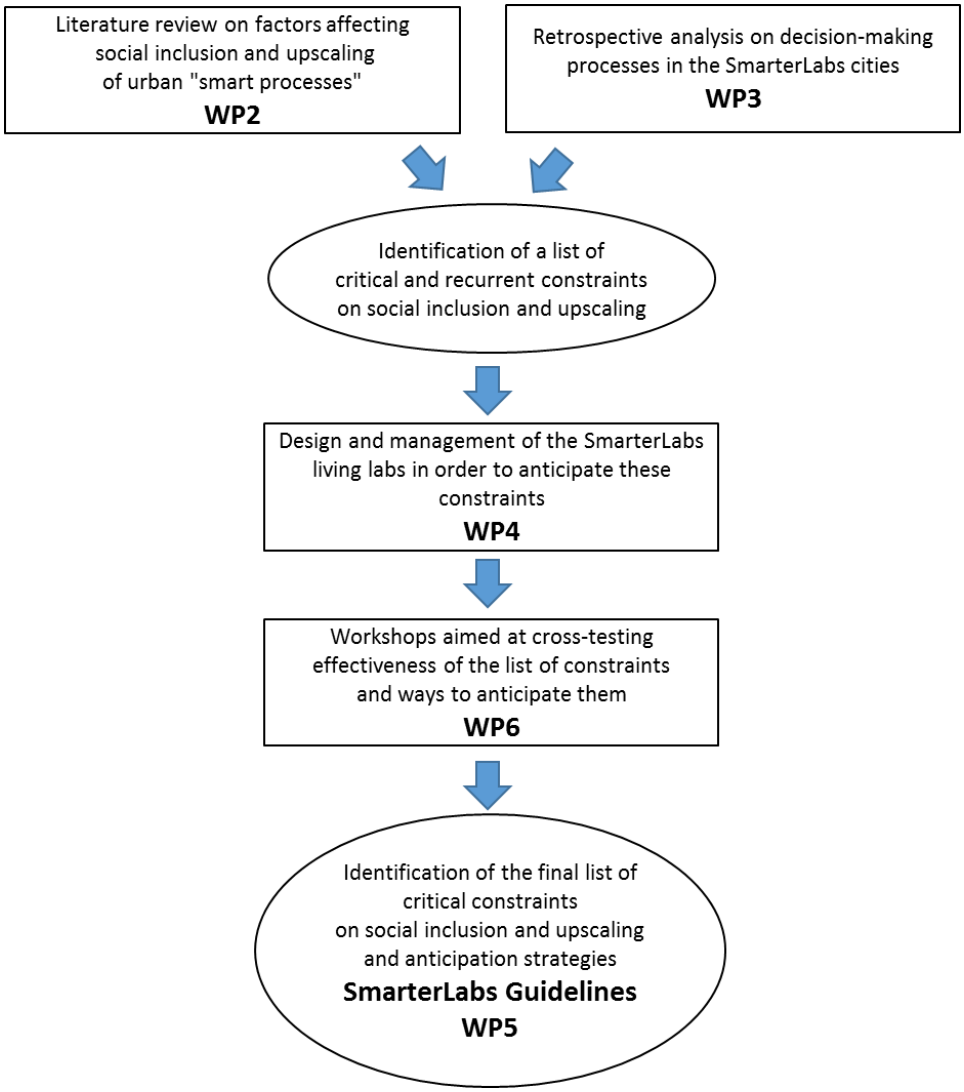

Figure 2 Steps of the methodology followed to develop the SmarterLabs guidelines.

3. Results: main constraints on social inclusion and upscaling

The final set of constraints resulting from the above procedure is summarized in Table 2. The table also shows in which SmarterLabs city/living lab experiment the constraint was identified and explicitly addressed within lab activities.

Table 2 The final set of constraints precluding social inclusion and upscaling, as they were identified from the cross-analysis within WP5 activities.

		Typical constraints in Living Lab experiments	Lessons from "Smarter" Labs
Social Inclusion	Exclusion from the living lab	1. Citizens lack financial, intellectual and time resources to participate in the Living Lab	Bellinzona, Brussels, Graz
		2. Relevant stakeholders remain outside the Living Lab	Bellinzona, Brussels
		3. Groups and impacts outside the Living Lab context are overlooked	Brussels, Maastricht
	Exclusion in the living lab	4. Existing power structures are reproduced inside the Living Lab	Graz, Maastricht
Upscaling	Related to Living Lab design	5. The Living Lab's potential for learning is underexploited	Bellinzona, Maastricht
		6. The Living Lab is disconnected from broader societal debate	Brussels, Graz, Maastricht
	Related to Living Lab context	7. The Living Lab consensus is not reflected in policy and society	Bellinzona, Maastricht
		8. Stakeholders and institutions are highly fragmented	Bellinzona, Maastricht
		9. The urban assemblage is sticky and locked-in	Graz, Maastricht
		10. The Living Lab meets low institutional receptiveness	Bellinzona, Brussels, Maastricht

3.1 Citizens lack financial, intellectual and time resources to participate in the Living Lab

Living Labs can be complex and long lasting. To participate meaningfully, citizens need to have time and energy, a certain level of understanding of the discussion and sometimes also specific economic and intellectual resources. Minorities and vulnerable social groups risk being excluded from Living Lab activities. People with no, low or very discontinuous revenues might be excluded from the Lab, since earning their living can leave little space to other activities. Also people with precarious employment or residential conditions might lack the possibility to plan for long term and therefore commit to participate in a Lab. People responsible for taking care of elderly or children, as well as people working during non-office shifts might lack the material time to join the Lab. Foreigners and new-comers can be excluded because of their limited proficiency in the language. In addition, people lacking a minimum understanding of the issue at stake or acquaintance with the technology used in the Lab (e.g. because of low education level or age) are also at risk of exclusion. Socially marginalized groups may tend not to participate in community initiatives due to a lack of self-determination, of financial or educational resources, or both.

While it is virtually impossible for Living Labs to be inclusive of all relevant groups, it is desirable to minimise exclusion throughout its lifetime. Barriers to broad inclusion in a Living Lab can be of many different kinds and require a fully-fledged strategy to be addressed. It is important to reflect on desired outcomes and apply stakeholder and requirement analysis tools to identify potential types of exclusion and adequate coping

strategies. While this exercise is primordial in the design phase, it requires to nourish an ongoing reflection at different stages of the Living Lab. All Living Lab participants need to participate in an explicit reflection concerning the causes and outcomes of exclusion, and in the identification of solutions.

Overall, the micro-practices of the Living Lab need to be strategically designed and then jointly orchestrated. These range from the choice of venue and schedules of the Living Lab meeting, to the language and the style of Living Lab moderation, to the time spent in all sorts of capacity building. Other methods to ensure broad inclusion include targeted calls for participants, through the channels that are more likely to be used by the target group or technological fixes, to provide the tools to all (e.g. purchase of smartphones or computers).

For example, efforts to minimise exclusion were at the core of the Brussels Lab since the beginning. Different adjustments were also made in progress, to cope with unexpected circumstances. At very early stages, the organizers (one of the local universities, and a network of neighbourhood committees) identified potential barriers to inclusion and opted for establishing different sub-groups, precisely to include the broadest variety of population. Throughout the process, regular outreach efforts were made towards groups at potential risk of exclusion, also relying on a 'focal person' identified in each group. For instance, venues and schedules for each group were strategically selected: for EU officers, meetings were convened in EU premises at lunch time, for groups of parents and shopkeepers, small meetings were organised in the early morning (just after leaving the children in school/before opening the shop), for young professionals, meetings were organised at early evening in a central neighbourhood. Several smartphones were purchased to ensure everybody could still take part in the Lab, as well as tablets, used for demonstrative purposes. Less acquainted people with smart technologies where dedicated more training time. In some cases, however, these efforts were not enough to bridge the gap, resulting in participants not using the technology. Exclusion from the Living Lab was also part of the reflection that the participants engaged in. In a focus group interview on the topic, they were invited to identify potential drivers of exclusion, the possible implications, as well as suggestions for coping strategies.

Similarly, the City of Graz aimed to take action in a district with challenging circumstances: high proportion of migrants, various cultures and ethnics, education levels and incomes below average. The strategy to reach out to marginalized groups such as migrants, elderly people and children was to offer different formats of LL activities: workshops, social safaris, online questionnaires, mental maps, etc. Lab organizers did not wait for people to show up, but actively approached them on the street, literally bringing the Lab to the people. By repeatedly offering possibilities for stakeholders to participate and actively approaching them, over a long period of time also marginalized groups were included.

In the Bellinzona Living Lab, social groups at risk of exclusion were identified in elderly and young people and migrants. To favor their participation, a targeted recruitment strategy was applied. Flyers introducing Living Lab activities were distributed at places where computer literacy courses for elderly people are offered, and personal contacts with high school teachers and a local association supporting migrants were established. The aim was to exploit the already existing formal (computer literacy courses, teacher-pupil relation) and semi-formal (local migrant association) social networks to capitalize on the existing trust relationships, as well as to provide specific assistance (e.g. language mediating support). Considering the young generation's natural inclination to interact with the digital world, it was expected that students would be the easiest segment to include. Resulting numbers suggest that the performed recruitment strategies were not enough to favor a significant participation of the groups at risk of exclusion. For instance, while young generations are the most inclined with technological innovation, they are also less used to participation and engagement in public processes. The limited engagement of students (two out of around forty participants, but not in a continuative way) suggests that further efforts could have been dedicated to specifically outreach students directly by means of informal networking, instead of involving intermediary persons such as school teachers. Providing also stronger in-person contacts to elderly people would probably have helped to trigger more active engagement than just relying on flyering mediation. In fact, even though flyers specified that no specific computer competences were needed, they probably were not as convincing as a person would have been. As

for migrants, even in this case, a more direct interaction and personal invitations (face-to-face or telephone) could have reinforced the supportive action and thus engagement.

3.2 Relevant stakeholders remain outside the Living Lab

Due to the intrinsic innovation nature of Living Labs, large shares of the population and the relevant stakeholders might not be interested in joining them (or remaining active within them for a long period of time), because either they do not share the sense of urgency to discuss the issues at stake and take action (they have different priorities), or they even have conflicting attitudes or goals. As a consequence, the group of Living Lab active participants risks being monopolized by people with strong personal commitment to the issue at stake and/or people already used to (critically) interact with public authorities and institutions.

Ultimately, the Living Lab might become a low conflict circle of people sharing priorities, attitudes and goals, while the large majority of citizens would simply ignore the Living Lab process. Dissenting groups might also explicitly opt for keeping themselves out of the Living Lab, in order to be able to later criticize its outcomes and the introduction of policy measures based on them, according to a well-experienced and more comfortable to them "Decide-Announce-Defend" (DAD) framework. In both cases, level and intensity of debates within the Living Lab would be trivialized and upscaling possibilities of its results would be strongly inhibited.

In the process of setting up a Living Lab fundamental questions need to be clarified, above all the objectives and who could effectively contribute and therefore should be involved in order to be able to define clear goals and guarantee transparency and an open communication inside and outside the Living Lab.

In particular, a stakeholder analysis should be performed in order to identify the relevant target groups, together with the reasons why they might (not) be interested to join Living Lab activities.

Analyzing the reasons against a participation in the Living Lab helps to define

- how to frame Living Lab activities in public communication campaigns aimed at recruiting participants,
- and specific actions in order to also raise the interest of less intrinsically motivated target groups and achieve their active engagement in Living Lab activities.

Aiming to involve a variety of people, special attention needs to be paid to their individual demands and desires. The objectives of the Living Lab have to be negotiated in order to prevent mismatching expectations between the Living Lab and its potential participants, as well as to avoid the possibility of generating misleading information (e.g. from Living Lab opponents). This is important to attract people in the first place as well as to keep them active in the process. Ultimately, transparent communication helps the Living Lab to obtain the right motivation and loyalty from its participants.

For example, in Brussels, an initiative for "Smart Mobility" was reframed by Living Lab initiators as one where air quality and people health were at the core. Adopting the right problematization approach favored raising commitment also among those citizens who would not engage in a smart mobility-related process, perceiving the topic as outside their own priorities. Instead, they genuinely and very proactively engaged in an air pollution-related process, since their cared very much for their health, and especially the one of their kids. Reframing the focus of the Living Lab helped reaching out to a rather broad variety of citizens, with different geography, and socio-economic, demographic, cultural background. Overall, though, participants could not be considered as a representative sample of Brussels population, with an overrepresentation of the educated and socially active middle class as opposed to other groups.

In the City of Bellinzona, the challenge to include all the relevant stakeholders was addressed through a combination of activities. The Living Lab in Bellinzona was in fact largely at risk of just attracting people who had already reduced their car use, thus resulting in a very polarized sample of participants possibly jeopardizing the efforts made to keep the Living Lab as open as possible to the entire population. Particularly, there was the risk to mainly involve only cyclists, since the local association lobbying in favor of regular bicycle

use was among the Living Lab initiators, and participation to the Living Lab was open to any interested citizen, on a voluntary basis. However, how could a group of urban cyclists have been able to co-design an effective smartphone app targeting reduction in car use among mainstream car drivers? To favor large diversity and high representativeness of the local population among the Living Lab participants, Living Lab organizers opted for a hybrid recruitment campaign, relying on both bottom-up and top-down activities.

First of all, a stakeholder analysis was performed, in order to identify the key target groups to be engaged. As a result, commuters, car drivers, bicycle riders and public transport users were identified and the relevant associations representing their interests were involved, with the aim of mobilizing them in the outreach of Living Lab participants. Posts in their newsletter and articles in their bulletins were published, to amplify and support the press release delivered by the City of Bellinzona at the launch of the public campaign for Living Lab recruitment. The campaign explicitly remarked that all citizens were welcome and desired – especially car drivers, the claim targeting those citizens being "always stuck in the car". The emphasis was put on co-creation activities, and on the key idea behind the app, that was rewarding citizens with tangible prizes, if they opt for (more) sustainable mobility patterns. Highly attractive prizes (extrinsic motivational factors) were supposed to raise the interest in mainstream commuters and car drivers up to the level of already intrinsically motivated bicycle riders and public transport users.

To reinforce and integrate such bottom-up, spontaneous self-applications, a top-down selection of diverse and overall representative citizens was also made. By referring to their wide network of personal contacts, city authorities identified a set of around fifty citizens to be personally invited to join the Living Lab, being sufficiently diverse in socio-economic characteristics as well as mobility patterns, to be considered representative of the variety and differences among the whole population. Not all of them accepted the invitation, but, together with the totally self-selected participants, the group of participants in Living Lab activities was sufficiently diverse to avoid typical "preaching to the converted" limitations. It is to be remarked, however, that the top-down selection of the citizens to be invited was performed by the City civil servants and policy-makers themselves. Notwithstanding reassurances on their good faith, opting for a fully transparent selection process, or maybe even for a random selection process, such as the "citizens jury" or "planning cell" participatory techniques, would have endowed the whole process with additional fairness and reliability, further attracting other participants.

3.3 Groups and impacts outside the Living Lab context are overlooked

Living Labs are experiments situated in a specific geographic context, ranging from a building block to a neighbourhood, a municipality or a whole urban area. While there is a certain flexibility in choosing the scale within which to operate, any choice implies the definition of boundaries excluding people living beyond them. While this exclusion happens sometimes by design, it is more often due to self-exclusion: people living outside or faraway the project context might relinquish to join the Living Lab either because it takes too much of an effort to go to the locations where the Living Lab meetings are held, or because – though they might be impacted by the project – they do not feel immediately concerned.

This constraint represents also a barrier to successful upscaling of the Living Lab, as replicating pilot projects in the broader urban area can be prevented because generated knowledge is very much related to the specific context of the Living Lab or because the whole Living Lab process only focused on the pilot project, neglecting or forgetting the effects beyond its boundaries, namely lacking a system perspective.

To address this constraint, one should adopt a systemic approach and consider that exclusion based on participant residence can be either a matter of logistic, or of personal concern with the stakes of the Living Lab, or both. In both cases, it is important to reflect on desired outcomes and apply stakeholder analysis and requirement analysis tools to identify potential types of exclusion and adequate coping strategies. In other words, this implies a thorough reflection on the multiple scales relevant to the Living Lab and on the actors that might be included/excluded at all scales. In the former case, adequate logistic arrangements can help to minimize exclusion. Living Lab meetings can be convened at different locations, to target different audiences.

One might in fact opt for going to the people, instead of waiting for the people to come. In the latter case, a constant outreach effort might be necessary. This includes both communicating the Living Lab purposes, but also adapting them and adjusting the frame. Overall, constantly negotiating with participants and potential participants the objectives and the frame of the Living Labs can be particularly helpful in defining a shared vision, thereby increasing motivations and buy in of a broader audience. Organizers, in particular, need to estimate and take into account projects' indirect and cross-scale effects, also outside the boundary of analysis. To adequately cope with them and anticipate any negative impact, they also need to actively engage with stakeholders of the broader urban context that might be affected by the Living Lab or by an upscaled version of its results.

In the Brussels Living Lab, the citizens' place of residence was one of the most solid barriers to broad inclusion. In particular, the city is characterized by a great inflow of workers commuting in and out the city from the metropolitan area. These commuters are immediately impacted by air pollution in the city, and largely contribute to it. At the same time – with some exceptions – the Living Lab failed to include them in the activities because of lack of time and resources to identify suitable locations at the urban periphery, and because of their relatively lower concern for the issue at stake (i.e. widespread perception that suburban living is less impacted by air pollution).

Given its main focus (i.e. air pollution), the Brussels Living Lab was characterized by the overlapping presence of multiple scales. To minimize exclusion based on participants' place of residence, different arrangements were made. To begin with, the Living Lab ateliers were held in different locations, depending on the participants' place of residence and employment. In one case (group of parents of children at school age), the group was split in two, based on the location of the school, and the information between the groups was constantly being relayed by the Living Lab facilitators. These included places throughout the regional territory. In one case (EU officer citizen group), rather than building the group based on place of residence, it was built based on the shared place of work. To do so, meetings took place during office hour at the office location: this allowed for participation of people living in many different locations to interact around common questions. It also allowed to have a discussion on different scales: while it started from a concern about the air at place of work, it soon included the commute, and finally their place of residence.

Despite the outreaching efforts, the Living Lab was eventually not successful in including participants from all neighborhoods of the region, nor participants living outside of the regional borders. To complement for this shortcoming, constant efforts of networking and coordination with other organizations were made, to share good practices and lessons from the Living Lab: by experience sharing with organizations in nearby cities, the conditions were created for replication in other contexts.

In Maastricht, instead, although the station area was of main concern, the visioning assessment Living Lab experiment initially focused on the city of Maastricht as a whole. Later on, the scope of the visioning exercise was narrowed, and participants were specifically asked to consider implications for the station area. Also, the stakeholder analysis identified people from different areas (residents of city center, of outer districts, commuters) as relevant stakeholders for the vision of Maastricht, and these actively participated. This helped to include effects on other areas than the station area, hence anticipating this constraint.

3.4 Existing power structures are reproduced inside the Living Lab

One fundamental aim of LLs is to establish a democratic structure that guarantees that every voice is heard and taken into account. However, in practice, instead of achieving real participation, various circumstances can lead to mere reproductions of the power structures already existing in real life. This could be the result of deliberate management in the LL, if run as an alibi activity. Or, LL organizers might not be aware of the heterogeneity of stakeholders and precautions needed to provide any group with equal opportunities.

To avoid reproducing existing power structures, first these need to be assessed by carrying out a group dynamics analysis, aimed at understanding group structure and leadership relations among group members.

Particularly, it is important to identify any dominant position among Living Lab participants, which could be due to already existing institutional roles, such as political responsibilities, lobbying or expertise. If people in such positions attend Living Lab activities, their ideas should be given no more attention than those of the other citizens without a leading societal role.

The Living Lab organizers have then to design a communication and management strategy to address all identified target groups, applying tailor-made methods for each of them, and adopting proper facilitation methods, aimed at guaranteeing that any voice can be heard. To ensure fair and equal participation, flexibility in the use of methods is a key requirement (e.g. not only conversation or only ICT tools). Inviting people at various levels and occasions and building trust and social cohesion plays an important role for a long-term success of a Living Lab. Organizers should facilitate development of activities along different tracks and allow each group to adapt to their speed of progress: equal opportunities are often the result of different – not identical – processes. In general, group facilitation techniques help guarantee that everybody is engaged and contribute to a good learning and planning process.

Next to the methodology, also the locations should contribute to setting a plain ground. For example, if city representatives actively participate in Living Lab activities, meeting at the city hall might indirectly reinforce existing power structures, involuntary putting hosts in a dominant position. Meeting in places such as schools, or maybe changing locations over time, helps counter-balancing existing power structures.

For example, the City of Graz aimed to take action in a district with challenging circumstances: high proportion of migrants, various cultures and ethnics, education levels and incomes below average. Reaching out to marginalized groups such as migrants, elderly people and children turned out to be difficult. At events organized by the Living Lab the people who showed up represented an incomplete sample of the actual target group. Even more so, a couple of persons repeatedly “sabotaged” events by excessively raising their voices and acting as opinion leaders.

The Living Lab in Graz involved a lot of stakeholders including residents, shop owners, bus operators, city entities and politicians. All of them filled out certain roles that contained different levels of power. The Living Lab organizers aimed to blur the borders between them enabling each person to participate equally. This was achieved by offering different formats of Living Lab activities: online questionnaires, workshops, social safaris, mental maps, etc. By repeatedly offering possibilities for stakeholders to participate and actively approaching them over an extended period of time also marginalized social groups (e.g. migrants) were included. Locations of events were carefully selected. In particular, a city district office was installed next to Griesplatz and was used as a neutral place for diverse activities throughout the whole project duration, complemented by outdoor activities in the district, literally bringing the Living Lab to the people. These measures created awareness for the Living Lab and social cohesion among the people involved.

In Maastricht, instead, the Living lab was run by the local university, i.e. a relative outsider. They arranged the invitations and facilitation of the visioning workshops, whilst treating the municipality as just one of the six stakeholder groups (others were: entrepreneurs, mobility operators, and three types of residents/travelers). All groups made their own vision and these were presented and discussed as equivalent outputs. A facilitator was present at each of the six tables to manage the discussion among very different types of people and make sure everyone was included in the discussion. In the post-interviews all participants stressed they felt they could express themselves well. The municipality enjoyed their freer role as participant and not being the facilitator. No one mentioned (s)he felt overruled by another group.

3.5 The Living Lab’s potential for learning is underexploited

Some stakeholders tend to reduce Living Labs to pilot project “to try out something new”, without an agenda on what exactly they like to learn. Although the label of Living Lab is used and the importance of learning is acknowledged, local authorities taking part in such bottom-up experiences may not fully recognize opportunities offered by Living Labs, thus neglecting to systematically assess the process, to improve their

future work. Performing structured evaluations and drawing lessons from Living Lab activities would instead allow them to get a broad understanding of specific innovation processes, including their implications and consequences, thus supporting diffusion of the innovation across spatial scales.

Often, local authorities lack the farsightedness and political will to perform explicit monitoring of the lessons learnt throughout the process since this would imply accepting the potential of shared (stakeholder) knowledge and could imply challenging the *status-quo* system.

When single Living Lab participants draw their assessments and conclusions, they often lack a comprehensive view of the process, and therefore no comprehensive knowledge is generated and the lessons learnt are partial or biased. If no single actor has an overview of all options, mechanisms and impacts emerged during Living Lab activities, limited transfer of learning is possible to future users, precluding upscaling.

Explicit comprehensive learning strategies are needed, including a learning agenda (i.e. a co-created set of learning goals), capable of capturing and monitoring knowledge creation and transferring it to the engaged actors, in order to empower them and supporting the transfer of lessons to other contexts. Living Lab managers should first formulate the learning goals, understand who has to be involved in learning, with respect to the final goal of upscaling Living Lab outcomes, and then make sure that the experiments are designed in such a way as to answer the learning goals. In other terms, this means developing a strategy to favour collective knowledge co-production.

To this purpose, first goals and ambitions of each actor need to be understood. Then, period reflection sessions can help to monitor the learning process. Especially people-to-people real-life interactions (i.e. physical meetings) make learning more rewarding and comprehensive to all and also ensure tacit knowledge to emerge.

For example, the Lab in Bellinzona was a pilot project, run on a voluntary, politically non-binding base. On the one hand, this favored acceptance of the Living Lab approach by the City, but on the other hand it made also responsibilities and commitment by the City to contribute to the participatory knowledge-sharing process less pressing. This made the process of capitalizing on the “lessons-learnt” from the Living Lab and integrating them into the City’s policies more difficult. Thus, a learning strategy was explicitly designed, with the aim of monitoring knowledge co-created within the Living Lab. This implied analyzing the project’s impacts according to a multi-criteria framework, assessing the level of engagement and satisfaction by Living Lab participants and reporting and communication of results, both internally to all actors involved, as well as externally, through local media.

Similar activities were also planned for the period following the launch of the app to the whole population: regular statistics regarding app use and its effect on local mobility (who, when, how, how much, etc.) were envisioned. Special attention was dedicated to avoiding “unbiased and neutral” assessment by external experts driving a one-way learning process, by defining “their problem”, providing “their knowledge and technology”, and preparing “their solutions”. Therefore, such statistics would at first be summarized within traditional report documents, though they were planned to be publicly made available, within an online dashboard, showing anonymized key indicators, data and maps, and therefore also fostering a public debate on the future of local mobility and land development.

To further avoid a traditional “expert-driven” learning process, a user-centered approach to learning was adopted, and focus of the Living Lab was put on co-creation activities themselves, through the co-design of the persuasive app. In particular, during Living Lab meetings inclusive participatory techniques were adopted (division in small groups, favor round-robin interactions, voting, short discussions for different topics, ecc.), to better stimulate the participation and knowledge-sharing of all the different personalities present in a heterogeneous group of participants. Results of a final evaluation survey were planned to be openly shared with all Living Lab participants, in order to attract their further feedback and comments. Overall, such an

approach was expected to help increasing intrinsic motivation, enduring participation and learning and knowledge-sharing between participants.

In Maastricht the Living Lab consisted of two physical meeting sessions with the stakeholders, with a combination of plenary meeting and sub-group meetings. The stakeholder knowledge was captured by asking them to make their vision for 2040 explicit in the first session. In the second session, they learned about each other's visions, they received reflections from practitioners about their vision (including implications on cost, environmental quality and accessibility) and they received visualizations of their vision. Possible adaptation of the visions they thus decided to introduce were monitored. The expression of the visions in the first round nicely mapped a diversity of stakeholder views on mobility in the future. However, in the second round most groups stuck to their vision of the first round. Only the urban planners (i.e. the municipality) adapted their vision, mostly based on feedback from practitioners. This lack of learning could be because:

- the groups were quite strongly convinced of their vision developed in the first round, with changes only likely on longer time frames (than four weeks);
- the format of feedback on their visions was not sufficiently "tailor-made" to be absorbed by the participants.

3.6 The Living Lab is disconnected from broader societal debate

Urban Living Labs are forms of societal experiments that take place in real life conditions. While they can and should have an innovative flavor, they will successfully scale up only through existing windows of opportunity. If an experiment is designed as if it was to take place in a vacuum, disregarding the social, economic, cultural and political conjuncture, or if the external conditions change (the windows of opportunity close), the Living Lab is unlikely to scale up.

In such cases of "disconnected Living Labs", even though Living Lab outcomes are positively assessed by participants and aligned with original plans and expectations, the broader public is unlikely to share the Living Lab's objectives, understand and replicate its methods, and to find it relevant in addressing current priorities.

Under such shifts in policy windows, instead of proactively supporting upscaling of Living Lab outcomes, decision-makers might adopt a "wait-and-see" attitude, maybe not opposing the Lab launch and management, but intentionally avoiding to develop and implement any strategy specifically designed to favor the active diffusion of its results.

A Living Lab should be designed and implemented with great care for the local conjuncture. No immediate replication of Living Lab examples of best practices is likely to be successful if it is not adequately customized and adapted to changing conditions in the outside social and political agenda. This includes broader socio-economic, cultural and political considerations, but also ensuring links with the existing public debate, with what a community considers to be its priorities, and what is considered to be feasible by stakeholders.

Efforts to connect the Living Lab with the broader societal developments need to be done while designing the Living Lab, but also throughout its development. This requires a degree of flexibility and adaptability to changing external conditions, involving – when needed – adjustments and re-framing.

In particular, what can reasonably be scaled up should be identified since the very beginning of Living Lab activities and an upscaling strategy should be designed, together with the relevant communication and dissemination measures. Consistently, such a strategy should be kept flexible and open to the evolution of activities in the Living Lab as well as the external dynamics, and tailored to the specific context where Living Lab results are to be upscaled, by choosing the right channels, time and language.

In this context, an important precondition is to place citizens at the core of the process, as they are likely to have the most detailed understanding of the local context. In addition, it also requires to actively coordinate with other societal developments and initiatives related to the content of the Living Lab. This can be done at different levels ranging from simple information sharing, to building bridges and identify possibilities of

cooperation. As a corollary, ensuring the Living Lab is well linked to the broader societal debate, is also a way to ensure Living Lab participants feel recognized, thereby strengthening internal dynamics and empowering them. In turn, this further favors their active engagement in the diffusion of Living Lab outcomes and the implementation of the upscaling strategy.

For example, in Brussels, Living Lab activities have been coordinated from the onset with the broader citizen movement for a cleaner air in the city. To begin with, an initiative for "Smart Mobility" was immediately reframed by the local partners in order to put air quality and people health at the core. Adopting the right problematization approach favored raising commitment among those citizens who would not have voluntarily engaged in a mobility-related process, perceiving the topic as outside their own priorities. Instead, they genuinely and very proactively engaged in an air pollution-related process, since they cared very much for their health, and especially the one of their kids.

From very early on, in addition, the Living Lab initiators (the local university and a citizen movement) engaged in an open dialogue with all stakeholders active on the topic, contributing to establishing both a platform for discussion for all civic movements active for better air, and a network of researchers working on air quality and citizen science. Both efforts contributed to reaching out to a broad audience and ensure that the Living Lab was immediately part of a broader discussion.

Throughout the process, finally, the Living Lab was fully co-conducted by the project partners and by the various groups who decided to join. While the broad structure was proposed by the organizer (i.e. getting to know pollution, letting others know), different groups decided to fill it in in different ways, for example by raising different questions (e.g. the level of pollution in school, while commuting, or throughout the day) and identifying different communication forms (i.e. a citizens science paper, a public conference with experts, or creative ateliers).

In Maastricht, instead, Living Lab organizers decided to run a visioning assessment experiment to anticipate this constraint on upscaling smart-intermodality. Being well aware of the fact that the Municipality was one of the most relevant stakeholders in this process, Living Lab managers first waited about a year until the topic achieved visibility in the societal debate, thus leading the Municipality to accept participating in it and get interested in its results. Then, by organizing the Living Lab around visioning in the far future (2040) and inviting stakeholders relevant for urban mobility, Living Lab managers sought to make the lessons relevant for the coming years – not just the project plan for the station area that was due in July 2018. This way, they manage to nourish and enrich the ongoing debate on the creation of shared visions for the future.

Finally, in Graz the Living Lab was initiated by the city government which aimed to improve the quality of life in the traffic-dominated area of Griesplatz. The city's Executive Directorate for Urban Planning was responsible for organizing a participatory process around a Living Lab. The concept was well prepared and applied by the Living Lab team. However, after one year, priorities in the city government changed towards other projects and the future of the Griesplatz was uncertain. The Living Lab continued but it was difficult to maintain a clear line in communication that would not promise too much but still encourage citizens to be active in the lab. Demonstrating flexibility, the city district office, where the lab was based, was tunred into an exhibition room to show all collected results and ideas so far. As a direct reaction based on feedback from the exhibition, the lab organizers facilitated an additional social safari dedicated to the local economy in the district of Gries. In their overall communication strategy that comprised various media and channels they emphasized that "no idea is lost" and that everything would feed into the public architectural competition after the end of the Living Lab.

3.7 The Living Lab consensus is not reflected in policy and society

In some contexts or for some specific topics, outcomes of the Lab might not find consensus beyond Living Lab participants. Even when the need for intervention on a specific topic is well acknowledged by the population and the interested parties, and addressed as a priority of the social and political agenda, persistence of conflicts might preclude reaching an agreement on a specific solution.

Conflicts might appear both within the Living Lab itself, thus leading to no shared outcomes, or outside, when trying to upscale the shared Living Lab outcomes across the city. In both cases, Living Lab outcomes would lack support or agreement by the population, as well as of the political majority needed to activate the envisioned upscaling measures.

Living Labs should open to participation as much and as early as possible, by activating participatory processes already from the development of visions, selection of methodologies and identification of the actions to be performed. Including natural beneficiaries of the Living Lab outcome (cities, regions) will favour later political agreement on the outcome. Also, a "participation policy" (e.g. guidelines for participation) at city level can support citizen involvement in the first place and give structure to ongoing processes.

Further, a stakeholder analysis should be performed at the start of Living Lab activities, and regularly updated whenever external conditions change, in order to avoid the exclusion of any stakeholder group. Participatory processes should then be designed as to favor emergence of any conflicting goals among Living Lab participants, first of all, and then among Living Lab participants and any external stakeholder groups not actively engaged in Living Lab activities.

Management of conflicting goals could then be performed by means of multi-criteria decision-making techniques, which support Living Lab participants and policy-makers towards a transparent and thoughtful choice among different goals. In doing so, community-level benefits should always be emphasized and already existing networks and coalitions between groups of stakeholders should be exploited. Relying on a multi-criteria approach might also favor the creation of new and unexpected alliances between groups of stakeholders.

Finally, also building relationships with successful initiatives already developed by other actors would be beneficial. In case these strategies fail in conflict resolution within the Living Lab, political authorities will be called to make decisions.

In Maastricht, Living Lab managers invited all those stakeholders that are relevant for urban mobility to attend the Living Lab and organized activites in a first session around visioning in the far future (2040). This was meant to help make the information emerging relevant for the coming decade– not just the project plan for the station area that was due in July 2018. This approach helped discussion not to get stuck on current conflicting issues, favouring instead a creative and less conflictual co-creation of visions for the future. In this context, by asking partcipants to draw their vision for 2040, Living Lab manageres were also able to make the diversity of stakeholder perspectives explicit. In the second session, participating stakeholders learned about each other's visions, they received an assessment from practitioners about their vision on multiple criteria: implications on cost, environmental quality and accessibility. Showing the pros and cons of each vision was helpful to prevent one stakeholder hijacking the debate, but it didn't lead to overall consensus either. Although final convergence of visions was not achieved, involved stakeholders learned arguments to better understand each other's point of view.

In Bellinzona discussion on the future of mobility and land use planning in general is perceived as a very conflictual topic, with highly contrasting positions among stakeholders and an equally heated societal debate, as shown by the amount of municipal referendum processes activated in the last years against decisions made by local authorities.

In such a context, local authorities would have not accepted to launch and support a living lab shared with citizens and dealing with scenario-building for the future of mobility in Bellinzona. However, Living Labs can provide significant benefits exactly in such contexts, where achieving consensus is critical. Therefore, to start activating a Living Lab process, Living Lab initiators opted to first focus on a practical, technologically-oriented topic, such as the smartphone app development. Perceived as a low-conflict topic, it was easily supported. Scenario-building activities were instead introduced later on, capitalizing on the fact that a multi-stakeholder process had already been activated for the development and test of the app. At that stage, it was easier to ask

Living Lab participants what they would have needed to make mobility more sustainable in Bellinzona, thus spontaneously upscaling discussion to future mobility scenarios and policy-making. This way, highly conflicting discussions were spontaneously introduced in the Living Lab.

3.8 Stakeholders and institutions are highly fragmented

Usually a series of different stakeholder networks and institutions are involved and need to interact with one another to pursue management and development of urban processes. Acknowledging this interdependency, however, coordination between these many actors is often difficult, fragmented, and may lack horizontal cooperation among the different sectors.

Fragmentation may be due to different reasons: a given legislative or hierarchical framework, lack of trust and/or communication, financial constraints, poor knowledge or strategic vision. Particularly, this phenomenon is detectable at the institutional level itself. It is not uncommon to experience vertical fragmentation in units and departments ("silo compartments") within and between public administration institutions. Consequently, even when policy-makers embrace a Living Lab participatory approach, its outcomes might suffer from limited diffusion due to fragmented institutional arrangements, which hinder clear distribution of responsibilities and effective cooperation between involved city departments. This makes both horizontal and vertical dissemination of results rather difficult. As such, nurturing the interaction between different stakeholders and institutions is an important key to success for Living Lab processes.

Transparency and collaboration between administrative units and organizations should be actively fostered from the very beginning to create the atmosphere of "a common endeavor". To overcome problems of fragmentation, it is essential to acknowledge interdependency between different actors, institutions, units and departments and to strengthen and reinforce these networks and their specific roles. In addition, it might be necessary to build a comprehensive vision outside the administration, by putting the wished-for changes of citizens at the heart of the debate and then address specific issues to specific institutions

In Maastricht one constraint is high institutional fragmentation, in the sense that key stakeholders (residents, commuters, businesses) normally do not meet and discuss on these matters in an organized way, although probably having very different views on this. Typically, the municipality bilaterally speaks to business actors and citizens for policy input. The visioning assessment experiment was designed to help anticipating this constraint on upscaling smart inter-modality. In two sessions the stakeholders came together in both a plenary meeting and sub-group meetings, and the diverse visions were developed, presented, discussed, assessed, re-developed in an open and equivalent way.

In the post-interviews all participants stressed they felt they could express themselves well and freely. About half of the participants said they had heard some interesting points from other participants. At the same time, business actors found the residents "too ignorant for such a visioning exercise" and residents' visions "just dreams". This looks like a type of institutional fragmentation through a classic framing of "experts" and "non-experts". A few participants remarked they liked the format of separate stakeholder groups to first work with peers, before a larger discussion with a mix of stakeholders, because it helps to better structure arguments.

The Living Lab was successful to bring the different stakeholders in a dialogue amidst institutional fragmentation, by showing all participants the pros and cons of their vision. Although the experiment did not show convergence of visions, the municipality learned more arguments for a larger car-free area in the city center. Possibly, two sessions are not sufficient to enable convergence of visions, and a follow-up is needed.

In Bellinzona, for example, administrative organization at the City level was the main obstacle preventing diffusion of the LL approach to other fields than mobility and institutionalization of new governance practices. The strategy to overcome 'silo compartments' barrier was to actively engage councillors and civil servants, instead of waiting for them to spontaneously express interest in process or results. Thus, it was planned to invite them to attend LL meetings, in order to personally experience how they work and the effort needed, and guess their potential in addressing complex or conflictual topics.

In the end, the envisioned strategy was not put into practice, mainly due to 'low institutional receptiveness' (see Section 10). However, this gap will at least partially be closed, by inviting councillors and civil servants to a workshop aimed at presenting the approach and discussing its opportunities and limitations, as emerged from final assessment of the whole LL process.

3.9 The urban assemblage is sticky and locked-in

Changes in urban contexts are sometimes tricky to achieve due to technical, infrastructural, legal or financial interlinkages. In fact, frequently obduracy to urban assemblages can occur, due to persisting infrastructure, long-term contracts or legal "lock-ins". Decisions need to be taken by multiple stakeholders or entities on a political level and cannot be attached to the outcome of a participatory process only. Depending on the specific situation in a city, several obstacles might exist at the same time which makes it difficult for Living Lab activities to take effect.

To find out about possible barriers for a Living Lab's objective, a dialogue with relevant actors has to be initiated and the connections between them have to be made visible. By developing future visions with stakeholders and crucial decision-makers, the potential of more structural changes can be highlighted. Also, local actors can be empowered by teaming up with supra-urban actors, such as municipalities with provinces or local NGOs with their national counterpart (scale jumping). They might also assume different roles, e.g. as decision-maker and personally concerned citizen at the same time.

If still circumstances do not allow big changes, a Living Lab should focus on what is actually possible. Also providing legal flexibility at least for a limited amount of time to experiment with temporary measures can be useful (e.g. permission for markets). Communication strategy and methodology have to be designed accordingly, in order to avoid wrong expectations among Living Lab participants. Finally, also collecting ideas and concepts to apply in future when circumstances will allow it, can be a strategy.

For example, the Living Lab in Graz aimed to improve the quality of life in the traffic-dominated area of Griesplatz through infrastructural changes. As a consequence of its purpose as traffic hub, not all infrastructural elements could be replaced according to citizens' desires. In addition, long-term contracts with bus operators forced the organizers to wait. Living Lab participants started to feel that elaborated discussions ended up in little outcome. The organizers remained flexible and changed their strategy by focusing on short- and middle-term measures. In order to deliver visible outcomes of the participatory process, they provided small and quick improvements for the Griesplatz area such as a bike lane, a new lightening system in one street, enlargement of a public space and street furniture. Also temporary awareness-raising measures were taken, e.g. organizing a pop-up market.They released press articles ensuring that "no idea is lost". That means that ideas created in the Living Lab will be remembered and put into place at a later stage in the course of a public architectural competition, once the bus contracts had expired.

In Maastricht one constraint on upscaling inter-modality is the "urban assemblage" around car use and parking in the inner-city, which is rather obdurate. This refers to the interlinking of traffic circulation plans that are adapted to the operation of the many underground parking garages; visitors expecting to be able to park in the center; shop owners who like cars passing by their stores; urban planners' expertise around developing over- and underground parking; and operational contracts (mostly running until 2032) of the garages, also reflecting significant financial interests. This interlocking bundle of social and technical elements tends to resist change of the whole assemblage, only allowing "add-ons" that leave the rest in place.

The visioning assessment experiment was designed by considering a year in the further future, 2040, in order to move beyond the interests and structures of today, and to allow envisioning more structural change. The experiment found that there are broadly two different future visions:

- entrepreneurs and mobility operators envisioned incremental development toward more underground parking refining and strengthening the current urban assemblage;

- on the other hand, residents and commuters envisioned structural change towards an (almost) car-free city center. The group of urban planners had a compromise in the middle. The urban planners did learn that there is more support for a larger car-free zone than they thought, and in a second session they reduced urban parking. This was also based on the reflections that showed the ineffectiveness of park and ride (P+R) projects, without reducing urban parking.

All in all, the experiment (making integrated visions for mobility explicit, including the assessment and reflections provided on this), was somewhat successful to highlight to all stakeholders the pros and cons of basically two types of visions, but it didn't bring the two types closer to each other. There was some evidence that the municipality has learned more arguments for a larger car-free area in the city center.

3.10 The Living Lab meets low institutional receptiveness

Sometimes barriers might be due to the lack of open-mindedness and receptiveness by institutions and policy-makers. Institutions may not show (or indeed not have) real commitment for a Living Lab approach. Sometimes barriers might be due to the lack of open-mindedness and receptiveness by institutions involved in Living Lab activities. Local governments, as well as other actors involved in the process, including NGOs, universities and companies, might in fact be unfamiliar with, or open to, co-creation approaches, believing that interaction with other stakeholders adds unneeded complexity to policy development.

Low receptive institutional contexts tend to favor expert-driven ways of thinking and agreement with powerful lobbies, in traditional Decide-Announce-Defend (DAD) approaches. In such contexts, even if Living Labs are activated and developed, they might lack full support of key institutions, who might support them as a façade tactic, indeed being unwilling to implement their outcomes.

To cope with such constraints, early inclusion of policy-makers should be sought for. Provided that activities in the Living Lab are adequately designed, namely that Living Lab organizers show genuine commitment and give voice, role and responsibility to diverse groups of citizens, civil society organizations and experts, policy-makers and institutions might start appreciating the approach and its benefits. Then, it would be a matter of repetition. Once multiple successful pilot processes are carried out, institutions and policy-makers would embrace approaches and processes, supporting their outcome.

If instead policy-makers and institutions do not accept invitations to engage in Living Lab practices, one should try to bring Living Lab outcomes into traditional channels of democratic representation, fostering a public discussion with and within elected political representatives.

For example, the City of Bellinzona was formally owning the Living Lab process; however, due to the lack of familiarity with participatory approaches, they were not fully aware of the potential of participatory Living Lab projects in supporting policy development. Therefore, they lacked leadership and predominantly relied on advice and superintendence by the local university. They mainly perceived the Living Lab as a technology innovation testing ground: a single, small-scale, closed and controlled process, aimed at developing and evaluating the mobile app prior to its rollout at city-level.

In particular, local decision-makers tended to cling to authoritative governance styles, rather than opening up to more consultative, cooperative or even facilitative approaches, mainly due to the fear of losing formal power and responsibility on the decision. Their main concern was to avoid possible financial and personal drawbacks and, inadvertently or not, the tendency was to keep the Living Lab in the policy periphery. However, leadership can only be learnt through experience: providing first-hand opportunities of experiencing public participation processes is a first start. Thus, researchers involved in Living Lab organization tried to promote a new political culture by ensuring the presence and active participation of representatives of the Municipality (civil servants, politicians) in Living Lab meetings. This helped getting local authorities and decision-makers gradually acquainted with the concept that Living Labs may represent a valuable learning-by-doing tool and a constructive and enriching means for reflection on practices or policy.

Also, to favor Living Lab acceptance by decision-makers, the strategy was to focus at first on an app development: practical and technologically oriented, this was perceived as a low-conflict topic and therefore easily supported. Later on, capitalizing on the actor- and context-dependent knowledge created while Living Lab participants were testing the app and concretely experiencing new mobility behaviors, discussion in the Living Lab was upscaled to policy-related topics regarding future mobility scenarios ("What would we need to make mobility more sustainable in Bellinzona?"). This way, also potentially scaring and far-reaching discussions were spontaneously introduced in the Living Lab with the support of the institutions.

In Maastricht, although found cumbersome, there is already experience and (at least among part of the civil servants) appreciation for more Living Lab-type of approaches. The tool of visioning and participatory visioning is also applied in Maastricht, although not very often. One constraint for further use is that not the municipality, but stakeholders like the national railways and local businesses, prefer to exclude citizen groups.

A further constraint on upscaling of Living Lab approaches was anticipated by refining specific details in the experiment in Maastricht, most notably:

- separate stakeholder groups to first work with people with similar perspective, before a larger discussion with a mix of stakeholders, helping to better structure the arguments;
- build further on output of the first session in the second one, whilst receiving reflections;
- include the municipality as one of the participants since the very beginning.

These characteristics were indeed new and appreciated by civil servants, because they helped them to participate in an equal, more fruitful way. Normally, when the municipality facilitates participatory sessions, they either tend to be under pressure and criticism due to policies in the past (raising frustration at the side of citizens and others), or they risk (at least the impression of) "reproducing existing power structures" (see Section 3.4). Therefore, civil servants are now open for wider application in other policy fields.

During the first year of the Brussels Living Lab, different attempts were made by Cosmopolis and BRAL (respectively, the local university and a city movement) to engage with regional governmental institutions responsible for mobility, environment and smart city. These included various meetings with staff of the cabinet's and of the administration, and official letters with different proposals for cooperation and joint activities within the Living Lab. The institutions did not answer to any of the proposals, for reasons that, at this point, we could only speculate on. On this basis, it was decided to approach institutions through a different channel: via the political production of the Brussels movement for cleaner air. Rather than approaching directly the regional institutions, BRAL and Cosmopolis contributed to facilitate a dialogue between citizen groups and political parties in the context of the local and regional elections, thereby scaling up the Living Lab via the consolidated practices of democratic representation. This was done, for instance, through, a process of citizen lobby in view of the regional election (series of facilitated dialogues between citizens groups and parties' representatives), and of a large event on the topic of citizen, science, and air pollution.

4. Conclusions

In this report we summarized the lessons learnt from action research in four 'Smart City Living Labs' in the field of mobility. In particular we aimed at understanding which factors typically hinder effective social inclusion and upscaling possibilities, thus conditioning Living Lab's overall impacts. We identified ten typical constraints affecting upscaling inclusive Living Lab experiments, and then developed 'smarter' ways to anticipate them, in both design and management of Living Lab activities. Finally, we then practically tested such smarter ways to anticipate constraints in the four cities involved in the SmarterLabs project. The insights obtained from these experiences (both examples of success and of failure, depending on the constraint, on the context and on the topic under discussion), allowed us to identify a number of reliable and effective ways to anticipate them.

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